CITY OF ROSEBURG

TRANSPORTATION SYSTEM PLAN

Volume 2

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ACKNOWLEDGEMENTS

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Roseburg TSP - Appendix

MEMORANDUM

DATE: **November 30, 2016**

SUBJECT: Roseburg Transportation System Plan Update
DRAFT Public Involvement Program (PIP)

Introduction

This Public Involvement Program (PIP) memorandum will guide stakeholder and public involvement during the Roseburg Transportation System Plan (TSP) update. The PIP describes fundamental objectives and activities that the City of Roseburg, the consultant team, and other agency staff will implement in order to ensure that interested parties have adequate opportunities to provide meaningful input to the TSP. The following describes the fundamental purpose and objectives for involvement, specific outreach mechanisms, and how the PIP will be integrated throughout the TSP process.

Identifying Stakeholders: Who is Involved

The public and stakeholder involvement efforts seek participation of all potentially affected and/or interested individuals, communities, and organizations. To date, the Roseburg TSP team has identified a number of stakeholders and a number of types and groups of stakeholders groups to engage in the process.

Project Advisory Committee

A Project Advisory Committee (PAC) will oversee the development of the TSP. The PAC members were carefully selected to ensure representation from all community transportation users, organizations and stakeholders. The PAC consists of the following individuals each representing a community group or agency with vested interest in the success of our local transportation system:

Denny Austin	Roseburg Public Schools
Cheryl Cheas	Umpqua Community Action Network – UTRANS
Merten Bangemann-Johnson	NeighborWorks Umpqua
Jeff Jackson	Bike/Walk Roseburg
Kristi Hagey	Umpqua Valley DisAbiliities
Doug Feldcamp	Umpqua Dairy – Freight
Jenny Carloni	League of Women Voters
David Price	CHI Mercy Hospital
Bob Dannenhoffer	Douglas County Public Health
Marjan Coester	Umpqua Community College
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Duane Haaland	Roseburg Planning Commission
Tim Allen	Roseburg Economic Development Commission
Stuart Leibowitz	Roseburg Public Works Commission
Tom Guevara, Jr.	Oregon Department of Transportation

Involvement Structure and Process

The City of Roseburg will involve the public and stakeholders primarily through a series of committee meetings and public meetings, in addition to the distribution of project information through a variety of media, including a project website.

Kick-off Teleconference

The kick-off teleconference provides an opportunity for the City, Agency Project Manager (APM), and PAC members to provide guidance to the Consultant on the Project schedule, tasks, meetings, milestones, deliverables, and messaging. An interactive tool (i.e., WebEx, Go To Meeting) may be desirable for the teleconference. The milestones will be determined during the teleconference in conjunction with the City and APM. The kick-off teleconference will also provide an opportunity for the City to finalize the project's PIP. The kick-off teleconference will provide an opportunity for the City/Agency to present information for use in later tasks and provide a summary of key spots in the Project area to the Consultant. Agency and City will arrange teleconference facilities, provide teleconference notification to attendees, and distribute summary teleconference materials.

Project Advisory Committee Meetings

The PAC will provide technical and policy guidance to Consultant throughout the Project. Additionally, they will represent the public perspective regarding the TSP. Consultant shall meet with the PAC three (3) times. Agency and City will arrange meeting facilities, provide meeting notification to PAC, and distribute meeting materials. A meeting schedule will be developed by the City, APM and Consultant after the Kick-Off meeting.

City may choose to hold additional meetings in advance of the established PAC meetings with the Consultant to compile comments on deliverables.

Public Meetings

Public outreach will consist of two (2) public meetings.

- **Public Meeting #1** will introduce the Project to the public and provide an opportunity to give input on existing and future conditions analysis.
- **Public Meeting #2** will provide members of the public an opportunity to review and provide input on proposed projects for the TSP.

Distribution and Review of Work Products

The City will email project work products directly to PAC members, and post them to the project website for access by the general public. TAC and PAC members will be able to comment directly through regular committee meetings. The general public will be able to comment during the public comment period at the end of PAC meetings, at public open houses, and through the project website.

Public Involvement Tools

These tools will be used in the PIP outreach:

- **Public Involvement Program** *(this document)*: This memorandum will guide stakeholder and public involvement during the Roseburg TSP. The PIP describes fundamental objectives and activities that the Project Management Team (PMT) will implement in order to ensure that interested parties have adequate opportunities to provide meaningful input to the TSP.

- **Comment Tracking Database** *(Ongoing)*: The PMT team will log all public comments, questions, and concerns, and respond to or coordinate a response when appropriate. The log will include comments from all sources, including emails, phone calls, web form submissions, and comments made during presentations and briefings with stakeholders.

- **Website** *(Ongoing)*: The project website will be the primary portal for information about the project. It includes: pages that describe TSP activities and events, the process timeline, and documents and materials. At any time, members of the public may submit comments through the project website's online commenting tool. City staff will receive comments, coordinate responses as needed, and track comments.

- **Interested Parties and Email Communications** *(Ongoing)*: The City will develop and maintain a list of interested parties who will receive meeting notices. The list will serve as the basis of targeted invitations to attend scheduled Community Meetings. The list will also provide information on affiliations and identify individuals related to Title VI and EJ requirements.

Study Team and Roles

The following are the key team members and their roles in the PIP:

City of Roseburg

City staff will oversee the PIP and take the presentation lead at all meetings, unless otherwise delegated to the Consultant. City staff is expected to provide guidance on the informational materials and graphics for the meetings and finalizing, printing, and distributing the draft materials provided by the consultant. City staff is primarily responsible for managing the PAC and comment tracking; creating and distributing news releases and stakeholder emails; and holding meetings and briefings with committees and groups. City staff is responsible for providing summaries at City Council and Planning Commission meetings and all meeting logistics.

Consultant Team

David Evans and Associates, Inc. (DEA) is the primary consultant and serves as the consultant project manager for the TSP. DEA provides overall project management, leads the overall work plan, and leads all technical tasks. DEA will review public involvement deliverables and make presentations to groups and committees involved in the TSP (as outlined previously). They will also track and manage public involvement activities, as public record for the project, and implement key many aspects of the public involvement program, particularly: facilitation of the three (3) PAC meetings and two (2) Public Open House meetings. DEA is responsible for preparing draft meeting agendas and informational materials and graphics.

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CITY OF ROSEBURG
TRANSPORTATION SYSTEM PLAN UPDATE

Technical Memorandum #1
(Task 3.3 – Goals and Objectives/Review of Plans & Policy)

Prepared for

City of Roseburg
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Prepared by

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APRIL 2017

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Attachment A: Plans and Policy

Project Overview

Purpose and Introduction

The City of Roseburg is located in southern Oregon on Interstate 5 (I-5) and serves as the county seat and regional center of Douglas County. The 2016 population estimate for Roseburg within the City limits was 22,820[1] and within the larger Urban Growth Boundary (UGB) area, the 2015 population estimate was 29,870[2]. The planning area includes all of the transportation facilities within the City's UGB.

The Transportation System Plan (TSP) serves as the Transportation Element of the City's Comprehensive Plan. It provides guidance and regulatory tools so that the City can develop its transportation system to meet community goals and aspirations through coordinated policies and planned improvements over the next 20 years. It also identifies planned transportation facilities in a manner consistent with the Transportation Planning Rule (OAR 660-012) and the Oregon Transportation Plan. More generally, the TSP helps to accomplish the following goals:

- Create a transportation system that helps make Roseburg a safer, more attractive, healthy and prosperous community.
- Assure adequate planned multimodal transportation facilities to support planned uses over the next 20 years;
- Provide certainty and predictability for improving public streets, county roads, state highways and other planned transportation improvements;
- Provide predictability for land development; and
- Help reduce the costs and maximize the efficiency of public spending on transportation facilities and services by coordinating land use and transportation decisions.

From a legal perspective, Oregon State law (Statewide Planning Goal 12, Transportation) requires that all Oregon communities prepare a transportation plan to address existing and future access and circulation needs of the community.

The transportation modes addressed in a TSP include:

Motor vehicles (autos, trucks/freight)	**Bicycles**	**Pedestrians**	**Public transportation**	**Other modes (rail, air, pipelines)**

Each of these modes will be addressed in separate chapters of the TSP, which will be developed during several months of extensive transportation planning and engineering analysis.

[1] Portland State University Estimate, 2016

[2] Coordinated Population Forecast for Douglas County, its Urban Growth Boundaries (UGB), and Area Outside UGBs 2015-2065, Portland State University Population Research Center, June 2015

The key steps to the plan development process are:

- Develop vision, goals and objectives
- Inventory transportation system and collect data
- Evaluate existing conditions
- Project future travel demand
- Identify transportation deficiencies and needs by mode
- Develop draft improvement strategies
- Develop preferred action plans
- Develop cost estimates and identify funding sources
- Finalize the TSP

A TSP kick-off meeting was held in December 2016 to introduce the Public Advisory Committee (PAC) to the TSP planning process and purpose. Throughout the plan process, there will be opportunities for citizens of Roseburg to comment upon and shape the emerging plan through public open house meetings. Additional opportunities for the public to provide input on the TSP are expected to take place after key project milestones are met and the City of Roseburg is hosting a website and online public forum for the project.

The Project Management Team (PMT) will meet throughout the project to provide technical review and comment on TSP work products; to provide local, regional, and state policy direction; and to accept or make recommendations on project deliverables. The PMT is responsible for ensuring that TSP activities are consistent with other planning efforts in the area.

Study Area

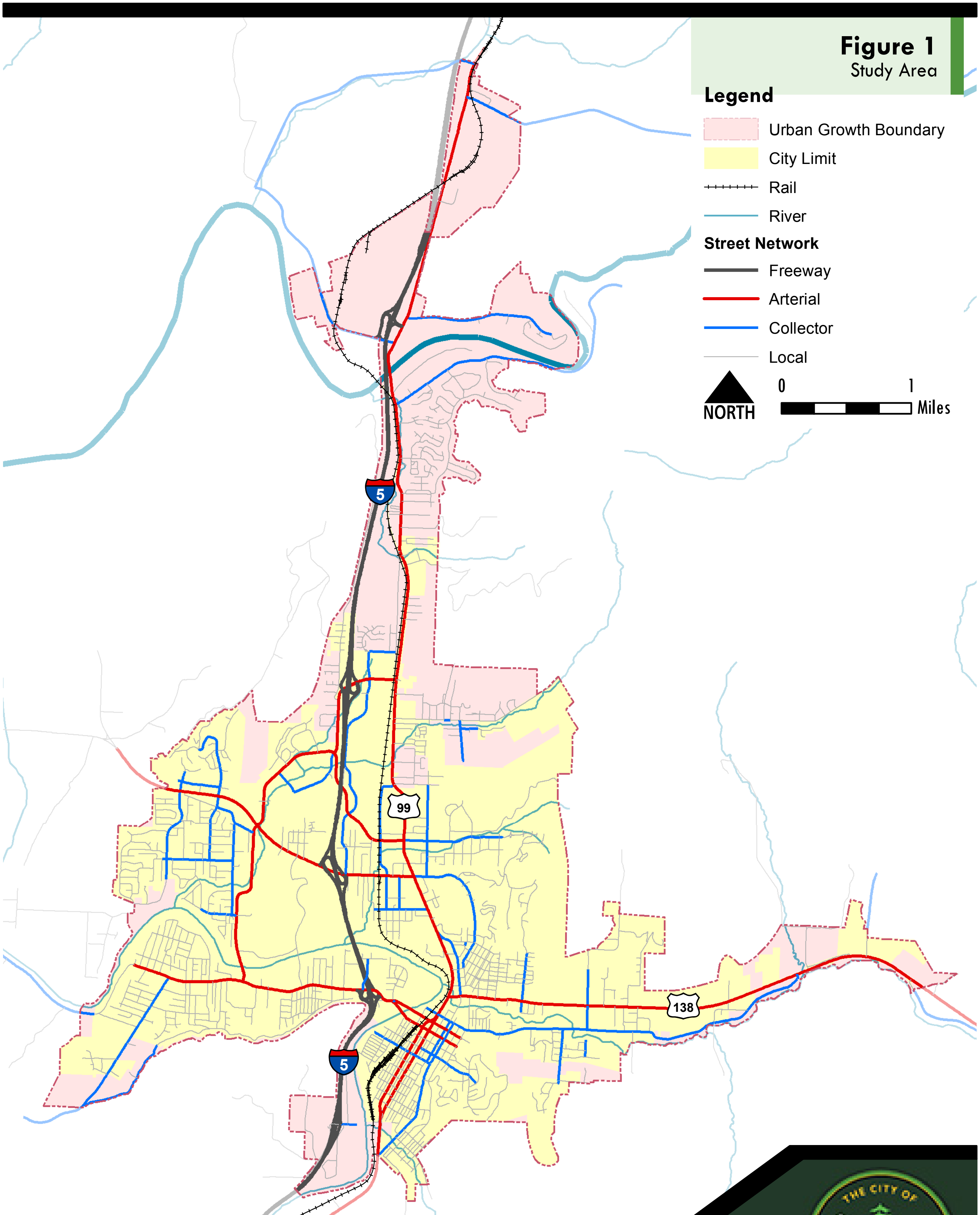
I-5 and the South Umpqua River bisect Roseburg. I-5 generally runs in a north-south direction through town and connects to OR 138E and Old Highway 99. The South Umpqua River generally runs east to west and south parallel to I-5 (see Figure 1). The proposed study area for the Roseburg TSP includes the area within the UGB. The street network and area development conform to extreme topological and riparian constraints.

There are five I-5 interchanges that serve Roseburg: Exits 123, 124, 125, 127 and 129. Old Highway 99 parallels I-5 through Roseburg's UGB and runs north/south through town. Old Highway 99 serves as a connection to I-5, OR 138, and to OR 42 southwest of Roseburg. OR 138E runs north/south as a shared route with I-5 from Sutherlin to Exit 124, east to Oak Avenue/Washington Avenue, north on Stephens Street, where it then runs east through town as Diamond Lake Boulevard and exits the UGB in the east. It connects to Old Highway 99 and I-5. OR-138E is a Freight Reduction Route subject to ORS 366.215(2), which prevents the permanent reduction in vehicle-carrying capacity.

The local street system in Roseburg largely consists of a two-way street grid system. Roseburg west of I-5 is predominantly residential, except for some concentrated commercial development on Garden Valley Boulevard, Stewart Parkway, and Harvard Avenue. The east side of Roseburg is the oldest part of the city, is a mix of residential and commercial areas, and houses the government center (county seat) with supporting offices.

Roseburg has east-west connectivity by way of several routes that cross the I-5 barrier. Roads such as Harvard Avenue, Garden Valley Boulevard, Edenbower Boulevard and Stewart Parkway allow traffic to navigate past the physical barrier of I-5. The multi-use path also provides an east-west connection for pedestrians and bicyclists under I-5 and a north-south crossing of the South Umpqua River.

Figure 1
Study Area



Why Should We Update the TSP?

There is significant rationale for updating the TSP from the current version. Since the adoption of the previous TSP, the City has experienced significant changes: increase in employment, population changes, shifting trends in travel choices, acute funding challenges, and outdated data sources including revised and state-approved 20-year population forecasts.

The current TSP project list is outdated, lacks findings of the Bicycle and Pedestrian Plan and is out of alignment with the current funding realities and current best practices. Revisiting the TSP project list through the lens of new financial parameters is essential.

Updating the TSP also provides an opportunity for the public to play a role in the development of the vision of their community and transportation system. Through the PAC and community events, the public can help shape the content, organization, and priorities of an updated plan. The City values the opportunity to be open and transparent, recognizing that successful public involvement leads to more sustainable decisions.

These reasons, in conjunction with the goals and objectives, will serve as a basis for the development and evaluation of concepts, and ultimately the selection of preferred improvements.

Goals and Objectives

This section revisits the current TSPS's goals and introduces the draft transportation-related goals and objectives that will be used to evaluate the Roseburg TSP. Development and implementation of the Roseburg TSP will be guided by a series of goals, policies and objectives. Once adopted they will become part of the City of Roseburg's Comprehensive Plan.

For consistency and in order to assist in interagency transportation plan coordination, this memorandum contains specific definitions:

> ***Goals*** are broad statements of philosophy that describe the hopes of the community for the future, as it relates to transportation. A goal may never be completely attainable, but it is used as a point towards which to strive. Pursuit of these statements underpins all of the Plan's objectives, policies and projects.
>
> ***Policies*** are statements adopted to provide a consistent course of action, moving the community towards attainment of its goals. ***Objectives*** are attainable targets that the community attempts to reach in striving to meet a goal. An objective may also be considered as an intermediate point that will help fulfill the overall goal.

Current TSP (2006) Goals

This section summarizes the goals and objectives as they were written for the current Roseburg TSP (2006). The goals provide context for how Roseburg had previously established the direction for their transportation vision. The 2006 goals will be used to revise the goals and objectives as part of the TSP update; the themes associated with each goal were pulled out and are emphasized below in yellow boxes.

The objectives developed for the current TSP will need to be revised; in their current form, they are inconsistent with the definition of an objective and many of the statements overlap other objectives or would be more appropriate as a policy statement.

Goal 1. Overall Transportation System

Provide a transportation system for the Roseburg planning area that is safe, efficient, and accessible

Safety, accessibility and reliability

A. Manage projected travel demand consistent with community, land use, environmental, economic, and livability goals.
B. Use the Transportation System Plan as the legal basis and policy foundation for decisions involving transportation issues.
C. Ensure that adequate access for all emergency services vehicles is provided throughout the City.
D. Promote transportation safety through a comprehensive program of engineering, education, and enforcement.
E. Enhance safety by prioritizing and mitigating high collision locations within the City.
F. Designate safe routes from residential areas to schools, and identify transportation improvements needed to ensure the safety of Roseburg's children.
G. Provide satisfactory levels of maintenance to the transportation system in order to preserve user safety, facility aesthetics, and the integrity of the system.
H. Maintain access management standards for streets consistent with city, county, and state requirements to reduce conflicts among vehicles, trucks, bicycles, and pedestrians.
I. The City shall regularly consult with pedestrian, cycling, and the disabled communities regarding transportation needs, plans, and improvements.

Goal 2. Enhanced Livability

Enhance the livability of Roseburg through the location and design of transportation facilities to be compatible with the characteristics of the built, social, and natural environment.

Environment, social, ADA and health

A. Enhance the livability of Roseburg through proper location and design of transportation facilities. Design streets, highways, and multi-use paths to be compatible with the existing and planned characteristics of the surrounding built, social, and natural environment.
B. Locate and design recreational and multi-use paths to balance the needs of human use and enjoyment with resource conservation and social attractions in areas identified in the Comprehensive Plan.
C. Design roadways to enhance livability by ensuring that aesthetics and landscaping are an integral part of Roseburg's transportation system.
D. Manage the transportation system for adequate and efficient operations.
E. Construct all transportation facilities to meet the requirements of the Americans with Disabilities Act and other applicable federal and state regulations. A comprehensive list of federal and state regulations is included in Appendix D.
F. The City shall every 3 to 5 years use the walkability and bikeability checklists as a tool to help determine how walkable and bikeable Roseburg is, and where improvements are needed.
G. In order to improve the health of Roseburg's citizens and reduce the dependence on automobiles for all travel, developments or improvement plans will promote walking or cycling for many trips.

H. The design of Roseburg, its neighborhoods, and transportation systems shall encourage walking, bicycling, or other activities that would help more residents reach the recommended 30 minutes each day of moderately intense physical activity.

Goal 3. Transportation and Land Use

Maximize the efficiency of Roseburg's transportation system through effective land use planning.

Land use, mixed-use, trip reduction and ordinances

A. Facilitate development or redevelopment on sites that are best supported by the overall transportation system and that reduce motor vehicle dependency by promoting walking, bicycling, and transit. This may include altering land use patterns through changes to type, density, and design.
B. Plan land uses to increase opportunities for multi-purpose trips.
C. Support mixed-use development.
D. Integrate transportation and land use into development ordinances.

Goal 4. Street System

Provide a well-planned, comprehensive street system that serves the needs of the Roseburg UGB.

Mobility and connectivity

A. Develop a street classification system to provide an optimal balance between mobility and accessibility for all transportation modes consistent with street function.
B. Design the street system to safely and efficiently accommodate multiple travel modes within public rights-of-way.
C. Balance the needed street function for all travel modes with adjacent land uses through the use of context-sensitive street and streetscape design techniques.
D. Improve existing streets in the Roseburg UGB to City street design standards.
E. Improve local street connectivity in the Roseburg UGB to limit the use of I-5 by local traffic.
F. Undertake efforts to reduce per capita vehicle miles traveled (VMT) and single occupancy vehicle (SOV) demand through transportation demand management (TDM) strategies.

Goal 5. Balanced Transportation System

Facilitate the development of bus stops, bike lanes, sidewalks, and multi-use paths in the Roseburg UGB to provide more transportation options for Roseburg residents and visitors.

Equity, options, multi-purpose and incentives

A. Develop a safe, complete, attractive, efficient, and accessible system of pedestrian way and bicycle ways including bike lanes, shared roadways, multi-use paths, and sidewalks.
B. Provide connectivity to each area of the City for convenient multimodal access. Ensure pedestrian, bicycle, transit, and vehicle access to schools, parks, employment, and recreational areas, and the Roseburg core city area by identifying and developing improvements that address connectivity needs.

C. Implement Roseburg street standards that recognize the multi-purpose nature of the street right-of-way for utility, pedestrian, bicycle, transit, truck, and auto use, and recognize these streets as important to the community identity.
D. Develop neighborhood and local connections to provide adequate circulation into and out of neighborhoods.
E. Construct multi-use paths where they can be developed with satisfactory design components that address safety, security, maintainability, and acceptable uses.
F. Work with regional and local public transportation providers to identify opportunities to improve public transportation service within the City and to surrounding communities.
G. Recognizing that maintenance is a major source of complaints and a widely cited reason for lack of use, increase maintenance of pedestrian and bicycle lanes and facilities.
H. The City shall investigate, and as appropriate, adopt incentives to promote ridesharing, walking, cycling (such as best parking spaces for carpools, covered/locked bike parking with fewer auto spaces, covered shelter for carpoolers or transit users, etc.)
I. The City shall educate the public about, and enforce laws protecting pedestrians and cyclists as one way to promote those activities.
J. The City shall regularly consult with state-wide pedestrian and bicycle groups regarding bicycle and pedestrian improvement ideas, safety, education, and improvements.
K. The City shall actively seek representatives from the pedestrian, cycling, and disabled communities on public works commission and similar groups.
L. City plans and the Land Use and Development Ordinance need to address the need to maximize the comfort level of driving (such as fewer distractions and driveways, increase site distances, etc.) consistent with the needs for access.

Goal 6. Transportation that Supports Economic Development

Freight, economy and service

Facilitate the provision of a multimodal transport system for the efficient, safe, and competitive movement of goods and services to, from, and within the Roseburg UGB.

A. Promote accessibility to transport modes that fulfill the needs of freight shippers.
B. Balance the needs of moving freight with community livability.
C. Provide safe routing of hazardous materials consistent with federal guidelines, and provide for public involvement in the process.
D. Designate arterial routes and freeway access are essential for efficient movement of goods. Design these facilities and adjacent land uses to reflect the needs of goods movement.
E. Encourage and support the operation, maintenance, and expansion of facilities and services provided at or near the Roseburg Regional Airport that accommodate passenger air travel, air cargo, and charter services.
F. Provide for the current and future needs of commercial and general aviation and facilities, consistent with the Roseburg Regional Airport Master Plan. Protect public investment at the Roseburg Regional Airport by allowing compatible land use and development within the airport environs to be consistent with the Roseburg Regional Airport Master Plan.
G. Promote the appropriate location of regional pipeline systems to enhance security, local service, and efficiency.
H. Meet federal and state safety compliance standards for operation, construction, and maintenance of the rail system.

I. Consider the needs of railroad transportation facilities to enhance economic resources. Add railroad safety components for railroad to be compliant with safety standards.
J. Plan for future parking in downtown Roseburg by addressing future parking needs.
K. Manage on-street parking in downtown Roseburg to assist in slowing traffic, facilitating pedestrian movement, and efficiently supporting local businesses and residences consistent with the land use and mobility goals for each street.
L. Require an appropriate supply and design of off-street parking facilities to promote economic vitality, neighborhood livability, efficient use of urban space, and reduced reliance on single occupancy motor vehicles.

Goal 7. Funding Transportation System Improvements

Implement the transportation plan by working cooperatively with federal, state, regional, and local governments, the private sector, and residents. Create a stable, flexible financial system for funding transportation improvements.

Implementable, fundable, sustainable and flexible

A. Regularly update the City's System Development Charges for transportation system projects.
B. Regularly update the costs contained in the System Development Charges for transportation system projects to reflect increases in the rate of inflation.
C. Coordinate transportation projects, policy issues, and development actions with all affected governmental units in the area. Key agencies for coordination include Douglas County, Oregon Department of Transportation, URCOG, and Umpqua Transit.
D. Participate in regional transportation, growth management, and air quality improvement policies. Work with agencies to assure adequate funding of transportation facilities to support these policies.
E. Maintain a current Capital Improvement Program (CIP) that establishes the City's construction and improvement priorities, and allocates the appropriate level of funding.
F. Establish rights-of-way at the time of land division or site development and, where appropriate, officially secure them by dedication of property.
G. Working in partnership with Oregon Department of Transportation, Douglas County, and other jurisdictions and agencies, develop a long-range financial strategy to make needed improvements to the transportation system and support operational and maintenance requirements.
H. Establish and provide adequate funding for maintenance of the capital investment in transportation facilities.
I. Ensure System Development Charges (SDCs) are available for all transportation modes.

Revising Roseburg's Transportation Vision

At the most basic level, a TSP provides a blueprint for all modes of travel: motor vehicle (both personal and freight), bicycle, pedestrian, and transit. It is also an opportunity to build on community values and protect what makes Roseburg a great place to live, work, and visit. The TSP should support Roseburg's vision to be an accessible, compact and livable community.

The TSP goals and objectives serve as the basis of evaluation criteria to assess multimodal plan options and identify plan priorities. The previous objectives generally support the 2006 TSP goals, however their organization is overwhelming and they could be targeted to better support the individual goals they are meant to embody.

Below is an example of what a revised list of goals *could* look like. They are based on the 2006 goals and objectives, with some refinement to align with existing Roseburg policies and the changing economic climate and priorities established today. These goals were crafted from feedback and input received from a meeting with the PAC. The revised goals provide a clearer theme which will allow for more targeted objectives.

Mobility and Accessibility

Goal 1: Provide a comfortable, reliable and accessible transportation system that ensures safety and mobility for all members of the community.

Policies

- Provide mobility and accessibility for all transportation modes where feasible while continuing to preserve the intended function of existing transportation assets.
- Support multimodal access, with a focus on youth, seniors, persons with disabilities and other disadvantaged populations.
- Support paratransit[3] or alternative services where development patterns do not support fixed route transit.
- Increase access to the transportation system for all modes regardless of age, ability, income, and geographic location.
- Improve pedestrian and bicycle circulation within and between neighborhoods and commercial centers.
- Coordinate with law enforcement and emergency response agencies in the planning and design of transportation facilities and emergency response operations.
- Enhance safety by prioritizing and mitigating high collision locations within the City.

Objectives

- Continue to modernize existing streets and transportation facilities within the Roseburg UGB to current design standards.
- Increase annual transit ridership by improving frequency and reliability.
- Increase ADA compliant sidewalks and intersection curb ramps.
- Maintain or improve emergency vehicle access.
- Reduce overall traffic-related fatalities and serious injury collisions.

[3] Paratransit is special transportation services for people with disabilities, often provided as a supplement to fixed-route transit.

Vibrant Community

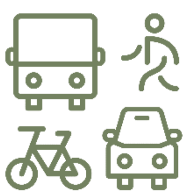
Goal 2. Create an integrated multimodal transportation system that enhances community livability.

Policies

- Coordinate transportation and land use decision-making to maximize the effectiveness of Roseburg's transportation system.
- Design access points along major arterials to reduce conflicts among vehicles and other modes.
- Continue to develop safe, connected pedestrian and bicycle facilities near schools, residential districts, downtown, employment centers, and riverfront areas.
- Improve pedestrian, bikeways, and trails as well as directional signs to points of interest.
- Explore opportunities to utilize and enhance access to riverfronts and other attractive natural features.
- Encourage use of the transportation system to improve community health.
- Provide pedestrian and bicycle amenities downtown and at social spaces.
- Improve access to educational facilities for all students within the UGB.

Objectives

- Consider appropriate traffic calming measures in school zones.
- Improve quality of existing infrastructure to be in alignment with current design standards.
- Provide multi-modal connections to social spaces and schools.



Transportation Options

Goal 3. Provide for multi-modal transportation system that enhances connectivity.

Policies

- Continue to develop a multi-modal transportation system that integrates all modes and addresses system gaps or deficiencies.
- As development occurs, maintain a network of arterials, collectors, local streets and paths that are interconnected, appropriately spaced, and reasonably direct.
- Ensure neighborhood and local connections provide adequate circulation into and out of neighborhoods.
- Provide appropriate multi-modal links to schools, commercial areas and tourist destinations.

Objectives

- Improve cross-town connectivity where feasible considering environmental, land use, and topographical factors.
- Develop unused rights-of-way for pedestrian and bike ways or trails where appropriate.

Economic Vitality

Goal 4. Advance regional sustainability by providing a transportation system that improves economic vitality and facilitates the local and regional movement of people, goods and services.

Policies

- Support transportation system management (TSM) including intersection improvements, ITS and other strategies to improve traffic flow.
- Support the economic development of regionally defined economic activity centers.
- Facilitate access to local businesses and business districts by all modes of transportation.
- Facilitate efficient freight movement.
- Engage in public-private partnerships to address barriers to efficient development.
- Facilitate development or redevelopment on sites that are supported by the overall transportation system
- Facilitate the through-movement of goods and services along city arterial streets and state highways

Objectives

- Focus potential capacity improvements on routes accessing major employment areas.
- Design elements of the transportation system to be aesthetically pleasing to through travelers, residents, tourists, and users of adjoining land.
- Provide wayfinding signage to community attractions.
- Support truck access to industrial and manufacturing sites, including turn and acceleration/deceleration lanes where appropriate.
- Proactively identify and correct roadway design, safety and operations deficiencies on designated freight routes.
- Protect active freight railroads, and appropriate abandoned railroads that connect to active lines, from encroachment and/or reversion to other land uses.

Implementation

Goal 5. Provide a sustainable transportation system through responsible stewardship of financial and environmental resources.

Policies

- Support community education and involvement in transportation planning.
- Encourage preservation of the existing transportation system.
- Plan for an economically viable and cost-effective transportation system.

Objectives

- Adequately fund and maintain the existing transportation system.
- Implement new sources of funding to grow local transportation dollars.

- Prioritize funding of projects that are most effective at meeting the goals and policies of the Transportation System Plan.
- Ensure open communication and collaboration across agencies.

Evaluation Criteria

It is possible that the full set of identified needs and/or desired projects will exceed available funding or conflict with other projects. It will be important to determine which potential projects should be proposed for adoption and potential funding opportunities, and when the projects should be constructed.

To address these larger questions, the goals and objectives presented earlier in this document were used in conjunction with the 2006 TSP criteria to develop project evaluation criteria to determine which projects would be advanced, and to group projects for short-range and longer-range implementation.

These criteria will be "applied" to each potential improvement project, typically requiring subjective assessments. In some cases, one or more of the evaluation criteria may not apply due to the nature of the project. If this is the case, it will be noted as "not applicable".

Evaluation criteria for selecting the TSP Update project shall include, at a minimum:

- Mobility
- Cost
- Likelihood of being funded
- Safety
- Land use
- Environmental effects
- Effect on Title VI and Environmental Justice populations (Transportation Disadvantaged)

Further criteria were developed based on input received at a Project Advisory Committee (PAC) meeting to discuss the vision for the transportation system:

- Economic vitality
- Promotes a balanced system among all modes

As the TSP Update progresses and modal improvements are developed, they will be compared to the evaluation criteria, goals and objectives. The projects that best meet the evaluation criteria will move forward to the draft improvement project list.

Potential improvements for each travel mode will be summarized after the existing conditions and future analysis has been completed (Technical Memorandums 3 and 4). The potential solutions will be finalized by the Project Management Team (PMT) and PAC and presented to the public for their review.

Plans and Policy Review Summary

Overview

Table 1 presents a summary of the documents reviewed as part of the Plans and Policy review of this task. The documents reviewed include those identified in Task 3 of the Statement of Work, as well as a few additional City documents reviewed in previous plan documents. The individual document summaries and their relevance to the TSP are included as an attachment to this memorandum (Attachment A). Table 1 lists the plans reviewed and the page of Attachment A where each document summary is located.

TABLE 1. SUMMARY OF PLANS AND POLICY REVIEW

Plan	Attachment A Page Number
---- State Documents ----	2
Oregon Transportation Plan (2006, recent update 2016)	2
Oregon Transportation Options Plan (2015)	2
Oregon Highway Plan (1999 with 2006 amendments, recent updates through 2015 Amendments)	3
	7
Oregon Bicycle and Pedestrian Plan (2011, recent update 2016)	8
Oregon Rail Plan (2014)	9
Oregon Freight Plan (2011 – Currently Being Updated)	10
Oregon Public Transportation Plan (1997, Being Updated)	11
Oregon Aviation Plan (2007)	11
Oregon Transportation Safety Action Plan (2011)	12
Transportation Planning Rule (OAR 660-012) (Amended 2011)	13
Access Management Rule (OAR 734-051) (Amended 2012)	13
Highway Design Manual (2011)	14
2018-2021 Statewide Transportation Improvement Program	14
OR- 138E Diamond Lake Boulevard Access Management Plan	14
Interchange Area Management Plan: I-5 Exit 123 (August 2006)	15
Interchange Area Management Plan: I-5 Exits 124 & 125 IAMP Technical Memorandums #1-#5 (October 2013)	15
Interchange Area Management Plan: I-5 Exit 127 (December 2014)	16
Interchange Area Management Plan: I-5 Exit 129 (March 2011)	16
ODOT Analysis Procedures Manual	16
---- City Documents ----	16
City of Roseburg Urban Area Comprehensive Plan (1984)	18
City of Roseburg Land Use and Development Ordinance (LUDO) (Updated 2016)	19
City of Roseburg Transportation System Plan (2006)	22
City of Roseburg Bike and Pedestrian Master Plan (2009)	23
City of Roseburg Waterfront Master Development Plan (2010)	23
City of Roseburg Downtown Master Plan (2000)	24
Roseburg Downtown Plaza and Transit Station Project (2013)	24
City of Roseburg Public Works Standard Drawings (1995)	25

TECHNICAL MEMORANDUM #1: ATTACHMENT A

DATE: April 28, 2017

TO: City of Roseburg

FROM: Darci Rudzinski and Shayna Rehberg, Angelo Planning Group
Angela Rogge, PE, David Evans and Associates, Inc. (Consistency Revisions/Formatting)
Dana Shuff, EIT, David Evans and Associates, Inc. (Consistency Revisions/Formatting)

SUBJECT: Roseburg Transportation System Plan Update
Task 3.3, Final TM #1 (Policy Review)

Table 1 presents a summary of the documents reviewed. This memorandum presents the summaries of pertinent plans and their relevance to the TSP. The documents reviewed include those identified in Task 3 of the Statement of Work, as well as a few additional City documents reviewed in previous plan documents. Table 1 also lists the page of this document where each plan summary is located in this document.

TABLE 1. SUMMARY OF PLANS AND POLICY REVIEW

Plan	Page Number (This Document)
---- State Documents ----	2
Oregon Transportation Plan (2006, recent update 2016)	2
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Interchange Area Management Plan: I-5 Exit 127 (December 2014)	15

State Documents

Oregon Transportation Plan (2006, recent update 2016)

The Oregon Transportation Plan (OTP) is the state's multimodal transportation plan that assesses the needs of airports, bicycle and pedestrian facilities, highways and roadways, pipelines, ports and waterway facilities, public transportation and railroads through 2030. The OTP provides a framework for prioritizing transportation improvements to address the challenges Oregon faces based on various revenue conditions. This plan offers guidance for state, regional, local, and private transportation facilities.

The 2006 amendment supersedes the 1992 OTP, which established a vision of a balanced, multimodal transportation system and called for an expansion of ODOT's role in funding non-highway investments. The current 2006 OTP furthers these policy objectives with emphasis on maintaining the assets in place, optimizing the existing system performance, creating sustainable funding, and investing in strategic capacity enhancements. The OTP was updated in 2016 to strengthen ODOT's commitment with the Americans with Disabilities Act (ADA) , Title II Transition Plan. The OTP strongly supports a transportation system with multiple travel choices that are easy to use, cost effective and accessible to all potential users, including the transportation disadvantaged. A new strategy was added to establish actions and funding priorities that ensure transportation facilities are accessible to all users. *Note: The review is of the 2006 amendment, as the 2016 update was not the basis of current plans in the area. As state facility plans are updated, the 2016 (or current version) should be reviewed.*

> ***Project Relevance:*** *Transportation improvements must be consistent with the applicable OTP goals and policies and, therefore, findings of compatibility with the OTP will be used in the TSP adoption process.*

Oregon Transportation Options Plan (2015)

The Transportation Options Plan (OTO Plan) aims to implement and refine the Oregon Transportation Plan's (OTP) goals, policies, and strategies. The purpose of the OTO Plan, specifically, is to "establish a vision and policy guidance that integrates transportation options in local, regional, and state transportation planning, programming, and investment." The OTO Plan provides an outline for polices and strategies for state and local agencies to expand transportation systems, increase funding, and improve planning. The Plan promotes the use of existing transportation infrastructure to provide Oregon with an efficient and affordable transportation system. The OTO Plan:

- Identifies opportunities to expand transportation choices.
- Looks to increase funding opportunities for transportation options programs and investments.
- Provides information to better integrate transportation options into local, regional, and state transportation planning.

> ***Project Relevance:*** *Within the next 25 years, the population of Oregon is expected to increase by nearly 30 percent. As a local planning effort, the development of the TSP is an opportunity to embrace the OTO Plan's goals and key initiatives by supporting transportation options programs, where feasible, in order to meet the growing demands in the community. The TSP will aim to address the growing populations and economy in the area while improving the efficiency and use of existing transportation systems in a cost-effective manner.*

Oregon Highway Plan (1999 with 2006 amendments, recent updates through 2015 Amendments)

The Oregon Highway Plan (OHP) is a modal plan of the OTP that guides ODOT's Highway Division in planning, operations, and financing.

Policies in the OHP emphasize the efficient management of the highway system to increase safety and to extend highway capacity, partnerships with other agencies and local governments, and the use of new techniques to improve road safety and capacity. These policies also link land use and transportation, set standards for highway performance and access management, and emphasize the relationship between state highways and local road, bicycle, pedestrian, transit, rail, and air systems. The following policies, in particular, are relevant to the TSP Update. The OHP was updated in 2015 to incorporate all previous amendments through May 2015. This included five (5) new amendments since the OHP was last updated in 2006; (1) Mobility Standards Revisions; (2) Access Management Revisions; (3) Tolling and Pricing Policy Amendment; (4) Expressway Classifications Revisions; and (5) State Highway Freight System Policy Revisions and Adoption of Rule on Reduction of Vehicle-Carrying Capacity. *Note: The review includes the 2006 amendments, as the 2015 amendments were not the basis of current plans in the area. As state facility plans are updated, the 2015 (or current version) should be reviewed.*

> ***Project relevance:*** *Develop the TSP update in coordination with ODOT so that the plan's projects, policies, and regulations are consistent with or move in the direction of meeting OHP policies, standards, and targets such as state highway classifications, mobility targets, and access spacing standards. A TAC, which will provide technical and policy guidance during plan preparation, should include representatives from the County, City, ODOT, and other transportation agencies.*

Policy 1A: State Highway Classification System

The OHP classifies the state highway system into four levels of importance: Interstate, Statewide, Regional, and District. ODOT uses this classification system to guide management and investment decisions regarding state highway facilities. The system guides the development of facility plans, such as Interchange Area Management Plans (IAMPs), as well as ODOT's review of local plan and zoning amendments, highway project selection, design and development, and facility management decisions including road approach permits.

Interstate 5 (I-5) and OR 138 (Harvard Avenue/North Umpqua Highway) in the study area are classified as Interstate and Regional highways in the state classification system. The purpose and management objectives of these highways are provided in Policy 1A, as summarized below.

- **Interstate highways** provide connections between major cities in a state, regions of the state, and other states. A secondary function in urban areas is to serve regional trips within the urban area. Their primary objective is to provide mobility and, therefore, the management objective is to provide for safe and efficient high-speed continuous-flow operation in urban and rural areas.
- **Regional highways** typically provide connections and links to regional centers, Statewide or Interstate highways, or economic or activity centers of regional significance. The management objective for these facilities is to provide safe and efficient, high-speed, continuous-flow operation in rural areas and moderate to high-speed operations in urban and urbanizing areas. A secondary function is to serve land uses in the vicinity of these highways.

In addition to the state highway classification system, I-5 and OR 138 have been given other highway designations that are addressed by other policies.

- I-5 through the City is part of the National Highway System (NHS), and is a state freight route and federally designated truck route.
- OR 138 is a Scenic Byway from mile point 2.34 to 83.08.

Policy 1B: Land Use and Transportation

Policy 1B applies to all state highways. It is designed to clarify how ODOT will work with local governments and others to link land use and transportation in transportation plans, facility and corridor plans, plan amendments, access permitting and project development. Policy 1B recognizes that state highways serve as the main streets of many communities – as OR 138 does in Roseburg – and strives to maintain a balance between serving local communities (accessibility) and the through traveler (mobility). This policy recognizes the role of both the state and local governments related to the state highway system and calls for a coordinated approach to land use and transportation planning.

Policy 1C: State Highway Freight System

The primary purpose of the State Highway Freight System is to facilitate efficient and reliable interstate, intrastate, and regional truck movement through a designated freight system. This freight system, made up of the Interstate Highways and select Statewide, Regional, and District Highways, includes routes that carry significant tonnage of freight by truck and serve as the primary interstate and intrastate highway freight connection to ports, intermodal terminals, and urban areas. Highways included in this designation have higher highway mobility standards than other statewide highways.

Policy 1D: Scenic Byways

The Oregon Transportation Commission has designated Scenic Byways throughout the state on federal, state, and local roads which have exceptional scenic value. OR 138 (North Umpqua Highway) is a Scenic Byway in Roseburg starting just over two miles from I-5. For designated Scenic Byways, ODOT will consider aesthetic and design elements along with safety and performance considerations in managing and maintaining the roadway and will develop guidelines for aesthetic and design elements within the public right-of-way.

Policy 1F: Highway Mobility Standards Access Management Policy

Policy 1F sets mobility standards for ensuring a reliable and acceptable level of mobility on the state highway system. The standards are used to assess system needs as part of long range, comprehensive planning transportation planning projects during development review, and to demonstrate compliance with the Transportation Planning Rule (TPR).

Policy 1F provides policy framework for considering measures other than volume-to-capacity (v/c) ratios for evaluating mobility performance. V/c ratios established in Policy 1F are “targets.” These targets are to be used to determine significant effect pursuant to TPR Section -0060.

Table 2 includes the mobility targets include for the state facilities in the study area.

TABLE 2. STATE FACILITY MOBILITY TARGETS IN STUDY AREA

I-5	0.80 v/c
I-5 Ramp Terminals	0.85 v/c
OR 138	• 0.90 v/c (posted speeds less than or equal to 35 mph) • 0.85 v/c (posted speeds more than 35 mph)

Policy 1G: Major Improvements

This policy requires maintaining performance and improving safety on the highway system by improving efficiency and management on the existing roadway network before adding capacity. The state’s highest priority is to preserve the functionality of the existing highway system. Tools that could be employed to improve the function of the existing interchanges include access management, transportation demand management, traffic operations modifications, and changes to local land use designations or development regulations.

After existing system preservation, the second priority is to make minor improvements to existing highway facilities, such as adding ramp signals, or making improvements to the local street network to minimize local trips on the state facility.

The third priority is to make major roadway improvements which could, in the case of interchange improvements, include adding lanes or reconfiguring on- or off- ramps.

Policy 2B: Off-System Improvements

This policy recognizes that the state may provide financial assistance to local jurisdictions to make improvements to local transportation systems if the improvements would provide a cost-effective means of improving the operations of the state highway system.

Policy 2F: Traffic Safety

This policy emphasizes the state's efforts to improve safety of all users of the highway system. Action 2F.4 addresses the development and implementation of the Safety Management System to target resources to sites with the most significant safety issues.

Policy 3A: Classification and Spacing Standards

It is the policy of the State of Oregon to manage the location, spacing, and type of road intersections on state highways to ensure the safe and efficient operation of state highways consistent with the classification of the highways.

Action 3A.2 calls for spacing standards to be established for state highways based on highway classification, type of area, and posted speed. Tables in OHP Appendix C present access spacing standards which consider urban and rural highway classification, traffic volumes, speed, safety, and operational needs. The access management spacing standards established in the OHP are implemented by access management rules in OAR 734, Division 51, addressed later in this report.

Policy 3C: Interchange Access Management Areas

This policy addresses management of grade-separated interchange areas to ensure safe and efficient operation between connecting roadways. Action items include developing interchange area management plans to protect the function of existing interchanges, provide safe and efficient operations between connecting roadways, and minimize the need for major improvements.

The local jurisdiction's role in access management includes the following: "necessary supporting improvements, such as road networks, channelization, medians and access control in the interchange management area must be identified in the local comprehensive plan and committed with an identified funding source, or must be in place (Action 3C.2)."

Policy 4A: Efficiency of Freight Movement

This policy emphasizes the need to maintain and improve the efficiency of freight movement on the state highway system. I-5 is a state freight route and federally designated truck route.

Policy 4B: Alternative Passenger Modes

This policy encourages the development of alternative passenger services and systems as part of broader corridor strategies and promotes the development of alternative passenger transportation services located off the highway system to help preserve the performance and function of the state highway system. Umpqua Transit provides public transportation service in the study area.

Policy 6A: New Toll Facilities

This policy encourages the use of tolling for financing the construction, operations and maintenance of new roads, bridges or dedicated lanes if expected toll receipts will pay for an acceptable portion of project costs.

Policy 6E: Tolling Technology and Systems

This policy addresses tolling of state highways to implement a tolling system that enables cash-based motorist ready access to all-electronic toll facilities while eliminating the need for cash payment at the point of entry; and develop technology that facilitates interoperability with tolling systems of neighboring states and allows evolution of fully functional, non-proprietary tolling systems.

Oregon Bicycle and Pedestrian Plan (2011, recent update 2016)

The intent of the Oregon Bicycle and Pedestrian Plan (OBPP) is to provide safe and accessible bicycling and walking facilities in an effort to encourage increased levels of bicycling and walking. The plan is comprised of two parts: the Policy and Action Plan and the Oregon Bicycle and Pedestrian Design Guide.

The plan was adopted in 1995 and reaffirmed as an element of the OTP in 2006. The second part of the plan – the Design Guide – was updated in 2011. The Oregon Transportation Commission (OTC) updated the Oregon Bicycle and Pedestrian Plan on May 19, 2016. The plan directs the work of ODOT and will be used in the development of regional and local Transportation System Plans, other planning efforts, and in overall decision making that apply and refine the policies to specific geographic locations, framing solution identification, project selection, actions to help achieve the statewide vision of the Oregon Bicycle and Pedestrian Plan and meet the specific needs of the area. There are two types of policies in the plan, decision-making policies and deliverable-based policies.

Decision-Making Policies have an immediate and long lasting impact by providing direction in how to consider walking and biking across the state. The plan will help create tangible outcomes including, but not limited to:

- Opening opportunities to address speed concerns to improve safety.
- Assuring pedestrian and bicycle capacity is preserved.
- Increasing data collection over time to support decision-making.
- Providing safe ways to navigate construction zones or detour routes around.
- Continuing Safe Routes to School (SRTS) programmatic funding.

Deliverable-Based Policies are those policies that require further research and development for a particular item or topic, such as updating the ODOT Bicycle and Pedestrian Guidelines. For those items under the responsibility/authority of ODOT, an Oregon Bicycle and Pedestrian Plan (OBPP) Implementation Work Program will be created. *Note: The review is of the 2011 update, as the 2016 update was not the basis of current plans in the area. As state facility plans are updated, the 2016 (or current version) should be reviewed.*

The Policy and Action Plan provides background information, including relevant state and federal laws, and includes goals, actions, and implementation strategies proposed by ODOT to improve bicycle and pedestrian transportation. The plan states that bikeway and walkway systems will be established on state highways as follows:

- As part of modernization projects (bike lanes and sidewalks will be included);
- As part of preservation projects, where minor upgrades can be made;
- By restriping roads with bike lanes;
- With improvement projects, such as completing short missing segments of sidewalks;
- As bikeway or walkway modernization projects;
- By developers as part of permit conditions, where warranted.

The Design Guide is the technical element of the plan that guides the design and management of bicycle and pedestrian facilities on state-owned facilities. It has been designated as a companion piece to the Highway Design Manual and includes updated and innovative pedestrian and bicycle treatments.

> ***Project relevance:*** *OBPP standards and guidelines will inform potential bicycle and pedestrian improvements to state facilities in the study area. Recommendations in the 2011 Design Guide (Appendix L in the Highway Design Manual) should be considered as "best practices" for potential applications on City facilities in the study area. Advisory committees for the project should include pedestrian and bicycle representatives.*
>
> *The plan should reflect the goals (e.g., safety, connectivity, equity, health, sustainability, and coordination), policies, and strategies for implementation identified in the 2016 OBPP. The jurisdiction should work with adjacent local jurisdictions as well as regional and state agencies to help identify gaps in the regional walking and biking network and prioritize projects.*

Oregon Rail Plan (2014)

The Oregon Rail Plan (ORP), another modal plan within the OTP, addresses long-term freight and passenger rail planning in Oregon. Currently, freight rail service in Roseburg is provided by Central Oregon & Pacific (CORP), Oregon's second largest short line railroad. It operates in the southwest Oregon, serving the southern Willamette Valley to the California border and the central Oregon coast. The main north-south line provides connections from Eugene-Springfield to Cottage Grove, Roseburg, Glendale, Grants Pass, Medford, Ashland, and into California. The Oregon Transportation Commission (OTC) adopted the 2014 Oregon State Rail Plan in response to the 2008 Passenger Rail Investment and Improvement Act (PRIIA) which increased the level of state involvement in rail transportation and rail planning.

Oregon's residents and businesses can capitalize on the many benefits freight and passenger rail services provide:

- The rail system is a significant conduit for economic and job activity.
- The rail system improves connections for people and goods.
- The rail system provides travel choice and relieves congestion.
- Use of rail contributes positively to the environment.
- When coordinated, rail enhances community quality of life.

The Oregon State Rail Plan establishes a vision for the future of rail in Oregon supported by goals, policies, and strategies. The most relevant goals from this Plan are described below.

Goal 1 - Partnership, Collaboration and Communication: Partner, collaborate and communicate with rail system operators and other stakeholders to maximize bene�its, align interests, remove barriers and bring innovative solutions to the rail system; and foster public understanding of rail's importance.

Goal 2 - Connected System: Promote, preserve and enhance an efficient rail system that is accessible and integrated with Oregon's overall multimodal transportation system.

Goal 3 - System Investments and Preservation: Enhance transportation system reliability, capacity, frequency and travel times through investments that preserve and improve freight and passenger rail assets and infrastructure.

Goal 4 - Funding, Finance and Investment Principles: Establish funding that meets the critical needs of the rail system in Oregon and achieves the objectives of this State Rail Plan.

Goal 5 - System Safety: Plan, construct, operate, maintain and coordinate the rail system in Oregon with safety and security for all users and communities as a top priority.

Goal 6 - Preserving and Enhancing Quality of Life: Increase use and investment in freight and passenger rail systems to conserve and improve Oregon's environment and community cohesion.

Goal 7 - Economic Development: Increase opportunity and investment in freight and passenger rail assets to grow Oregon's economy.

> ***Project relevance:*** *The ORP establishes minimum levels of service standards and policies for freight and passenger rail.*
>
> *The TSP Update will consider rail freight needs (e.g., Central Oregon & Pacific rail, long-range plan for higher speed rail extension to Roseburg) in developing recommended policies and projects.*

Oregon Freight Plan (2011 – Currently Being Updated)

The Oregon Freight Plan (OFP) is another modal plan of the OTP and implements the state's goals, and policies related to the movement of goods and commodities. Its purpose statement is: "to improve freight connections to local, Native American, state, regional, national and global markets in order to increase trade-related jobs and income for workers and businesses." The objectives of the plan include prioritizing and facilitating investments in freight facilities (including rail, marine, air, and pipeline infrastructure) and adopting strategies to maintain and improve the freight transportation system. The OFP must meet new federal requirements for the state to obligate federal formula freight funding beyond December 4, 2017. While several requirements are addressed by the 2011 OFP and other statewide policy plans, ODOT's OFP amendment process will address the remaining requirements, including a tiered statewide inventory of freight transportation facilities with mobility needs; a list and map of urban and rural facilities designated as critical freight corridors; a five-year fiscally constrained investment plan listing priority projects to make use of federal formula freight funding; and performance measures.

The plan defines a statewide strategic freight network. I-5 and parallel railroads – CORP in the study area – are designated as a strategic corridor in the OFP.

Policy and strategic direction provided in the OFP prioritizes preservation of strategic corridors as well as improvements to the supply chain achieved through coordination of freight and system management planning.

Strategy 1.2*: Strive to support freight access to the Strategic Freight System. This includes proactively protecting and preserving corridors designated as strategic.*

Action 1.2.1*. Preserve freight facilities included as part of the Strategic Freight System from changes that would significantly reduce the ability of these facilities to operate as efficient components of the freight system unless alternate facilities are identified or a safety-related need arises.*

Strategy 2.4*: Coordinate freight improvements and system management plans on corridors comprising the Strategic Freight System with the intent to improve supply chain performance.*

> ***Project relevance:*** *I-5 and CORP are designated as part of a strategic corridor in the OFP.*
>
> *Maintaining and improving freight system efficiency will be part of the planning process. Advisory committees for the plan should include freight representatives.*

Oregon Public Transportation Plan (1997, Being Updated)

The Oregon Public Transportation Plan (OPTP) is the modal plan of the OTP that provides guidance for ODOT and public transportation agencies regarding the development of public transportation systems. The vision guiding the Public Transportation Plan is as follows:

- *A comprehensive, interconnected and dependable public transportation system, with stable funding, that provides access and mobility in and between communities of Oregon in a convenient, reliable, and safe manner that encourages people to ride*
- *A public transportation system that provides appropriate service in each area of the state, including service in urban areas that is an attractive alternative to the single-occupant vehicle, and high-quality, dependable service in suburban, rural, and frontier (remote) areas*
- *A system that enables those who do not drive to meet their daily needs*
- *A public transportation system that plays a critical role in improving the livability and economic prosperity for Oregonians.*

The OPTP Implementation Plan directs ODOT investments towards commuter and mobility needs in larger communities and urban areas and also in smaller communities where warranted. It also prioritizes investments in intercity connections statewide. Long-term implementation and funding is geared toward both modernization and preservation projects while preservation projects are more the focus for short term implementation and funding.

Umpqua Transit provides intercity transit service in Roseburg. It operates three fixed routes, including one route entirely within the City of Roseburg, one route connecting the Winston/Green area with Roseburg and

Umpqua Community College (UCC), and one route connecting the cities of Sutherlin and Oakland with UCC and Roseburg. Umpqua Transit also provides Dial-A-Ride paratransit service for seniors and the disabled.

> ***Project relevance:*** *Initial ODOT objectives and a few draft policies for the updated OPTP have been released, and the TSP update process should work to be consistent with those objectives. The planning process should also be coordinated with Umpqua Transit long-range planning and other transit service providers in the study area as needed. Advisory committees for the plan should include transit agency and rider representatives.*

Oregon Aviation Plan (2007)

The Oregon Aviation Plan (OAP) is a modal plan of the OTP that defines policies and investment strategies for Oregon's public use aviation system for the next 20 years. The plan addresses the existing conditions, economic benefits, and jurisdictional responsibilities for the existing aviation infrastructure. The plan contains policies and recommended actions to be implemented by Oregon Department of Aviation in coordination with other state and local agencies and the Federal Aviation Administration.

The OAP categorizes airports based on functional role and service criteria. The Roseburg Regional Airport, located to the northeast of Exit 125, is classified as a Category III facility (Regional General Aviation). Category III airports serve regional transportation needs and support most twin and single-engine aircraft and possibly occasional business jets. The Roseburg Regional Airport is also home to a permanent US Forest Service fire base, which provides training for firefighters, staging areas for fire response, and storage of equipment and aircraft.

An individual report on each airport is provided in the OAP. The report on Roseburg Regional Airport identified potential lighting and fencing improvements to meet performance criteria for a Category III facility. The report includes taxiway, runway, apron, and fencing improvements as well as potential airport, hangar, and approach improvements to be considered, when recommended by airport management. Topography and wetlands surrounding the airport, as well as residential uses south of the airport, are noted as challenges and limits to future growth of the airport.

> ***Project relevance:*** *The OAP classifies the Roseburg Regional Airport as a Category III facility (Regional General Aviation) based on functions and service criteria. It includes policies and actions to be implemented by the Oregon Department of Aviation in coordination with federal, state, and local agencies, as well as individual reports and recommended improvements for each airport. The planning process will take into account policies and improvements recommended in the OAP, in addition to land uses adjacent to the airport.*

Oregon Transportation Safety Action Plan (2011)

An element of the OTP, the Oregon Transportation Safety Action Plan (OTSAP) establishes a safety agenda to guide the investments and actions of ODOT and the state for the next 20 years. As indicated in the name of the plan, the emphasis of the OTSAP is action and implementation. Actions included in the OTSAP were chosen based on crash data and information provided by transportation safety experts.

Actions identified in the OTSAP that will guide or be addressed include:

- Focus on "safety areas of interest" such as intersection crashes and pedestrian/bicycle crashes with improvements such as advance signing, roundabouts, access management, signal timing, bulb-outs, refuge islands, bicycle signals, and rapid flashing beacons (Action 23).
- Elevate safety in local system plans by, for example, more widely implementing access management strategies and moving toward compliance with access management standards; and involving engineering, enforcement, and emergency service staff professionals, as well as local transportation safety advocacy groups, in planning (Actions 8 and 9).
- Design improvements for the increased safety of pedestrians, bicyclists, and other non-motorized vehicles, accommodating multiple users on a street and considering the needs of families, seniors, and children using transportation facilities (Action 4).

Project relevance: *The OTSAP emphasizes implementation. Actions included in the OTSAP should be reflected in the plan's Goals and Objectives and projects. Advisory committees should include ODOT Safety, local public safety, emergency services, and other safety and public health representatives.*

Transportation Planning Rule (OAR 660-012) (Amended 2011)

The Transportation Planning Rule (TPR), OAR 660-012, implements Goal 12 (Transportation) of the statewide planning goals. The TPR contains numerous requirements governing transportation planning and project development, several of which are relevant to TSPs.

> ***Project Relevance:*** *The TPR includes several requirements governing transportation planning and project development. 2012 amendments include provisions for exempting proposed zone changes from significant effect determinations and proposed land use regulation amendments from mobility standards if a multi-modal mixed-use area is designated. These requirements should be reflected in the plan and in associated policy and development code amendments as needed.*

Section -0045

OAR 660-012-0045 requires each local government to amend its land use regulations to implement its TSP. It also requires local government to adopt land use or subdivision ordinance regulations consistent with applicable federal and state requirements: "to protect transportation facilities, corridors and sites for their identified functions."

Local compliance with TPR provisions is achieved through a variety of measures, including access control measures, standards to protect future operations of roads, and expanded notice requirements and coordinated review procedures for land use applications. Local development codes should also include a process to apply conditions of approval to development proposals, and regulations assuring that amendments to land use designations, densities, and design standards are consistent with the functions, capacities, and performance standards of facilities identified in the TSP.

Section -0060

The most recent amendments to TPR, effective January 1, 2012, include new language in Section -0060 that allows a local government to exempt a zone change from the "significant effect" determination if the proposed zoning is consistent with the comprehensive plan map designation and the TSP.

The amendments also allow a local government to amend a functional plan, comprehensive plan, or land use regulation without applying mobility standards (V/C, for example) if the subject area is within a designated multi-modal mixed-use area (MMA). Subsection (8) of Section -0060 establishes the criteria for a MMA.

Access Management Rule (OAR 734-051) (Amended 2012)

Oregon Administrative Rule (OAR) 734-051 defines the State's role in managing access to highway facilities in order to maintain functional use and safety and to preserve public investment. The rule includes spacing standards for varying types of state roadways and criteria for granting right of access and approach locations onto state highway facilities.

Amendments to OAR 734-051 were adopted in early 2012 based on passage of Senate Bill 1024 and Senate Bill 264 in the 2010 and 2011 Oregon Legislature respectively. The amendments were intended to allow more consideration for economic development when developing and implementing access management rules, and involved changes to how ODOT deals with approach road spacing, highway improvements requirements with development, and traffic impact analyses requirements for approach road permits. Senate Bill 408, which passed in the 2013 legislative session and becomes effective January 1, 2014, is expected to result in further rulemaking. This bill provides new requirements for development of facility plans and directs ODOT to develop an access management strategy[1] for each highway modernization or improvement project. ODOT must develop key principles for each facility plan, which will be used to evaluate how abutting properties may retain or obtain access to the state highway during and after plan implementation. In developing the key principles, the department must also develop a methodology to weigh the benefits of a highway improvement to public safety and mobility against the locally adopted TSP and land uses permitted in the local comprehensive plan, as well as the economic development objectives of affected real property owners who require access to the state highway. If a facility plan identifies the need to modify, relocate or close existing private approaches, the plan must include key principles for managing access to the state highway and a timeline for plan implementation. Each facility plan also must document that there was collaborative discussion and agreement between the department and the affected cities and counties regarding the location of county roads and city streets that intersect a state highway within the study area.

> ***Project Relevance:*** *2012 amendments were designed to allow for more consideration of economic development in creating and implementing rules. 2013-2014 amendments set more rigorous requirements for facility plans seeking to limit local access on state highways. The plan will be developed consistent with applicable criteria in the rule, including meeting or moving in the direction of compliance with OHP spacing standards.*

Highway Design Manual (2011)

The Highway Design Manual (HDM) provides design standards for state highways and associated highway elements. These standards are dependent on the highway's functional classification and project type (e.g., Modernization, Preservation, Safety, Operations, or Maintenance). The purpose of the HDM is to establish mobility standards when evaluating potential design configurations.

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[1] The development of this IAMP, a planning-level document, will not result in an "access management strategy," which is more specifically tied to project development and construction of improvements.

Project Relevance: *The HDM provides design standards for state facilities depending on the facility's functional classification and the project type. Plan projects will be developed to be consistent with the applicable HDM standards.*

Classification of state facilities in Roseburg should be established through review of the OHP (addressed above). Once projects are identified later in the TSP update process, the project's facility classification can be used along with project type to determine applicable HDM standards.

2018-2021 Statewide Transportation Improvement Program

The State Transportation Improvement Program (STIP) is the programming and funding document for transportation projects and programs statewide. The projects and programs undergo a selection process managed by ODOT Regions or ODOT central offices. The document covers a period of four years and is updated every two years.

OR- 138E Diamond Lake Boulevard Access Management Plan

Though not reviewed as part of this Plan and Policy review, the TSP will follow the guidelines of the Access Management Plan for any potential improvements identified for OR-138E.

Interchange Area Management Plan: I-5 Exit 123 (August 2006)

IAMP 123 (2006) amends the OHP by establishing and prioritizing methods to improve safety and operational efficiency of the interchange management area. OHP Policy 3C requires that improvements necessary to support the recommendations of the IAMP are either identified in the local comprehensive plan and committed with an identified funding source or are already in place. Such improvements may include road networks, channelization, medians, and access control.

At the time the IAMP was completed, most of the IAMP 123 study area was outside of the Roseburg UGB. Since the completion of the IAMP, the Roseburg UGB has expanded.

The IAMP 123 primary recommendation would replace the structurally deficient I-5 overcrossing and improve the safety and operational efficiency of the interchange. Portland Avenue, the interchange crossroad, would be widened to four lanes with bike lanes and sidewalks on both sides. This width would be to accommodate traffic associated with large events at the Fairgrounds, not daily traffic. The ramp terminals would be made to intersect Portland Avenue at more perpendicular angles. Acceleration and deceleration lengths on the on- and off-ramps would be increased to meet current ODOT design standards. A sight distance deficiency caused by bridge columns at the southbound ramp terminals would also be corrected. The access management strategy included in IAMP 123 recommends the relocation of Frear Street to line up with Kendall Street should a bridge be constructed that connects Portland Avenue with Roseburg, or if the Fairgrounds proposed an expansion that would result in peak period traffic volumes. None of these recommendations have been constructed.

Project Relevance: *The City should reference the IAMP during the development of the TSP to ensure that it will be consistent with the recommendations of the IAMP and achieve or move toward the mobility performance standards of the OHP for the interchange and related facilities.*

Interchange Area Management Plan: I-5 Exits 124 & 125 IAMP Technical Memorandums #1-#5 (October 2013)

IAMP 124/125 is in the development stages. Once adopted by the Oregon Transportation Council, it will amend the OHP. The IAMP 124/125 will establish short-term and long-term goals to improve safety and operations within the IAMP management area, which is entirely within the Roseburg UGB. OHP Policy 3C requires that improvements necessary to support the recommendations of the IAMP are either identified in the local comprehensive plan and committed with an identified funding source or are already in place. Such improvements may include road networks, channelization, medians, and access control. The TSP should reference the plan to ensure consistency with the recommendations and performance standards of the IAMP.

> ***Project Relevance:*** *The City should reference the IAMP during the development of the TSP to ensure that it will be consistent with the recommendations of the IAMP and achieve or move toward the mobility performance standards of the OHP for the interchange and related facilities.*

Interchange Area Management Plan: I-5 Exit 127 (December 2014)

IAMP 127 (2014) amends the OHP and identifies and prioritizes methods to improve safety and operations within the IAMP 127 study area, which includes Interchange 127 and supporting facilities in north Roseburg. OHP Policy 3C either requires that improvements necessary to support the recommendations of the IAMP are identified in the local comprehensive plan and committed with an identified funding source or are already in place. Such improvements may include road networks, channelization, medians, and access control.

IAMP 127 recommends the following projects:

- Edenbower Boulevard Signal Timing Coordination: Maintain signal coordination from the I-5 southbound ramp terminal through Stephens St (Ongoing)
- Edenbower Boulevard/Stewart Parkway Sight Distance Improvements: Mitigate the existing sight distance limitations that restrict visibility for drivers traveling through the intersection on the eastbound (Stewart Pkwy) and northbound (Edenbower Blvd) approaches (Medium Priority)
- Edenbower Boulevard/Stephens Street Intersection Improvements: Extend eastbound and northbound left-turn bays (Medium Priority)
- Edenbower Boulevard/I-5 Northbound Ramp Terminal Intersection Improvement: Install traffic signal (Low Priority)
- Edenbower Boulevard/I-5 Northbound Ramp Terminal Pedestrian Improvement: Improve pedestrian crossing on north side (High to Medium Priority)
- Edenbower Boulevard/Stewart Parkway Intersection Improvements: Add a second leftturn lane on the eastbound approach of Stewart Pkwy and add a second northbound receiving lane by widening Edenbower Blvd (Medium Priority). This project could be constructed in phases.
- Edenbower Boulevard/Aviation Drive Intersection Improvements: Modify the northeast corner of the intersection to extend the existing westbound right-turn bay (Low Priority)

> ***Project Relevance:*** *The TSP should reference the IAMP to ensure consistency with or progress toward meeting OHP policies, standards, and targets such as state highway classifications, mobility targets, and access spacing standards.*

Interchange Area Management Plan: I-5 Exit 129 (March 2011)

IAMP 129 (2011) amends the OHP (1999) by identifying and prioritizing specific recommendations to improve safety and operations within the IAMP 129 study area. The IAMP 129 study area is mostly within the Roseburg UGB and partially within unincorporated Douglas County.

OHP Policy 3C requires that improvements necessary to support the recommendations of the IAMP are either identified in the local comprehensive plan and committed with an identified funding source or are already in place. Such improvements may include road networks, channelization, medians, and access control. The TSP should reference the plan to ensure consistency with the recommendations and performance standards of the IAMP.

IAMP 129 recommended the following transportation improvement projects:

- Signalize the intersection and add a second westbound through lane at the intersection of Del Rio Road and I-5 Southbound Ramp Terminal
- Add a second eastbound right turn lane at the intersection of Old Highway 99 and I-5 Northbound Ramp Terminal
- Add a second northbound left turn lane and add a southbound shared through/right turn lane at the intersection of Del Rio Road/ Umpqua College Road and Old Highway 99.

Since the completion of the IAMP, construction of the I-5: Del Rio Road/ Winchester Interchange (Exit 129) project was completed. The new interchange configuration moved all four interchange ramps and realigned Del Rio Road to lead directly into Umpqua College Road.

> ***Project Relevance:*** *The City should coordinate with ODOT in developing the TSP and evaluating land use actions that are likely to affect the function of the interchange so that the plan's projects, policies, and regulations are consistent with or move in the direction of meeting OHP policies, standards, and targets such as state highway classifications, mobility targets, and access spacing standards.*

ODOT Analysis Procedures Manual

The Analysis Procedures Manual (APM) was created to provide a comprehensive source of information regarding current methodologies, practices and procedures for conducting analysis of Oregon Department of Transportation (ODOT) plans and projects.

> ***Project Relevance:*** *The Consultant will follow the methodologies outlined in the APM for all traffic and multimodal analysis work. Any deviation from the APM is summarized in Technical Memorandum #1A: Methodology and Assumptions Memorandum.*

City Documents

City of Roseburg Urban Area Comprehensive Plan (1984)

The City of Roseburg Comprehensive Plan is a long-range policy guide for land use in the city's urban area. Transportation policy in the City TSP, as explored later in this report, is more recent and supersedes the older transportation policies in the Comprehensive Plan. The following are goals, objectives, and policies excerpted from the Comprehensive Plan that influence transportation system planning.

Economics Element

Objective 8. Continue to develop the urban area as a regional distribution, trade and service center.

Objective 12. Provide the necessary public facilities and services to allow economic development.

Public Facilities and Services Element

Objective 1. Provide a level of public facilities and services adequate to meet the needs of existing and planned development.

Objective 2. Direct the location and timing of urban development by means of capital improvement planning which is closely coordinated with the Comprehensive Plan.

Objective 3. Optimize the utilization of existing facilities.

Objective 5. Strive for continued and improved cooperation and coordination between other units of government as well as other public and private organizations which provide services to the urban area's citizens.

Urbanization, Land Use, and Growth Management

Residential Development

> *Goal: To promote and encourage residential densities and designs that conserve land and energy, minimize unnecessary and costly public service extensions and maintain the unique geographic character of the urban area; to enhance and protect the quality of existing neighborhoods; and to ensure varied living areas and housing types for residents of all income levels and an adequate supply of serviced, developable land to support such housing.*
>
> *Objective 2. Residential areas shall be protected by zoning ordinance, subdivision ordinance, and other regulations from any land use activity involving an excessive level of noise, pollution, traffic volume, nuisances, and hazards to residents.*

Commercial Development

> *Goal: To encourage and promote the health and vitality of the central City core as a focus of civic and business life….*

Industrial Development

> *Goal: To encourage and promote industrial development which strengthens the economic base of the community and minimize air, noise, water, and visual pollution.*

Public and Semi-Public Buildings and Lands Development

> *Goal: To provide for an arrangement of public and semi-public facilities and services which complement private development and meet the needs of Roseburg residents.*

Transportation Development

Goal: To insure the provision and coordination of transportation facilities and services that reflect desired development pattern and are timed to coincide with community needs and to minimize the adverse impacts of traffic on residential areas.

Policy 1. When practical, the circulation system shall utilize existing facilities and rights-of-way, and on-street parking shall be removed in preference to widening streets for additional travel lanes.

Policy 3. Transportation facilities shall be designed and constructed to minimize noise energy consumption, neighborhood disruption, cost, and social, environmental and institutional disruptions, and to encourage the use of public transit, bikeway, and walkways.

Policy 4. Traffic movement on arterial streets should be facilitated by limiting or controlling access wherever possible.

Project Relevance: *Update of the City's TSP constitutes an update of the City's Comprehensive Plan, as the TSP is an element of the Comprehensive Plan. LUDO amendments that may be needed to implement the updated will be based on existing and updated Comprehensive Plan and TSP policies.*

City of Roseburg Land Use and Development Ordinance (LUDO) (Updated 2016)

The City Land Use and Development Ordinance (LUDO) regulate all development within the city and implement the long-range land use vision embodied in the City Urban Area Comprehensive Plan. This is done through requirements for coordination of land use application review with ODOT, access management, and traffic impact studies (TISs). Coordination, access management, and TISs are addressed by development approval procedures in LUDO Chapters 3, 5, and 6.

Project Relevance: *The LUDO regulates all development within the city and implements the long-range land use vision from the Comprehensive Plan. Implementation of the updated TSP will rely on existing and potential proposed amendments to LUDO provisions regarding agency coordination, access management, traffic impact studies, zoning districts, and site development and land division standards.*

Coordination

Development approval procedures require that public agencies providing transportation facilities and services to be notified in the following cases:

- Land use applications that require a public hearing;
- Subdivision and partition applications;
- Applications that involve major private access to public streets and roads (e.g., private streets) and large commercial and multi-family developments; and
- Applications within the Airport Impact Overlay.[2]
- Site development that accesses ODOT right-of-way; and

[2] LUDO Section 5.1.070 (General Provisions Regarding Notice)

- Land Use Actions that may impact ODOT right-of-way (e.g., zone changes adjacent to ODOT right-of-way).

Access Management

Access management standards are established in site development review provisions.[3] They include driveway spacing standards according to roadway classification and land use and requirements that driveways take access from the lowest order of roadway. Access management standards also refer to the City and State for access permission.

Block standards are addressed in land division provisions.[4] Maximum block lengths of 500 feet are established for local streets and recommended minimum block lengths of 1,000 feet and 1,800 feet are established for collector and arterial streets respectively.

Traffic Impact Studies

Traffic impact study requirements are established in site development review provisions.[5] There are basic applicability criteria and content standards set in these provisions, with discretion left to the Public Works Director and Community Development Director about applicability and content.

Coordination, access management, and traffic impact study requirements are consistent with state regulations.

Zoning Districts

Zoning regulations are established in LUDO Chapter 2. A new zoning (overlay) district or new requirements for existing zoning districts may be considered as well.

City of Roseburg Transportation System Plan (2006)

This Transportation System Plan (TSP) provides guidance and regulatory tools so that the City can develop its transportation system through coordinated policies and planned improvements over the next 20 years. It also identifies planned transportation facilities and services needed to support planned land uses identified in the Comprehensive Plan in a manner consistent with the Transportation Planning Rule (OAR 660-012) and the Oregon Transportation Plan.

More generally, the TSP helps to accomplish the following goals:

- Assure adequate planned transportation facilities to support planned uses over the next 20 years;
- Provide certainty and predictability for locating new public streets, roads, and other planned transportation improvements;
- Provide predictability for land development; and
- Help reduce the costs and maximize the efficiency of public spending on transportation facilities and services by coordinating land use and transportation decisions.

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[3] LUDO Section 3.1.040(2) (Access, Parking, and Loading) and (3) (Access Permission)

[4] LUDO Section 6.1.120 (Platting and Mapping Standards – Blocks)

[5] LUDO Section 3.1.040(4)

Relevant goals and objectives include:

Goal 1. Overall Transportation System: Provide a transportation system for the Roseburg planning area that is safe, efficient, and accessible.

Objective A. Manage projected travel demand consistent with community, land use, environmental, economic, and livability goals.

Objective B. Use the Transportation System Plan as the legal basis and policy foundation for decisions involving transportation issues.

Objective H. Maintain access management standards for streets consistent with city, county, and state requirements to reduce conflicts among vehicles, trucks, bicycles, and pedestrians.

Goal 3. Transportation and Land Use: Maximize the efficiency of Roseburg's transportation system through effective land use planning.

Objective D. Integrate transportation and land use into development ordinances.

Goal 5. Balanced Transportation System: Facilitate the development of bus stops, bike lanes, sidewalks, and multi-use paths in the Roseburg UGB to provide more transportation options for Roseburg residents and visitors.

Objective L. City plans and the Land Use and Development Ordinance need to address the need to maximize the comfort level of driving (such as fewer distractions and driveways, increase sight distances, etc.) consistent with the needs for access.

Goal 6. Transportation that Supports Economic Development: Facilitate the provision of a multimodal transport system for the efficient, safe, and competitive movement of goods and services to, from, and within the Roseburg UGB.

Objective D. Designate arterial routes and freeway access are essential for efficient movement of goods. Design these facilities and adjacent land uses to reflect the needs of goods movement.

Objective E. Encourage and support the operation, maintenance, and expansion of facilities and services provided at or near the Roseburg Regional Airport that accommodate passenger air travel, air cargo, and charter services.

Goal 7. Funding Transportation System Improvements: Implement the transportation plan by working cooperatively with federal, state, regional, and local governments, the private sector, and residents. Create a stable, flexible financial system for funding transportation improvements.

Objective C. Coordinate transportation projects, policy issues, and development actions with all affected governmental units in the area. Key agencies for coordination include Douglas County, Oregon Department of Transportation, URCOG[6], and Umpqua Transit.

Objective G. Working in partnership with Oregon Department of Transportation, Douglas County, and other jurisdictions and agencies, develop a long-range financial strategy to make needed improvements to the transportation system and support operational and maintenance requirements.

The roadway classifications in the study area identified in the TSP as follows:

- Arterials: Edenbower Boulevard between Stephens Street and Stewart Parkway, Stephens Street, Stewart Parkway

[6] The Umpqua Regional Council of Governments is no longer active.

- Collector: Aviation Drive
- Minor collector: Edenbower Boulevard (between Renann Street and Stewart Parkway), Airport Road

The typical cross section for arterials and collectors includes a 6- to 8-foot sidewalk, a 7- to 8-foot landscape strip, and a 6-foot (or 5-foot on Industrial collectors) bike lane.

The following improvements are identified in the TSP in or near the study area:

- Edenbower Boulevard between the I-5 ramps: add two through lanes in each direction through the I-5 ramp terminal intersections.
- Edenbower Boulevard and I-5 northbound off-ramp: widen off-ramp to two lanes and add northbound double lefts and a channelized westbound right-turn lane. A new northbound on-ramp in partial cloverleaf configuration is recommended as identified in the Environmental Impact Statement (EIS). Edenbower Boulevard and I-5 southbound off-ramp: widen off-ramp to two lanes.
- Stephens Street at Edenbower Boulevard: add northbound double left-turn lanes and an eastbound right-turn lane.
- Stewart Parkway at Edenbower Boulevard: add eastbound double left-turn lanes, westbound double left-turn lanes, add an exclusive northbound right-turn lane, and add two exclusive southbound right-turn lanes.
- Stewart Parkway Improvements (0-5 years): This project is proposed to widen Stewart Parkway to four lanes between Harvey Avenue and Garden Valley Parkway, straighten the S-curves, and build a new bridge over the South Umpqua River. In addition, new bike lanes and sidewalk are proposed with this project to promote other modes of transportation. Also, an access management plan is proposed to be included as part of this project. The safety improvement at the intersection of Harvard Avenue at Stewart Parkway includes adding turn lanes (as recommended in the intersection improvements). By adding turn lanes, the vehicles stopped to make turns are taken out of the through traffic stream to reduce rear-end type crashes (predominant crash type). This project is part of the Roseburg CIP.
- Broad Street to Edenbower Boulevard (16-20 years): To improve safety and mobility, this project proposes reconstruct Broad Street to collector street design standards, construct drainage facilities, and construct pedestrian facilities. This project is part of the Roseburg CIP.
- The Stephens Street / Pine Street Safety Improvement Project (0-5 years) (from Mosher Avenue to Edenbower Blvd) proposes the project to include traffic signal coordination along the corridor (as recommended per roadway improvement projects), intersection turn lanes (as recommended under intersection improvements), and multimodal considerations.

Sidewalks gaps include:

- Aviation Drive south of Edenbower Boulevard (short-term)
- I-5 Westside Path adjacent to I-5 between Edenbower Boulevard to Dogwood Street or Hill Avenue (long-term)
- Broad Street: Bike lanes on Broad Street from the Edenbower Interchange to the new road connection and Sidewalk infill (long-term)

Project Relevance: *The policies in the TSP supersede the older transportation policies in the Comprehensive Plan. The goals, policies, standards, and projects in the TSP will be fully updated as part of this planning process in order to meet identified needs and provide consistency with applicable regulations (e.g., TPR).*

City of Roseburg Bike and Pedestrian Master Plan (2009)

The City Bike and Pedestrian Master Plan provides policy and design guidance for improvements to the bicycle and pedestrian system in the city as well as recommendations for programming to promote walking and bicycling. In terms of physical improvements to the system, the plan provides more detail to improvements proposed in the TSP.

In terms of infrastructure, the plan addresses on-road bicycle facilities, sidewalks, and paths. Proposed system improvements are categorized as short-term, medium-term, and long-term. Improvements proposed include:

Short-term improvements

- Oak and Washington Bridge – restriping
- Douglas Street (Fowler to Rifle Range Street) – striping and filling sidewalk gap
- West Harvard Avenue – storm grate elevation fixes
- Washington, Oak, and Douglas railroad crossing – improvements for pedestrians and bikes
- Harvard Avenue/I-5 – ramp safety improvements
- NW Garden Valley Road – refinement plan
- NE Stephens Street/Old Highway 99 – refinement plan
- Garden Valley Boulevard/I-5 overcrossing – restriping bike lane

Medium-term improvements

- West Harvard Avenue – refinement plan
- NE Stephens Street/Winchester – design and construction
- Garden Valley Boulevard/I-5 overcrossing – sidewalk widening and enhancements

Long-term improvements

- *Multi-use paths*
    - Deer Creek pathway – South Umpqua River to Douglas Avenue Bridge
    - Portland Avenue bridge – new crossing of South Umpqua River
    - Stewart Park – adjacent to Steward Park Drive from Harvard Avenue to South Umpqua River
    - South Umpqua River/East Riverbank – along east side of the river from Douglas Avenue to Portland Avenue (new crossing)
    - Jackson Street Trail – trail under Jackson Street Bridge over Deer Creek
    - Deer Creek Bridge – bridge across Deer Creek
- *Sidewalks*
    - Stewart Parkway/Garden Valley Boulevard – add sidewalk on Stewart Parkway north of Harvey Avenue and west along Garden Valley Boulevard
    - Fulton Street – add sidewalks from Diamond Lake Boulevard north to end of public street
    - Ramp Street – add sidewalks
    - Pine Street – add sidewalks from Rice Avenue south to existing sidewalks

  - Main Street – add sidewalks from Rice Avenue south
- *Bicycle lanes*
  - Ramp Street – Douglas Avenue to east and proposed connection to Terrace Drive
  - Spruce Street – Douglas Avenue to Mosher Avenue
  - Garden Valley Boulevard – Stephens Street to Mulholland Drive
  - Main Street – add bike lanes on collector
  - Mosher Avenue – Spruce Street to Mill Street; add bike lanes on collectors
  - Rice Avenue – Mill Street to Pine Street
  - Jackson Street – OR 138/Diamond Lake Boulevard to Douglas Avenue

Project Relevance: *The plan should reflect or be consistent with improvements and programs recommended in the Bike and Pedestrian Master Plan, as well as potentially propose additional improvements.*

City of Roseburg Waterfront Master Development Plan (2010)

The City of Roseburg Waterfront Master Development Plan was prepared guided by the following directives:

- Place a high priority on passive, open space and recreational bicycle/pedestrian uses.
- Place a high priority on linking the waterfront area to Downtown Roseburg.
- Focus on protecting and enhancing the scenic and natural settings of the South Umpqua River and Deer Creek.
- Provide a theme that ties the community together to create a unique, special place, a place that welcomes people to the community as they exit Interstate 5 and enter Downtown Roseburg.

The plan makes many recommendations for the area between I-5, the South Umpqua Riverfront, Deer Creek, and Downtown ranging from park improvements and transportation facility and streetscape improvements to property redevelopment. The recommended transportation-related improvements include:

- Improve entry landscape at the I-5 interchange and roads leading into Downtown Roseburg.
- Improve bicycle and pedestrian facilities on the Oak and Washington Bridges. Add design elements that contribute to the function of the bridges as gateways to Roseburg.
- Improve the Bridge Undercrossing along Deer Creek to encourage pedestrians and cyclists to move between the river and the north part of Downtown.
- Improve north end of Pine Street with better paving and landscape and encourage redevelopment of adjoining properties.
- Focus streetscape improvements on Oak and Washington Avenues to encourage pedestrian movement between downtown and the riverfront.
- Improve under-crossings of Oak and Washington Bridges along the future Riverfront Loop Trail.
- Build connections for a complete Waterfront Loop Trail.
- Build a Portland Avenue Bicycle/Pedestrian Bridge.

Project Relevance: *The plan should include projects identified in the Waterfront Master Development plan yet to be implemented, and may recommend additions to or modifications of these projects.*

City of Roseburg Downtown Master Plan (2000)

The City of Roseburg Downtown Master Plan presents an extensive set of new development standards (primarily for a new Central Business District) and building design guidelines.

The master plan also addresses public improvements. While the Downtown Master Plan was refined in part by the Waterfront Development Plan, this earlier plan more broadly addresses the Downtown and needed public improvements. Transportation-related improvements that are recommended in the master plan include:

- Streetscape improvement programs Douglas Avenue, Jackson Street, and Downtown
- Gateway monuments at Stephens Street/Douglas Avenue and Stephens Street/Mosher Avenue
- Two-way operations on all Downtown streets except Pine Street/Stephens Street, Oak Street/Washington Street, and Jackson Street/Main Street
- Four-way stop control on all streets Downtown except Stephens Street/Pine Street
- Vacation of Main Street north of Douglas Avenue for expanded City Hall area
- New parking structures and improvements to existing structures.

Project Relevance: *The transportation-related improvements recommended in the Downtown Master Plan were not incorporated into the 2006 TSP. A determination should be made in the TSP as to whether transportation-related projects and recommendations from the Downtown Master Plan have been implemented, and, if possible, a determination of whether these projects are still relevant and desired.*

Roseburg Downtown Plaza and Transit Station Project (2013)

The Roseburg Downtown Plaza and Transit Station Project scope originally included a single potential site for the development of a downtown plaza, the former Rite Aid site, located at the intersection of Washington Avenue and Jackson Street. In March 2013, the project was expanded to include a suitability assessment of six additional potential sites in the downtown area. Out of seven potential sites, the existing Rite Aid site ultimately was selected as the preferred plaza site based on its ability to accommodate the most appropriate development opportunities, adjacency to downtown and the potential to provide the greatest economic impact to the downtown core. Through this process, and informed by public review and comments, three conceptual plaza design options have been developed for this site. The size of the plaza, the amount (in square feet) of retail accommodated, the amount and location of parking, and access to the site all vary between the options.

Project Relevance: *To the extent necessary, recommendations developed during the planning process will be coordinated with the plaza and transit station improvements.*

City of Roseburg Public Works Standard Drawings (1995)

The City of Roseburg Public Work Standard Drawings address detailed engineering elements of transportation facilities as well as other public facilities. The Standard Drawings related to transportation facilities establish specifications for collector streets (commercial) and local streets (residential) as well driveway approaches and sidewalks. The Standards Drawings give dimensions and grades for travel lanes, curb, gutter, and sidewalk for collectors and local streets as well as bike lanes on collectors.

The specifications in the Standard Drawings vary from TSP cross-sections in terms of roadway dimensions, the inclusion of parking on collectors and parking strips on collectors and local streets in the TSP, and the lack of an arterial cross-section in the Standard Drawings.

Project Relevance: *The specifications in the Standard Drawings vary from 2006 TSP cross sections in terms of roadway dimensions, the inclusion of parking on collectors and parking strips on collectors and local* *streets in the TSP, and the lack of an arterial cross section in the Standard Drawings. Inconsistencies between the Standard Drawings and the TSP should be resolved.*

City of Roseburg Capital Improvement Plan (2016 - 2021)

The City of Roseburg 2016 - 2021 Capital Improvement Plan (CIP), adopted in March 2016, programs the funding and construction of significant capital projects for the next five years. The CIP addresses parks, bike trail, sidewalk/street light/traffic signal, transportation, airport, urban renewal, City facility/building replacement, storm drainage, and water projects. Several of these categories other than transportation – like parks, bike trail, airport, and urban renewal – include transportation-related projects.

Listed below are funded and programmed projects in the transportation element of the CIP.

- **Spruce/Parrott Street Improvements (Urban Renewal)** – This project will completely reconstruct both Spruce and Parrott Streets from Oak to Mosher. Parrott Street is a residential street that wyes into Spruce Street at Lane Avenue. Parrott Street serves as the alternate bicycle and pedestrian access for crossing under the Oak and Washington Street Bridges. Spruce Street serves an underdeveloped industrial area and is included within the Urban Renewal District. $400,000 (transportation element) in 2016-2017.
- **Stewart Parkway Bridge Deck Repairs** – Address the deteriorating condition of the concrete bridge deck on the Stewart Parkway Bridge over the South Umpqua River. ODOT is doing similar bridge work in summer of 2017, and staff is working with them to have this work included in their project. $200,000 in 2016-2017.
- **Stewart Parkway Widening – Valley View to Harvey** – Widen and realign Stewart Parkway between Valley View Drive and Harvey Court. Add a vehicle lane and bike lane northbound between Valley View Drive and the entrance to the Ford Family Foundation and sidewalk and storm drainage improvements on the east side of the roadway. From the Ford Family Foundation entrance south to Harvey Court, the widen the roadway to two lanes in each direction with bike lanes, realign the curves to meet current design standards, and install curb, gutter, sidewalk, street lighting and storm drainage improvements. Construct large detention ponds to alleviate flooding in the area that has previously been problematic. $3.75 million; $600,000 in 2016-2017, $3.15 million in 2017-2018.
- **Transportation Funding Options –** Budgeted to assist staff in identifying potential transportation funding options and potentially surveying voters regarding those options. $25,000 in 2016-2017.
- **Rifle Range Street LID –** Staff is considering formation of a Local Improvement District to fund improvements to Rifle Range Street. The project would serve a residential area north of Diamond Lake Boulevard. The overall project would reside in the Assessment Improvement Fund. The City's potential contribution to the overall project: $750,000 in 2018-2019.
- **Valley View Improvements –** Improve Valley View Drive between Keasey Street and Kline Street. Staff is considering formation of a Local Improvement District to fund this project. The overall project funding would reside in the Assessment Improvement Fund. The City's potential contribution to an LID project: $400,000 in 2018-2019.
- **Douglas Avenue Transportation Enhancement Improvements –** The City has applied to ODOT for a Transportation Enhancement grant to make improvements to Douglas Avenue from Stephens Street to the City Limits. Improvements west of Deer Creek would include improved ADA access ramps, street lighting, signage and striping to accommodate bicycles. Improvements east of Deer Creek would include widening to include bike lanes, curb, gutter, storm drainage, sidewalks and street lighting. The project may also include improvements to the multi-use path and pedestrian bridge connecting Eastwood Park to Eastwood School and an enhanced crossing treatment where the path meets

Douglas Avenue. The project is dependent upon receiving grant funding. The funding shown below is the matching funds and costs of repaving existing sections of Douglas Avenue. $475,000 in 2019-2020.

- **Fulton/Lake/Odell/Gardiner Street Improvements –** Full street improvements for sections of Fulton, Lake, Odell and Gardiner Streets. This project will provide connection to and be done in conjunction with other developer driven improvements in this area. This project is not fully funded. It is expected that a significant amount of funding will come from developers. $600,000; $50,000 in 2019-2020 and $550,000 in 2020-2021.
- **Stewart Parkway – Harvey South Design –** New bridge construction or bridge widening to accommodate additional travel lanes. This project would be the final phase of the multi-phase Stewart Parkway Improvements and would connect to planned improvements near the YMCA and complete the section south to Harvard Avenue. The following funding would be targeted at alternative analysis and design. $500,000 total; $250,000 in 2019-2020 and $250,000 in 2020-2021.
- **Winchester Intersection Improvements Design –** Construct safety improvements the intersection of Stephens Street and Winchester Street. This project is not fully developed and additional preliminary design will need to occur to define project scope and costs. Potential solutions may include realigning and/or signalizing the intersection. It is likely that additional funding will need to be identified to construct this project. $225,000 in 2020-2021.
- **GIS/Mapping Improvements –** Money budgeted annually for maintaining the City's GIS system related to storm drainage. Funds will be used for maintaining/upgrading the computer system, handheld GPS units and related software and technical support. Money is also budgeted every five years to update the City's aerial photos, next scheduled for 2017/18. $30,000; $5,000 in 2016-2017, $10,000 in 2017-2018, $5,000 in 2018-2019 and $5,000 in 2020-2021.

Project Relevance: *Projects recommended in the plan should be coordinated with CIP projects as appropriate, including non-transportation projects in public right-of-way.*

Roseburg Regional Airport Layout Plan Report (2006)

The Roseburg Regional Airport is northeast of Exit 125. The Airport Layout Plan (ALP) Report identifies the current, short-term, and long-term needs of the airport. It updates the airport layout plan, airspace plan, and land use plan for the airport and the surrounding area. According to the Draft 2012 City CIP, the Airport Master Plan and ALP will be updated in 2013/2014 – 2014/2015, following completion of the taxiway relocation, runway extension, and other airport improvements. It appears from the airport's website that the taxiway relocation project is still underway and that the plan update has not yet begun.

Airport Layout Plan

The preferred alternative for the airport layout plan includes elements affecting land use and transportation planning in the study area.

- Based on current airline industry market conditions, it is believed that scheduled commercial air service by FAR Part 135 operators (commuter) may now be feasible.
- Scheduled commercial air service by operators such as Horizon Air is not anticipated during the 20-year planning period.
- A commercial air terminal reserve is recommended to be located adjacent to and west of the end of Runway 16.

Land Use Plan

Existing zoning has designated land around the airport (east and north) for manufacturing uses. This zoning is compatible with airport operations. Land south of the airport is zoned for residential use. Development of new residential areas, or increasing the densities of existing residential areas within the boundaries of the protected airspace surfaces of the airport, should be discouraged to ensure the long-term viability of the airport.

A "non-aviation commercial industrial reserve" is designated near the north end of the airport, beyond the future RPZ for Runway 16. This area (approximately 8 acres) is physically separated by Edenbower Boulevard and has several site constraints that prevent aviation-related development. The City of Roseburg should prepare necessary documentation for FAA review to support proposed non-aviation use and potential sale of this site, consistent with current planning.

> ***Project Relevance:*** *The planning process should take into consideration the facility and service expansions and possible development of airport property for non-aviation uses as recommended in the airport layout and land use plans.*

City Urban Renewal Plan

The North Roseburg Urban Renewal Plan was adopted in 1989. The Second Amendment to the Urban Renewal Plan in 2005 made the following changes to the Urban Renewal Plan:

- Removed 116.58 acres of land from the Plan boundary, and added 161.88 acres, bringing the downtown area into the Plan boundary.
- Added additional projects to the list of projects to be carried out under the Plan.
- Changed the maximum indebtedness of the Plan from $30,150,133 to $77,250,133.
- Changed the “Amendments” section of the Plan to reflect the current status of wording in ORS 457.

It is anticipated that the year 2019-20 will be the year in which projects can be carried out, indebtedness paid and tax increment collection terminated.

> ***Project Relevance:*** *The planning process should take into consideration the planned end to Urban Renewal funds and the projects that are anticipated to be completed before then.*

City Transportation System Analysis of Stephens Street from Garden Valley to Washington Street

This document was not available and thus not reviewed as part of this Plan and Policy review.

West Avenue Redevelopment Plan and Mill-Pine Neighborhood Master Plan

These documents outline plans for specific areas in the City of Roseburg. Though not reviewed as part of this Plan and Policy review, the TSP will need to ensure proposed improvements are in alignment with these adopted plans.

Miscellaneous Documents

American Association of State Highway and Transportation Officials (AASHTO) Policy of Geometric Design of Highways and Streets

See the section on the Highway Design Manual (2011) (HDM) on page 13. The HDM is in general agreement with the AASHTO *A Policy on Geometric Design of Highways and Streets*.

Douglas County Transportation System Plan (1998) and Amendments (2001)

The TSP was compiled from the Douglas County Comprehensive Plan Transportation Element and support documents. The Transportation Element contains findings concerning: the background and existing conditions that affect Douglas County's transportation system; a description of Douglas County's transportation facilities; a County roadway network plan; a Bikeway Master Plan; transportation goals and policies; and bikeway policies. The support documents contain discussions of road, rail, air, waterways, pipeline, pedestrian and bicycle modes, and the transportation for the disadvantaged.

Transportation objectives and policies applicable to planning for the Roseburg TSP Update are excerpted below:

Objective A: To accommodate existing and projected transportation demands in Douglas County.

Policy 2. The evaluation of all proposed Comprehensive Plan and Land Use Regulation amendments should specifically address the Transportation Planning Rule requirements that an amendment to land use designations, densities, and design standards are consistent with the functions, capacities and performance standards of facilities identified in the Transportation System Plan.

Policy 3. Existing and planned transportation facilities and corridors shall be protected from conflicting land uses.

Policy 4. All transportation facilities should be periodically evaluated for their adequacy to accommodate existing demand.

Policy Implementation: The evaluation of all proposed Comprehensive Plan and Land Use Regulation amendments shall address the transportation criteria found in the Land Use and Development Ordinance, Quasi-judicial Plan Amendment Chapter, Amendment Standards, of the Application Form and Content section.

Objective B: To develop and utilize design standards for road construction which promote vehicular safety and economy of construction.

Policy 1. The following classification system will be used for the planning and maintenance of all roads within the County maintenance system: a Principal Highway, b. Arterial, c. Major Collector, d. Minor Collector, e. Local

Policy 3. Pursuant to the Oregon Highway Plan, direct access points to state managed interstate highway and interchanges shall be prohibited. Direct access to remaining principal highways and arterial roadways should be discouraged to avoid conflicts with through traffic.

Policy 4. Direct access to non-interstate Principal Highways should be provided within unincorporated communities at levels which are consistent with land use classifications and facility operations.

Policy 5. Access to state roads is the jurisdiction of the Oregon Department of Transportation.

Objective F: To encourage, coordinate and assist in the development of transportation modes other than private vehicle.

Policy 1. The installation of spur lines in industrial areas as means of facilitating the use of rail transportation shall be encouraged.

Bicycle transportation objectives and policies applicable to planning for the Roseburg TSP Update are excerpted below:

Objective E: To develop a set of standards for bikeway development and establish a prioritization of bikeway construction.

Policy 4. The State of Oregon Department of Transportation is encouraged to install appropriate bikeway improvements on highways and roads under their jurisdiction (and within their maintenance system) as improvement projects are conducted on designated County bikeways.

Proposed urban and rural preferred alternatives that are considered conceptual in nature with no funding identified that are incorporated in the TSP include:

- Extend Vine Street north from Roseburg City Limits to NE Stephens near the new east-west facility that connects to the north Roseburg Interchange. This project should be completed as the area develops and may address two needs. The route will serve as a frontage road to local street networks and should reduce the local traffic usage of North Stephens.

Project Relevance: Upon completion of the TSP, subsequent amendments to the County's TSP will need to be compatible with the Roseburg TSP. If roadways are under County jurisdiction, County mobility targets apply.

METHODOLOGY MEMORANDUM

DATE: August 20, 2018

TO: Roseburg TSP Project management Team

FROM: Angela Rogge, PE, David Evans and Associates, Inc.
Dana Shuff, EIT, David Evans and Associates, Inc.

SUBJECT: Roseburg Transportation System Plan Update
Task 3.4, TM #1, Appendix A (Methodology and Assumptions Memorandum)

This memorandum summarizes the approach for collection and evaluation of information that the City of Roseburg Transportation System Plan (TSP) Update will use for traffic analysis purposes. The City of Roseburg is located in southern Oregon and is bisected by Interstate 5 (I-5). Roseburg serves as the county seat and regional center of Douglas County. The planning area includes the area within the City's UGB (Urban Growth Boundary).

Volume Development

Study Area Intersections

The TSP includes 76 locations for analysis. Of the 76 locations, 24 have been studied previously and will not require further post-processing. Since there have been a number of other plans done in the recent past, the 24 previously studied intersections will have volumes, needs, solutions, etc. that will be pulled directly from those plans to avoid having to do rework and create any potential conflicts. Appropriate footnotes will be created in future deliverables to notify the reader when this is done. The study area intersections are summarized below:

1. NE Chestnut Ave @ NE Cedar St
2. NE Diamond Lake Blvd @ SE Stephens St
3. NE Diamond Lake Blvd @ NE Jackson St/NE Winchester St
4. NE Diamond Lake Blvd @ NE Fulton St
5. NE Diamond Lake Blvd @ NE Rifle Range St
6. NE Diamond Lake Blvd @ NE Douglas Ave
7. NE Douglas Ave @ NE Rifle Range St
8. SE Douglas Ave @ NE Jackson St
9. SE Douglas Ave @ SE Kane St
10. SE Douglas Ave @ SE Ramp Rd
11. NW Edenbower Blvd @ NE Stephens St **(Previously studied – IAMP 127)**
12. NW Edenbower Blvd @ NW Aviation Dr **(Previously studied – IAMP 127)**
13. NW Edenbower Blvd @ NW Broad St **(Previously studied – IAMP 127)**
14. NE Garden Valley Blvd @ NE Walnut Street
15. NE Garden Valley Blvd @ NE Rocky Ridge Dr
16. NE Garden Valley Blvd @ NE Stephens St
17. NE Garden Valley Blvd @ NE Airport Rd/NE Cedar St **(Previously studied – Draft IAMP 125)**
18. NW Garden Valley Blvd @ Garden Valley Shopping Center **(Previously studied – Draft IAMP 125)**
19. NW Garden Valley Blvd @ Centennial Dr/NE Estelle St **(Previously studied – Draft IAMP 125)**
20. NW Garden Valley Blvd @ NW Goetz Street/Duck Pond Street
21. NW Garden Valley Blvd @ NW Stewart Pkwy.
22. NW Garden Valley Blvd @ Roseburg Valley Mall (Middle Entrance)
23. NW Garden Valley Blvd @ NW Kline St
24. NW Garden Valley Blvd @ NW Troost St
25. NW Garden Valley Blvd @ Melrose Rd
26. NW Keasey St @ NW Calkins Rd
27. W. Harvard Ave @ Lookingglass Rd
28. W. Harvard Ave @ W. Broccoli St
29. W. Harvard Ave @ W. Keady Ct.
30. W. Harvard Ave @ NW Stewart Pkwy.
31. W. Harvard Ave @ Centennial Dr

32. W. Harvard Ave @ W. Maple St **(Previously studied – Draft IAMP 124)**
33. W. Harvard Ave @ W. Harrison St **(Previously studied – Draft IAMP 124**)
34. W. Harvard Ave @ W. Corey St **(Previously studied – Draft IAMP 124)**
35. W. Harvard Ave @ W. Umpqua St **(Previously studied – Draft IAMP 124)**
36. I-5 Exit 129 @ SB On/Off Ramps/Del Rio Rd
37. I-5 Exit 129 @ NB On/Off Ramps/OR 99
38. I-5 Exit 127 @ NB On/Off Ramps/NW Edenbower Blvd **(Previously studied – IAMP 127)**
39. I-5 Exit 127 @ SB On/Off Ramps/NW Edenbower Blvd **(Previously studied – IAMP 127)**
40. I-5 Exit 125 @ NB Off-Ramp/NW Garden Valley Blvd/NW Mulholland Dr **(Previously studied – Draft IAMP 125)**
41. I-5 Exit 125 @ SB On-Ramp/NW Garden Valley Blvd/NW Mulholland Dr **(Previously studied – Draft IAMP 125)**
42. I-5 Exit 124 @ NB On/Off Ramps/W. Harvard Ave **(Previously studied – Draft IAMP 124)**
43. I-5 Exit 124 @ SB On/Off Ramps/W. Harvard Ave **(Previously studied – Draft IAMP 124)**
44. I-5 Exit 124 @ NB On-Ramp/W. Harvard Ave **(Previously studied – Draft IAMP 124)**
45. I-5 Exit 123 @ NB On/Off Ramps/SW Portland Ave
46. I-5 Exit 123 @ SB On/Off Ramps/SW Portland Ave
47. NE Lincoln St @ NE Malheur Ave
48. SE Oak Ave @ SE Spruce St **(Previously studied – Draft IAMP 124)**
49. SE Oak Ave @ SE Pine St **(Previously studied – Draft IAMP 124)**
50. SE Oak Ave @ SE Stephens St **(Previously studied – Draft IAMP 124)**
51. SE Oak Ave @ SE Jackson St
52. OR 99 @ Wilbur Rd
53. OR 99 @ N. Bank Rd
54. OR 99 @ Del Rio Rd /Umpqua College Rd
55. SE Pine St @ SE Mosher Ave
56. NE Stephens St @ Kenneth Ford Dr
57. NE Stephens St @ NE Newton Creek Rd
58. NE Stephens St @ NE Chestnut Ave
59. NE Stephens St @ NE Winchester St
60. SE Stephens St @ SE Douglas Ave
61. SE Stephens St @ SE Mosher Ave
62. SE Stephens St @ S. Gate Shopping Center Entrance
63. NW Stewart Pkwy. @ NE Stephens St
64. NW Stewart Pkwy. @ NE Airport Rd
65. NW Stewart Pkwy. @ NW Aviation Dr /NW Mullholland Dr
66. NW Stewart Pkwy. @ NW Edenbower Blvd **(Previously studied – IAMP 127)**
67. NW Stewart Pkwy. @ Roseburg Mall Entrance/Walmart Entrance
68. NW Stewart Pkwy. @ NW Valley View Dr
69. NW Stewart Pkwy. @ NW Harvey Ave
70. NW Troost St @ NW Calkins Rd
71. NE Vine St @ NE Alameda Ave
72. SE Washington Ave @ W. Madrone St **(Previously studied – Draft IAMP 124)**
73. SE Washington Ave @ SE Spruce St
74. SE Washington Ave @ SE Pine St **(Previously studied – Draft IAMP 124)**
75. SE Washington Ave @ SE Stephens St **(Previously studied – Draft IAMP 124)**
76. SE Washington Ave @ SE Jackson St

Traffic Data Collection

The transportation and traffic analysis will be based on existing year 2016 conditions for the design hour (30th highest) volumes.

The Consultant shall assemble classification counts as provided by ODOT (summarized in Table 1):

- 24-hour turning movement counts, including bicycles and pedestrians with 15 minute breakdowns from 6:00 AM to 9:00 AM, 11:00 AM to 1:00 PM, and 3:00 PM to 6:00 PM
- 16-hour turning movement counts, including bicycles and pedestrians with 15 minute breakdowns from 2:00 PM to 6:00 PM
- 12-hour turning movement counts, including bicycles and pedestrians with breakdowns from 6:00 AM to 9:00 AM and 2:00 PM to 6:00 PM
- 4-hour PM peak turning movement counts, including bicycles and pedestrians, with 15 minute breakdowns between 2:00 PM and 6:00 PM

- 48-hour volume tube counts, in 15 minute intervals

Not all of the study intersections have new count data. For those intersections, traffic volumes and operations from previous studies will be used as noted in Table 1.

TABLE 1. SUMMARY OF TRAFFIC COUNTS

ID	Count Location	Count Type	Duration	Date
1	NE Chestnut Ave @ NE Cedar St	Turning Movement	16 hr	6/9/2015
2	NE Diamond Lake Blvd @ SE Stephens St	Turning movement volumes & operations from TPAU		
3	NE Diamond Lake Blvd @ NE Jackson St/NE Winchester St	Turning movement volumes & operations from TPAU		
4	NE Diamond Lake Blvd @ NE Fulton St	Turning Movement	24 hr	5/12/15-5/13/15
5	NE Diamond Lake Blvd @ NE Rifle Range St	Turning Movement	16 hr	5/13/2015
6	NE Diamond Lake Blvd @ NE Douglas Ave	Turning Movement	16 hr	6/3/2015
7	NE Douglas Ave @ NE Rifle Range St	Turning Movement	16 hr	6/3/2015
8	SE Douglas Ave @ NE Jackson St	Turning Movement	16 hr	5/13/2015
9	SE Douglas Ave @ SE Kane St	Turning Movement	16 hr	6/8/2015
10	SE Douglas Ave @ SE Ramp Rd	Turning Movement	16 hr	6/2/2015
11	NW Edenbower Blvd @ NE Stephens St (IAMP 127)	Turning movement volumes & operations from IAMP 127		
12	NW Edenbower Blvd @ NW Aviation Dr (IAMP 127)	Turning movement volumes & operations from IAMP 127		
13	NW Edenbower Blvd @ NW Broad St (IAMP 127)	Turning movement volumes & operations from IAMP 127		
14	NE Garden Valley Blvd @ NE Walnut Street	Turning Movement	4 hr	4/25/2016
15	NE Garden Valley Blvd @ NE Rocky Ridge Dr	Turning Movement	16 hr	6/9/2015
16	NE Garden Valley Blvd @ NE Stephens St	Turning Movement	4 hr	5/31/2018
17	NE Garden Valley Blvd @ NE Airport Rd/NE Cedar St (Draft IAMP 125)	Turning movement volumes & operations from IAMP 125		
18	NW Garden Valley Blvd @ Garden Valley Shopping Center (Draft IAMP 125)	Turning movement volumes & operations from IAMP 125		
19	NW Garden Valley Blvd @ Centennial Dr/NE Estelle St (Draft IAMP 125)	Turning movement volumes & operations from IAMP 125		
20	NW Garden Valley Blvd @ NW Goetz Street/Duck Pond Street	Turning Movement	4 hr	4/25/2016
21	NW Garden Valley Blvd @ NW Stewart Pkwy	Turning Movement	4 hr	5/31/2018
22	NW Garden Valley Blvd @ Roseburg Valley Mall (Middle Entrance)	Turning Movement	16 hr	5/19/2015
23	NW Garden Valley Blvd @ NW Kline St	Turning Movement	16 hr	5/18/2015
24	NW Garden Valley Blvd @ NW Troost St	Turning Movement	16 hr	5/18/2015
25	NW Garden Valley Blvd @ Melrose Rd	Turning Movement	16 hr	5/18/2015
26	NW Keasey St @ NW Calkins Rd	Turning Movement	16 hr	6/9/2015
27	W. Harvard Ave @ Lookingglass Rd	Turning Movement	16 hr	5/14/2015
28	W. Harvard Ave @ W. Broccoli St	Turning Movement	16 hr	6/5/2015
29	W. Harvard Ave @ W. Keady Ct.	Turning Movement	16 hr	6/1/2015

ID	Count Location	Count Type	Duration	Date
30	W. Harvard Ave @ NW Stewart Pkwy	Turning Movement	4 hr	5/31/2018
31	W. Harvard Ave @ Centennial Dr	Turning Movement	16 hr	6/10/2015
32	W. Harvard Ave @ W. Maple St (Draft IAMP 124)	Turning movement volumes & operations from IAMP 124		
33	W. Harvard Ave @ W. Harrison St (Draft IAMP 124)	Turning movement volumes & operations from IAMP 124		
34	W. Harvard Ave @ W. Corey St (Draft IAMP 124)	Turning movement volumes & operations from IAMP 124		
35	W. Harvard Ave @ W. Umpqua St (Draft IAMP 124)	Turning movement volumes & operations from IAMP 124		
36	I-5 Exit 129 @ SB On/Off Ramps/Del Rio Rd	Tube	48 hr	4/29/14-5/1/14
37	I-5 Exit 129 @ NB On/Off Ramps/OR 99	Turning Movement	16 hr	5/11/2015
38	I-5 Exit 127 @ NB On/Off Ramps/NW Edenbower Blvd (IAMP 127)	Turning movement volumes & operations from IAMP 127		
39	I-5 Exit 127 @ SB On/Off Ramps/NW Edenbower Blvd (IAMP 127)	Turning movement volumes & operations from IAMP 127		
40	I-5 Exit 125 @ NB Off-Ramp/NW Garden Valley Blvd/NW Mulholland Dr (Draft IAMP 125)	Turning movement volumes & operations from IAMP 125		
41	I-5 Exit 125 @ SB On-Ramp/NW Garden Valley Blvd/NW Mulholland Dr (Draft IAMP 125)	Turning movement volumes & operations from IAMP 125		
42	I-5 Exit 124 @ NB On/Off Ramps/W. Harvard Ave(Draft IAMP 124)	Turning movement volumes & operations from IAMP 124		
43	I-5 Exit 124 @ SB On/Off Ramps/W. Harvard Ave(Draft IAMP 124)	Turning movement volumes & operations from IAMP 124		
44	I-5 Exit 124 @ NB On-Ramp/W. Harvard Ave(Draft IAMP 124)	Turning movement volumes & operations from IAMP 124		
45	I-5 Exit 123 @ NB On/Off Ramps/SW Portland Ave	Turning Movement	4 hr	6/4/2015
46	I-5 Exit 123 @ SB On/Off Ramps/SW Portland Ave	Turning Movement	16 hr	6/3/2015
47	NE Lincoln St @ NE Malheur Ave	Turning Movement	16 hr	6/16/2015
48	SE Oak Ave @ SE Spruce St (Draft IAMP 124)	Turning movement volumes & operations from IAMP 124		
49	SE Oak Ave @ SE Pine St (Draft IAMP 124)	Turning movement volumes & operations from IAMP 124		
50	SE Oak Ave @ SE Stephens St (Draft IAMP 124)	Turning movement volumes & operations from IAMP 124		
51	SE Oak Ave @ SE Jackson St	Turning Movement	16 hr	6/8/2015
52	OR 99 @ Wilbur Rd	Turning Movement	16 hr	6/15/2015
53	OR 99 @ N. Bank Rd	Turning Movement	16 hr	6/15/2015
54	OR 99 @ Del Rio Rd /Umpqua College Rd	Turning Movement	16 hr	6/3/2015
55	SE Pine St @ SE Mosher Ave	Turning Movement	16 hr	5/21/2015
56	NE Stephens St @ Kenneth Ford Dr	Turning Movement	16 hr	6/15/2015
57	NE Stephens St @ NE Newton Creek Rd	Turning Movement	16 hr	5/14/2015
58	NE Stephens St @ NE Chestnut Ave	Turning Movement	16 hr	5/20/2015
59	NE Stephens St @ NE Winchester St	Turning Movement	4 hr	5/20/2015
60	SE Stephens St @ SE Douglas Ave	Turning movement volumes & operations from TPAU		
61	SE Stephens St @ SE Mosher Ave	Turning Movement	16 hr	5/20/2015
62	SE Stephens St @ S. Gate Shopping Center Entrance	Turning Movement	16 hr	6/15/2015
63	NW Stewart Pkwy. @ NE Stephens St	Turning Movement	4 hr	5/31/2018

ID	Count Location	Count Type	Duration	Date
64	NW Stewart Pkwy. @ NE Airport Rd	Turning Movement	16 hr	5/21/2015
65	NW Stewart Pkwy. @ NW Aviation Dr /NW Mullholland Dr	Turning Movement	16 hr	2/27/2013
66	NW Stewart Pkwy. @ NW Edenbower Blvd (IAMP 127)	Turning movement volumes & operations from IAMP 127		
67	NW Stewart Pkwy. @ Roseburg Mall Entrance/Walmart Entrance	Turning Movement	16 hr	5/19/2015
68	NW Stewart Pkwy. @ NW Valley View Dr	Turning Movement	16 hr	6/10/2015
69	NW Stewart Pkwy. @ NW Harvey Ave	Turning Movement	16 hr	5/19/2015
70	NW Troost St @ NW Calkins Rd	Turning Movement	16 hr	5/19/2015
71	NE Vine St @ NE Alameda Ave	Turning Movement	16 hr	6/8/2015
72	SE Washington Ave @ W. Madrone St (Draft IAMP 124)	Turning movement volumes & operations from IAMP 124		
73	SE Washington Ave @ SE Spruce St	Turning Movement	16 hr	5/31/2018
74	SE Washington Ave @ SE Pine St (Draft IAMP 124)	Turning movement volumes & operations from IAMP 124		
75	SE Washington Ave @ SE Stephens St (Draft IAMP 124)	Turning movement volumes & operations from IAMP 124		
76	SE Washington Ave @ SE Jackson St	Turning Movement	16 hr	6/9/2015

Note: Highlighted rows indicated this location will not require new analysis; turning movement volumes and operations will be pulled from previous studies.

Design Hour (30th Highest) Volumes

Data for existing weekday counts will be reviewed to determine which hour is the highest traffic demand hour for the study area. Turning movements, peak hour factors, vehicle classification, and other data describing demand in the study area will be derived for this peak hour for intersections that have not been previously studied.

Inventory of Existing Facilities

The transportation system inventory is a citywide inventory of the street network, bicycle and pedestrian facilities and transit facilities.

Traffic Volumes

Traffic volumes will be developed for two study periods: existing year 2016 and future year 2040. The forecast year is compliant with the 20-year forecast requirement of Transportation Planning Rule (TPR) and allows for easier data sharing between upcoming projects in the region.

Existing Volumes

The existing PM peak hour volumes will be determined from the existing weekday counts and adjusted to design hourly volumes following the methodologies outlined in the ODOT Transportation Planning and Analysis Unit's (TPAU) *Analysis Procedures Manual* (APM) *Volume 2*.

Peak Hour Selection

A single system peak hour will be used for analysis purposes. Traffic counts will be reviewed in 15-minute intervals to determine the true peak hour for the entire study area. The final selection of a peak hour will be based on a simple majority of counts that have the same peak hour, which emphasis given to arterials.

Adjustment to Baseline Analysis Year

The project base year is 2016 but several of the counts available were counted as early as 2013. Of the intersections not previously studied, the following summarizes how many were counted in 2013, 2014, 2015 and 2016:

- 2013: 1 intersection
- 2014: 1 intersection
- 2015: 40 intersections
- 2016: 2 intersections
- 2018: 5 intersections

The previous update of the Roseburg TSP used an annual growth factor or 2.5% per year. The current TSP update will use ODOT's most current Future Volume Table and assume linear growth to adjust the counts to the base year of 2016. If more than one growth factor is applicable to an intersection, the factors will be averaged and applied to all movements of the study intersection. Table 2 summarizes the growth factors for the intersections not previously studied. The calculations are available in Attachment A.

As part of a project amendment, five intersections that were previously studied had new counts collected in 2018. This allows for updated operational outputs and project identification. The counts do not have a growth factor applied as they represent current conditions.

TABLE 2. GROWTH FACTORS (TO BASE YEAR 2016)

Description	1 Year Growth Factor	2 Year Growth Factor	3 Year Growth Factor
I-5 Exit 123 Ramp Terminals	1.013	1.026	1.038
I-5 Exit 129 Ramp Terminals	1.019	1.037	1.056
OR 138 and 4-Lane Arterials (e.g., Garden Valley Blvd, Harvard Ave, Stewart Pkwy and Stephens St)	1.012	1.023	1.035
Other Streets	1.010	1.020	1.030

Seasonal Adjustment Factors

Since traffic counts were taken during various times of the year, data from varying months will need to be converted to peak month equivalents using calculated seasonal adjustment factors. TPAU has three methods for developing seasonal factors: On-Site ATR Method, ATR Characteristic Table Method, and ATR Seasonal Trend Table Method. To accommodate the varying road types within the study area, different methods were used to develop seasonal factors for I-5 Ramps and all other streets. This is similar to the methodology used in the previous TSP update and IAMPs 124, 125 and 127.

There are no ATRs in the study area that meet all of the requirements for the on-site ATR method. The on-site ATR method requires that the ATR be located within or near the project area. If the ATR is located outside the project area, there should be no major intersections between the ATR and the project area and the Average Annual Daily Traffic (AADT) collected by the ATR must be within 10 percent of the AADT near the project area.

This memorandum calculates the seasonal factors for the count months of February, April, May and June. The traffic volumes will be multiplied by their appropriate seasonal factor to determine the 30th highest hour volumes.

I-5 Ramp Terminals

The Characteristic Table Method requires that the ATR be located on a facility that shares similar characteristics with the facility to be adjusted, such as seasonal traffic trends, area type, and number of lanes. Based on the characteristics of I-5 through the study area (Interstate Highway and Small Urban Fringe), two ATRs were selected to develop seasonal factors: ATR 10-005 and ATR 09-020.

ATR 10-005 is located along I-5, 0.53 miles north of the Winchester interchange and north of Roseburg. ATR 09-020 is located along US 97, 1.40 miles south of Yew Avenue in Redmond. US 97 is classified as a State Highway in a Small Urban Fringe. ATR 10-005 reflects conditions of I-5 mainline and ramp traffic in the study area, while ATR 09-020 provides a more similar commuter traffic trend. As such, considering that the AADT for both ATRs are within 10 percent of the study area AADT, an average of the two ATRs offers an appropriate seasonal adjustment factor.

Based on historical traffic data provided by the ATR, the Peak Month generally occurs in July or August. Attachment B summarizes the seasonal factor calculations.

Other Study Area Intersections

The seasonal factors for traffic moving on the local street network was calculated based on the count date using the ATR Seasonal Trend Method for a commuter route. These factors will be applied to two study area intersections.

TABLE 3. SEASONAL FACTORS

SEASONAL FACTORS	*I-5 Ramp Terminals* *(ATR 09-020 and 10-005)*	*Other Study Area Intersections* *(Commuter Trend)*
February	Not Applicable	1.09
April	1.15	1.03
May	1.12	1.03
June	1.04	1.04

Balancing

Once the seasonal factors are applied, the volumes will be input into Synchro and balanced accordingly. For conservative analysis, it is preferable to add traffic to the system instead of remove; this approach will be taken whenever possible. Volume imbalances between intersections will be managed to represent the volumes into and out of residential developments and commercial lots between study area intersections, whenever applicable.

Future Design Year 2040 Volumes

The future baseline volumes of intersections not previously studied will be developed from existing turning movement volumes and travel demand forecasting output from the Roseburg V2 model.

The post-processing procedures will follow APM and NCHRP Report 765 guidelines. To convert model volumes to design hour volumes, the two most commonly used methods are the growth method and the difference method.

Both methods will be compared in a spreadsheet and if the difference in values between the two methods is greater than 10 percent, then the value from the difference method will be used, otherwise the values from the methods will be averaged. The forecasted link volumes will reference the NCHRP Report 765 spreadsheet to determine the year 2040 turning movement volumes and the volumes will be rounded to the nearest five vehicles and balanced in Synchro.

Intersections that have been analyzed in previous studies will not be post-processed; the operations and future volumes will be copied directly from the previous planning documents. If as part of the TSP update process it becomes apparent that previous studies conflicts with more recent analysis results, the Consultant will work with the Project Management Team (PMT) to find an appropriate plan forward.

Evaluation Comparison Tools

Tools and techniques used to evaluate and compare the alternatives include traffic operations analysis tools for more detailed assessment of area conditions. Due to the potential latent demand shifts, the future baseline model volumes will be compared with the alternative model volumes and adjustment factors created and used as needed.

Traffic Mobility Targets

The City's performance measure standard is as follows:

Outside of Downtown District Boundary:

- Volume-to-capacity (V/C) ratio:
  - Arterial = 0.85
  - Collector = 0.90
  - Local = 0.95
- Level of service (LOS) standards:
  - LOS D for signalized intersections
  - LOS E for unsignalized intersections

Within Downtown District Boundary:

- Volume-to-capacity (V/C) ratio: 0.95
- Level of service (LOS) standards: LOS E

A summary of mobility targets by study area intersection is provided in Table 4.

The mobility targets of Douglas County facilities vary by the classification of the route and its urban or rural nature. According to the Douglas County TSP, "where two different county route classifications intersect, the V/C ratio of the higher county classification shall be used for the intersection. The intersection of a county Arterial and county Major Collector shall use the V/C ratio of the Arterial as the standard for the intersection."

For State facilities, the Oregon Highway Plan (OHP) and the Highway Design Manual (HDM) will be used in the assessment of intersection operations. Both documents base their mobility performance on the calculation of V/C; however, the standards in the HDM are based on higher performance levels than those in the OHP. The mobility targets from the OHP will be applied to the existing and future baseline (no build) analysis while the standards from the HDM will be applied to the evaluation of design alternatives.

TABLE 4. MOBILITY TARGETS BY STUDY INTERSECTION

ID	Count Location	Mobility Target[1]			
		City of Roseburg	Douglas County	OHP[2]	HDM[3]
1	NE Chestnut Ave @ NE Cedar St (AWSC)	0.90, LOS E	0.90	0.95	0.80
2	NE Diamond Lake Blvd @ SE Stephens St (Signal)	0.95, LOS E	0.70	0.90	0.75
3	NE Diamond Lake Blvd @ NE Jackson St/NE Winchester St (Signal)	0.95, LOS E	0.70	0.90	0.75
4	NE Diamond Lake Blvd @ NE Fulton St (NB/SBSC)	0.85, LOS E	0.70	0.95 (N/S) 0.90 (E/W)	0.80 (N/S) 0.75 (E/W)
5	NE Diamond Lake Blvd @ NE Rifle Range St (Signal)	0.85, LOS D	0.70	0.90	0.75
6	NE Diamond Lake Blvd @ NE Douglas Ave (NBSC)	0.85, LOS E	0.70	0.90 (NB) 0.85 (E/W)	0.75
7	NE Douglas Ave @ NE Rifle Range St (SBSC)	0.90, LOS E	0.90	0.95	0.80
8	SE Douglas Ave @ NE Jackson St (AWSC)	0.95, LOS E	0.90	0.95	0.80
9	SE Douglas Ave @ SE Kane St (NBSC)	0.95, LOS E	0.90	0.95	0.80
10	SE Douglas Ave @ SE Ramp Rd (NBSC)	0.90, LOS E	0.90	0.95	0.80
11	NW Edenbower Blvd @ NE Stephens St (IAMP 127) (Signal)	0.85, LOS D	0.85	0.95	0.80
12	NW Edenbower Blvd @ NW Aviation Dr (IAMP 127) (Signal)	0.85, LOS D	0.85	0.90	0.80
13	NW Edenbower Blvd @ NW Broad St (IAMP 127) (EBSC)	0.85, LOS E	0.85	0.90	0.80
14	NE Garden Valley Blvd @ NE Walnut St (Signal)	0.85, LOS D	0.85	0.95	0.80
15	NE Garden Valley Blvd @ NE Rocky Ridge Dr (SBSC)	0.85, LOS E	0.85	0.95	0.80
16	NE Garden Valley Blvd @ NE Stephens St (Signal)	0.85, LOS D	0.85	0.95	0.80

ID	Count Location	Mobility Target[1]			
		City of Roseburg	Douglas County	OHP[2]	HDM[3]
17	NE Garden Valley Blvd @ NE Airport Rd/NE Cedar St (Draft IAMP 125) (Signal)	0.85, LOS D	0.85	0.95	0.80
18	NW Garden Valley Blvd @ Garden Valley Shopping Center (Draft IAMP 125) (Signal)	0.85, LOS D	0.85	0.95	0.80
19	NW Garden Valley Blvd @ Centennial Dr/NE Estelle St (Draft IAMP 125) (Signal)	0.85, LOS D	0.85	0.95	0.80
20	NW Garden Valley Blvd @ NW Goetz Street/Duck Pond Street (Signal)	0.85, LOS D	0.85	0.95	0.80
21	NW Garden Valley Blvd @ NW Stewart Pkwy (Signal)	0.85, LOS D	0.85	0.95	0.80
22	NW Garden Valley Blvd @ Roseburg Valley Mall (Middle Entrance) (SBSC)	0.85, LOS E	0.85	0.95	0.80
23	NW Garden Valley Blvd @ NW Kline St (Signal)	0.85, LOS D	0.85	0.95	0.80
24	NW Garden Valley Blvd @ NW Troost St (Signal)	0.85, LOS D	0.85	0.90	0.80
25	NW Garden Valley Blvd @ Melrose Rd (EB/WBSC)	0.85, LOS E	0.85	0.75	0.70
26	NW Keasey St @ NW Calkins Rd (EB/WBSC)	0.90, LOS E	0.90	0.95	0.80
27	W Harvard Ave @ Lookingglass Rd (NBSC)	0.85, LOS E	0.85	0.95	0.80
28	W Harvard Ave @ W Broccoli St (NB/SBSC)	0.85, LOS E	0.85	0.95	0.80
29	W Harvard Ave @ W Keady Ct (Signal)	0.85, LOS D	0.85	0.95	0.80
30	W. Harvard Ave @ NW Stewart Pkwy (Signal)	0.85, LOS D	0.85	0.95	0.80
31	W Harvard Ave @ Centennial Dr (Steward Park Dr) (Signal)	0.85, LOS D	0.85	0.95	0.80
32	W Harvard Ave @ W Maple St (Draft IAMP 124) (NB/SBSC)	0.85, LOS E	0.85	0.95	0.80
33	W Harvard Ave @ W Harrison St (Draft IAMP 124) (NB/SBSC)	0.85, LOS E	0.85	0.95	0.80
34	W Harvard Ave @ W Corey St (Draft IAMP 124) (NBSC)	0.85, LOS E	0.85	0.95	0.80
35	W Harvard Ave @ W Umpqua St (Draft IAMP 124) (Signal)	0.85, LOS D	0.85	0.95	0.80
36	I-5 Exit 129 @ SB On/Off Ramps/Del Rio Rd (SBSC)	0.90, LOS E	0.90	0.95	0.80
37	I-5 Exit 129 @ NB On/Off Ramps/OR 99	0.85, LOS E	0.85	0.75	0.70

ID	Count Location	Mobility Target[1]			
		City of Roseburg	Douglas County	OHP[2]	HDM[3]
38	I-5 Exit 127 @ NB On/Off Ramps/NW Edenbower Blvd (IAMP 127) (NBSC)	0.85, LOS E	0.85	0.90	0.80
39	I-5 Exit 127 @ SB On/Off Ramps/NW Edenbower Blvd (IAMP 127) (Signal)	0.85, LOS D	0.85	0.90	0.80
40	I-5 Exit 125 @ NB Off-Ramp/NW Garden Valley Blvd/NW Mulholland Dr (Draft IAMP 125) (Signal)	0.85, LOS D	0.85	0.95	0.80
41	I-5 Exit 125 @ SB On-Ramp/NW Garden Valley Blvd/NW Mulholland Dr (Draft IAMP 125)	0.85, LOS D	0.85	0.95	0.80
42	I-5 Exit 124 @ NB On/Off Ramps/W Harvard Ave (Draft IAMP 124)	0.85, LOS E	0.70	0.90	0.75
43	I-5 Exit 124 @ SB On/Off Ramps/W Harvard Ave (Draft IAMP 124) (Signal)	0.85, LOS D	0.70	0.90	0.75
44	I-5 Exit 124 @ NB On-Ramp/W Harvard Ave (Draft IAMP 124)	0.85, LOS E	0.85	0.95	0.80
45	I-5 Exit 123 @ NB On/Off Ramps/SW Portland Ave (NB/SBSC)	0.85, LOS E	0.85	0.95	0.80
46	I-5 Exit 123 @ SB On/Off Ramps/SW Portland Ave (NB/SBSC)	0.85, LOS E	0.85	0.95	0.80
47	NE Lincoln St @ NE Malheur Ave (EB/WBSC)	0.90, LOS E	0.90	0.95	0.80
48	SE Oak Ave @ SE Spruce St (Draft IAMP 124) (SBSC)	0.85, LOS E	0.70	0.95	0.80
49	SE Oak Ave @ SE Pine St (Draft IAMP 124) (Signal)	0.95, LOS E	0.70	0.90	0.75
50	SE Oak Ave @ SE Stephens St (Draft IAMP 124) (Signal)	0.95, LOS E	0.70	0.90	0.75
51	SE Oak Ave @ SE Jackson St (AWSC)	0.95, LOS E	0.85	0.95	0.80
52	OR 99 @ Wilbur Rd (EBSC)	0.85, LOS E	0.85	0.95	0.80
53	OR 99 @ N Bank Rd (WBSC)	0.85, LOS E	0.85	0.95	0.80
54	OR 99 @ Del Rio Rd/Umpqua College Rd (Signal)	0.85, LOS D	0.85	0.95	0.80
55	SE Pine St @ SE Mosher Ave (EB/WBSC)	0.95, LOS E	0.85	0.95	0.80
56	NE Stephens St @ Kenneth Ford Dr (Signal)	0.85, LOS D	0.85	0.95	0.80
57	NE Stephens St @ NE Newton Creek Rd (Signal)	0.85, LOS D	0.85	0.95	0.80
58	NE Stephens St @ NE Chestnut Ave (EBSC)	0.85, LOS E	0.85	0.95	0.80
59	NE Stephens St @ NE Winchester St	0.85, LOS E	0.85	0.95	0.80
60	SE Stephens St @ SE Douglas Ave (Signal)	0.95, LOS E	0.70	0.90	0.75

ID	Count Location	Mobility Target[1]			
		City of Roseburg	Douglas County	OHP[2]	HDM[3]
61	SE Stephens St @ SE Mosher Ave (EB/WBSC)	0.95, LOS E	0.85	0.95	0.80
62	SE Stephens St @ S Gate Shopping Center Entrance (EB/WBSC)	0.85, LOS E	0.85	0.95	0.80
63	NW Stewart Pkwy @ NE Stephens St (Signal)	0.85, LOS D	0.85	0.95	0.80
64	NW Stewart Pkwy @ NE Airport Rd (Signal)	0.85, LOS D	0.85	0.95	0.80
65	NW Stewart Pkwy @ NW Aviation Dr /NW Mullholland Dr (Signal)	0.85, LOS D	0.85	0.90	0.80
66	NW Stewart Pkwy @ NW Edenbower Blvd (IAMP 127) (Signal)	0.85, LOS D	0.85	0.90	0.80
67	NW Stewart Pkwy @ Roseburg Mall Entrance/Walmart Entrance (Signal)	0.85, LOS D	0.85	0.90	0.80
68	NW Stewart Pkwy @ NW Valley View Dr (EBSC)	0.85, LOS E	0.85	0.90 (N/S) 0.95 (EB)	0.80
69	NW Stewart Pkwy @ NW Harvey Ave (Signal)	0.85, LOS D	0.85	0.95	0.80
70	NW Troost St @ NW Calkins Rd (AWSC)	0.90, LOS E	0.90	0.95	0.80
71	NE Vine St @ NE Alameda Ave (AWSC)	0.90, LOS E	0.90	0.95	0.80
72	SE Washington Ave @ W Madrone St (Draft IAMP 124) (Signal)	0.85, LOS D	0.70	0.90	0.75
73	SE Washington Ave @ SE Spruce St (NB/SBSC)	0.85, LOS E	0.70	0.95 (N/S) 0.90 (E/W)	0.80 (N/S) 0.75 (E/W)
74	SE Washington Ave @ SE Pine St (Draft IAMP 124) (Signal)	0.95, LOS E	0.70	0.90	0.75
75	SE Washington Ave @ SE Stephens St (Draft IAMP 124) (Signal)	0.95, LOS E	0.70	0.90	0.75
76	SE Washington Ave @ SE Jackson St (AWSC)	0.95, LOS E	0.70	0.95	0.80

Notes:

1. Unsignalized intersections may have two different mobility targets for the major and minor approaches
2. Table 6: Volume to Capacity Ratio Targets Outside Metro, Oregon Highway Plan, 1999
3. Table 10-2: 20 Year Design-Mobility Standards (Volume/Capacity [V/C] Ratio), Highway Design Manual, 2012

Arterial and Intersection Operations

The operational analysis will evaluate volume-to-capacity (v/c) ratios and level of service (LOS) using the Synchro software program as outlined in the APM. Throughout the analysis process, TPAU and Region 3 Traffic staff will review modeling assumptions, analysis settings, and other assumptions to help ensure consistency of data with other studies under way.

An assessment of adding or removing traffic signals may be needed. Any assessments of new traffic signals will use ODOT's preliminary signal warrant spreadsheets for ODOT facilities and MUTCD warrants for City facilities.

Operational analysis results will be compared with applicable mobility standards and specific recommendations for mitigation improvements will be reviewed by the agency with jurisdiction.

Traffic Operations Analysis Procedures

Evaluation of operations will use the methodology outlined in the *2000 and 2010 Highway Capacity Manual*s (HCM) along with the procedures outlined in the APM. For signalized intersections, operations will be reported using HCM 2000, while HCM 2010 will be used for unsignalized intersections; HCM 2010 reports are not available in Synchro for signalized intersections.

We will use the Synchro/SimTraffic (version 9) software for analysis; it provides the v/c ratio and LOS output of an HCM analysis and considers the systematic interaction of the intersections with regard to queuing and delays. Synchro is a macroscopic model similar to the Highway Capacity Software (HCS), and like the HCS, is based on the 2000 and 2010 HCM. The Synchro model explicitly evaluates traffic operations under coordinated and uncoordinated systems of signalized and unsignalized intersections. The v/c ratios and LOS will be based on the Synchro model output.

Bicycle, Pedestrian and Transit Evaluation

The project will analyze bicycle, pedestrian and transit operations in the study area using the Qualitative Assessment for pedestrians/transit and the Level of Traffic Stress for bicycles. Both methodologies are outlined in Chapter 14 of the APM.

The analysis for the aforementioned modes will be completed by segment (the Contract does not require block-by-block detail). The segments will be created based on where logical breaks in the system exist (intersections with arterials, change in speed limit, etc.) The multi-modal evaluation will use best available data as provided in *Technical Memorandum 2: Update System Inventory* and augmented by City and ODOT staff observations.

Crash History Analysis

Crash data for this project will be obtained from the ODOT Crash Analysis and Reporting Unit for the most recent five complete years. The most recent Safety Priority Index System (“SPIS”) data will be obtained as well. Data will be requested for study area intersections and both state and non-state arterials and collectors with the City of Roseburg within the City Limits.

The study area evaluation will include an analysis of the most recent five-year crash history on state and non-state roadways at count locations and arterial and collector segments between count locations. This analysis screens for patterns amongst the crashes that are indicative of existing geometric or operational deficiencies. The Highway Safety Manual Part B Network Screening Probability of Specific Crash Types Exceeding Threshold Proportions method will be used in the screening process where sufficient reference populations are available. Based on the crash patterns, the analysis may identify improvements for the build alternatives that could mitigate safety issues. ODOT SPIS locations (if applicable) will be included in the crash history.

Intersection crash rates will be calculated for each study area intersection and compared against the published 90th Percentile rates in the APM (Version 2). If there are enough ADT volumes available, the critical crash rate will be calculated.

K-Factor – The K-factor is the percent of ADT in the peak hour. A K-factor will be used to develop an estimate for ADT along roadway segments and intersections for the purpose of calculating crash rates. An average K-factor will be developed from the 24-hour and 48-hour counts (see Table 1 for list of these intersection locations).

Acceptance of Deliverables

The process for submittal of technical memorandums by the Consultant and approval from the Agency and City will follow the process outlined below.

Conflict Resolution

For Tasks 5, 6 and 7, once initial analysis is set up, the Consultant will send analysis files to TPAU and Region 3 Traffic for confirmation of analysis inputs/parameters. If the analysis assumptions are appropriate, Consultant will send City and APM preliminary analysis results and provide a week timeline to air any concerns. Consultant will then work with the concerned parties over the phone to address concerns before submitting a Preliminary Draft.

If the City and/or APM have concerns about the current and/or future conditions that is not easily resolved, the Consultant will schedule a conference call within a week of the PMT to discuss a plan for resolution.

Review Steps

1. Preliminary Draft
    a. Consultant will consolidate best available information and submit a Preliminary Draft to the City and APM.
    b. Consultant will follow-up with a phone call to the City to confirm submittal and confirm timeline for two-week review period.
    c. City and APM will review Preliminary Draft and submit a set of consolidated non-conflicting comments within two weeks of receipt of the Preliminary Draft.
    d. Consultant will address Preliminary Draft comments and create a Revised Draft.
    e. If no comments are received within two weeks of the Preliminary Draft submittal, DEA will resubmit as the Revised Draft.
2. Revised Draft
    a. Consultant will incorporate comments on the Preliminary Draft to create and submit a Revised Draft to the APM and City.
    b. Consultant will follow-up with a phone call to the City to confirm submittal and confirm timeline for two-week review period.
    c. Upon acceptance, City will distribute Revised Draft to the PAC.
    d. PAC, City and APM will review accepted Revised Draft and the City will submit a set of consolidated non-conflicting comments within two weeks of receipt of the accepted Revised Draft.
    e. If no comments are received within two weeks of the Revised Draft submittal, DEA will resubmit as the Final.
3. Final
    a. Consultant will address comments received from PAC, City and APM on the Revised Draft and submit a Final deliverable.
    b. Comment window closed.

Public Advisory Committee

Meeting #1: Kick-Off Meeting

December 22, 2016

10:00 AM – Noon

Roseburg Public Safety Center

700 SE Douglas Ave.

Portland, OR 97205

AGENDA

Roseburg Transportation System Plan Update: Kick-off Meeting

DATE: TBD

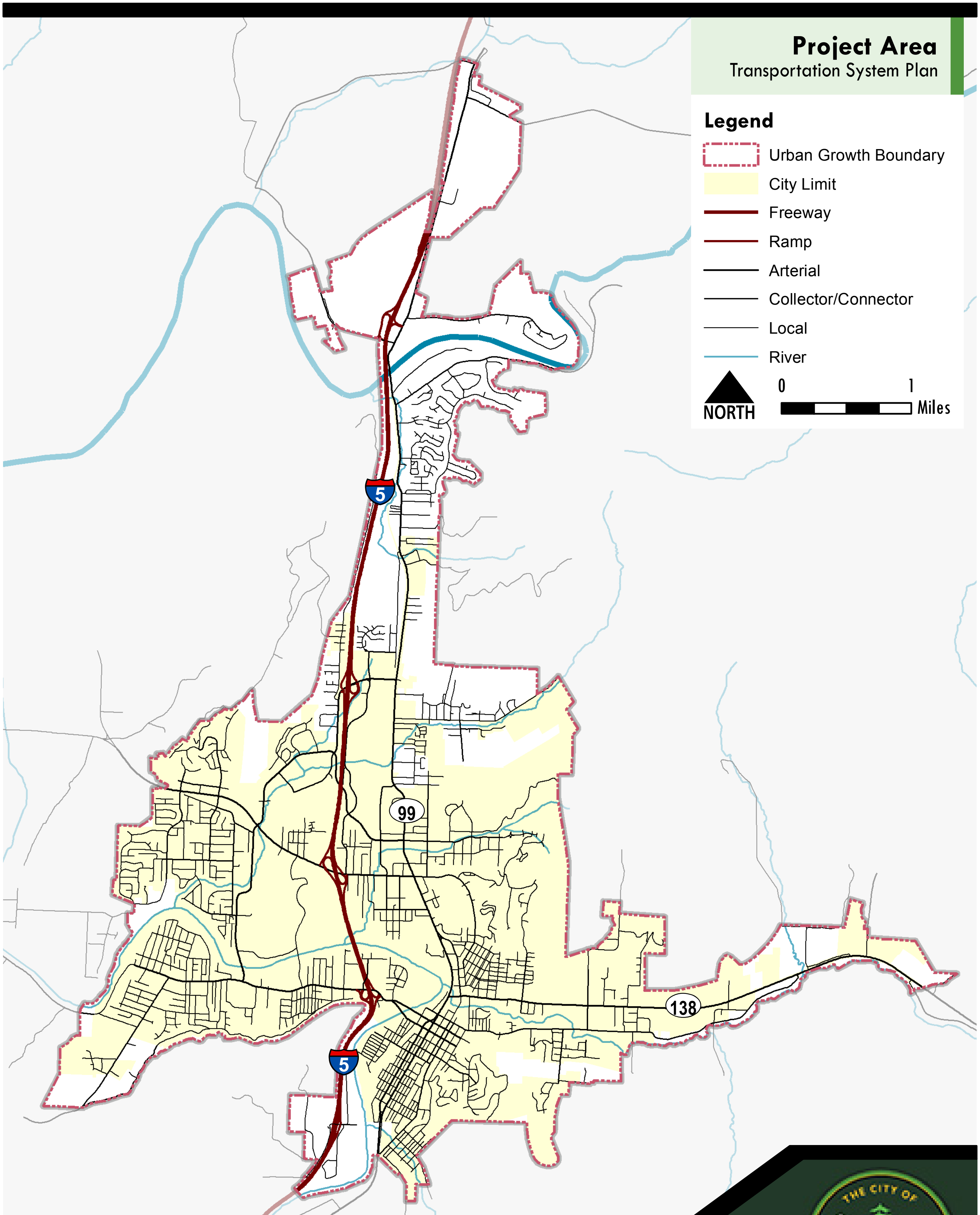
TIME: TBD (Up to 2 hours)

10 min. DEA	**Introductions**
20 min. DEA, City and ODOT	**Communication** • Points of contact • PAC involvement throughout project • PMT Conference Calls (9) – Preferred Day/Schedule
15 min. DEA	**Schedule** • Milestone deliverables • Process for comments/revisions • Protocol for deliverables (email, ftp, other?)

20 min.
City
	Public Involvement Program (PIP)
	• Public involvement goals
	• Recommendations for stakeholder involvement
	• Project decision making
	• Public involvement tasks:
	    ○ Posting project materials to web
	    ○ PAC Meetings
	    ○ Process for PAC input
	    ○ Public Meetings/Open Houses
	    ○ Media and outreach
	    ○ Process for obtaining feedback from public

40 min. City lead, all	**Roseburg Hot Spots** • Points of interest (operational concerns, access, safety, multimodal, land use, etc.) • Projects currently under consideration, but not documented • Changes from adopted plans • Status of projects in adopted plans
15 min. DEA and City	**Funding** • Available funding data • CIP or other resources, changes

Project Area
Transportation System Plan



City of Roseburg
Transportation System Plan

MEMORANDUM

DATE: **November 30, 2016**

SUBJECT: Roseburg Transportation System Plan Update
DRAFT Public Involvement Program (PIP)

Introduction

This Public Involvement Program (PIP) memorandum will guide stakeholder and public involvement during the Roseburg Transportation System Plan (TSP) update. The PIP describes fundamental objectives and activities that the City of Roseburg, the consultant team, and other agency staff will implement in order to ensure that interested parties have adequate opportunities to provide meaningful input to the TSP. The following describes the fundamental purpose and objectives for involvement, specific outreach mechanisms, and how the PIP will be integrated throughout the TSP process.

Identifying Stakeholders: Who is Involved

The public and stakeholder involvement efforts seek participation of all potentially affected and/or interested individuals, communities, and organizations. To date, the Roseburg TSP team has identified a number of stakeholders and a number of types and groups of stakeholders groups to engage in the process.

Project Advisory Committee

A Project Advisory Committee (PAC) will oversee the development of the TSP. The PAC members were carefully selected to ensure representation from all community transportation users, organizations and stakeholders. The PAC consists of the following individuals each representing a community group or agency with vested interest in the success of our local transportation system:

Denny Austin	Roseburg Public Schools
Cheryl Cheas	Umpqua Community Action Network – UTRANS
Merten Bangemann-Johnson	NeighborWorks Umpqua
Jeff Jackson	Bike/Walk Roseburg
Kristi Hagey	Umpqua Valley DisAbiliities
Doug Feldcamp	Umpqua Dairy – Freight
Jenny Carloni	League of Women Voters
David Price	CHI Mercy Hospital
Bob Dannenhoffer	Douglas County Public Health
Marjan Coester	Umpqua Community College
John McCafferty	Cow Creek Tribal Administration
Joe Heacock	Douglas County Public Works
Stuart Cowie	Douglas County Planning
Lance Colley	Roseburg City Manager
Nikki Messenger	Roseburg Public Works

Mark Rodgers	Roseburg Public Works
Teresa Clemons	Roseburg Community Development
John Lazur	Roseburg Community Development
Gary Garrisi	Roseburg Fire Department
Jeff Eichenbush	Roseburg Police Department
Steve Kaser	Roseburg City Council
Duane Haaland	Roseburg Planning Commission
Tim Allen	Roseburg Economic Development Commission
Stuart Leibowitz	Roseburg Public Works Commission
Tom Guevara, Jr.	Oregon Department of Transportation

Involvement Structure and Process

The City of Roseburg will involve the public and stakeholders primarily through a series of committee meetings and public meetings, in addition to the distribution of project information through a variety of media, including a project website.

Kick-off Teleconference

The kick-off teleconference provides an opportunity for the City, Agency Project Manager (APM), and PAC members to provide guidance to the Consultant on the Project schedule, tasks, meetings, milestones, deliverables, and messaging. An interactive tool (i.e., WebEx, Go To Meeting) may be desirable for the teleconference. The milestones will be determined during the teleconference in conjunction with the City and APM. The kick-off teleconference will also provide an opportunity for the City to finalize the project's PIP. The kick-off teleconference will provide an opportunity for the City/Agency to present information for use in later tasks and provide a summary of key spots in the Project area to the Consultant. Agency and City will arrange teleconference facilities, provide teleconference notification to attendees, and distribute summary teleconference materials.

Project Advisory Committee Meetings

The PAC will provide technical and policy guidance to Consultant throughout the Project. Additionally, they will represent the public perspective regarding the TSP. Consultant shall meet with the PAC three (3) times. Agency and City will arrange meeting facilities, provide meeting notification to PAC, and distribute meeting materials. A meeting schedule will be developed by the City, APM and Consultant after the Kick-Off meeting.

City may choose to hold additional meetings in advance of the established PAC meetings with the Consultant to compile comments on deliverables.

Public Meetings

Public outreach will consist of two (2) public meetings.

- **Public Meeting #1** will introduce the Project to the public and provide an opportunity to give input on existing and future conditions analysis.
- **Public Meeting #2** will provide members of the public an opportunity to review and provide input on proposed projects for the TSP.

Distribution and Review of Work Products

The City will email project work products directly to PAC members, and post them to the project website for access by the general public. TAC and PAC members will be able to comment directly through regular committee meetings. The general public will be able to comment during the public comment period at the end of PAC meetings, at public open houses, and through the project website.

Public Involvement Tools

These tools will be used in the PIP outreach:

- **Public Involvement Program** *(this document)*: This memorandum will guide stakeholder and public involvement during the Roseburg TSP. The PIP describes fundamental objectives and activities that the Project Management Team (PMT) will implement in order to ensure that interested parties have adequate opportunities to provide meaningful input to the TSP.

- **Comment Tracking Database** *(Ongoing)*: The PMT team will log all public comments, questions, and concerns, and respond to or coordinate a response when appropriate. The log will include comments from all sources, including emails, phone calls, web form submissions, and comments made during presentations and briefings with stakeholders.

- **Website** *(Ongoing)*: The project website will be the primary portal for information about the project. It includes: pages that describe TSP activities and events, the process timeline, and documents and materials. At any time, members of the public may submit comments through the project website's online commenting tool. City staff will receive comments, coordinate responses as needed, and track comments.

- **Interested Parties and Email Communications** *(Ongoing)*: The City will develop and maintain a list of interested parties who will receive meeting notices. The list will serve as the basis of targeted invitations to attend scheduled Community Meetings. The list will also provide information on affiliations and identify individuals related to Title VI and EJ requirements.

Study Team and Roles

The following are the key team members and their roles in the PIP:

City of Roseburg

City staff will oversee the PIP and take the presentation lead at all meetings, unless otherwise delegated to the Consultant. City staff is expected to provide guidance on the informational materials and graphics for the meetings and finalizing, printing, and distributing the draft materials provided by the consultant. City staff is primarily responsible for managing the PAC and comment tracking; creating and distributing news releases and stakeholder emails; and holding meetings and briefings with committees and groups. City staff is responsible for providing summaries at City Council and Planning Commission meetings and all meeting logistics.

Consultant Team

David Evans and Associates, Inc. (DEA) is the primary consultant and serves as the consultant project manager for the TSP. DEA provides overall project management, leads the overall work plan, and leads all technical tasks. DEA will review public involvement deliverables and make presentations to groups and committees involved in the TSP (as outlined previously). They will also track and manage public involvement activities, as public record for the project, and implement key many aspects of the public involvement program, particularly: facilitation of the three (3) PAC meetings and two (2) Public Open House meetings. DEA is responsible for preparing draft meeting agendas and informational materials and graphics.

Meeting Summary & Notes

Roseburg Transportation System Plan Update: Kick-off Meeting

LOCATION: Roseburg Public Safety Center. 700 SE Douglas Ave. (& WebEx call)

DATE: Thursday, December 22, 2016

TIME: 10:00 AM - NOON

Attendees:

John Lazur, City of Roseburg (CoR)
Nikki Messenger, CoR
Angela Rogge, DEA (Consultant Deputy PM)
Dana Shuff, DEA
Josh Heacock, Douglas County Public Works
Stuart Cowie, Douglas County Planning
Lisa Cornutt, ODOT Planning & Programming
Gary Garrisi, Roseburg Fire Department
Stuart Liebowitz, CoR Public Works Commission
Doug Feldcamp, Umpqua Dairy
Heather Albers, Healthy Communities
Dick Dolgonas, Bike Walk Roseburg/Umpqua Velo Club
Lance Colley, CoR
Bob Dannenhoffer, Public Health
Steve Kaser, Roseburg City Council
Denny Austin, Roseburg Public Schools
Duane Haaland, Roseburg Planning Commission
Kristi L. Hagey, Umpqua Valley disAbilities Network
Marjan Coester, Umpqua Community College
Virginia Elandt, Oregon Department of Transportation
Jenny Carloni, League of Women Voters Umpqua Valley
Mark Rodgers, CoR Public Works
Cheryl Cheas, UCAN/UTRANS
Jeff Eichenbusch, CoR Police Dept.
Joe Kaser, Rutgers University

Introductions

- John Lazur kicked off the meeting by welcoming those in attendance and introducing the City staff that were present
- We did a round of introductions for all PAC members in attendance
- Angela Rogge introduced herself as the Consultant Deputy PM from David Evans and Associates, Inc (DEA) and explained the "nuts and bolts" of what a Transportation System Plan (TSP) is and why we are updating the current plan.

Communication

- There was a summary given of the roles of the City, Consultant and DEA as part of the greater Project Management Team (PMT). The City will coordinate with stakeholders and the PAC while bringing institutional knowledge of the City's Transportation needs. The State is managing the contract and will also provide necessary resources to review state-managed facilities. The Consultant will be collecting the data, preparing reports, analyzing the system and facilitating the TSP development process. The Consultant will be responsible for developing all work products, meeting materials/summaries and responding to comments from the PAC and PMT.
- Points of contact: John Lazur (CoR) will be the main point of contact but Angela Rogge (DEA) explained that she is also available on the Consultant side.
- PAC involvement will be throughout the duration of the project and review of technical memorandums where comfortable

What is a TSP? Goals for TSP Update?

- At the most basic level, it provides a blueprint for all modes of travel: vehicle (both personal and freight), bicycle, pedestrian, and transit.
- Guide the maintenance, development, and implementation of the transportation system, to accommodate 20 years of growth in population and employment
- Compliance with the Oregon Transportation Planning Rule
- Existing plan was "lofty," would like this update to be more realistic. The previous plan identified a list of projects with a combined cost that was not feasible to implement.

Schedule

- The Consultant reviewed the plan for major deliverables/technical memos (TMs)
- The suggested schedule would result in an adoption-ready TSP in early 2018, open to feedback
- Projects need to be included in the TSP in order to apply for funding
- The first Consultant/PAC in-person meeting is slated for after Draft TM #4: Future Baseline Conditions (July 2017?)
- Consultant will send TMs #1, 2, 3, & 4 at approximate highlighted dates (see attached presentation) – **there will be opportunities for PAC to provide feedback/work with City before July 2017**.
- A PAC meeting could possibly take place without Consultant present before July if necessary – would be facilitated by the City.

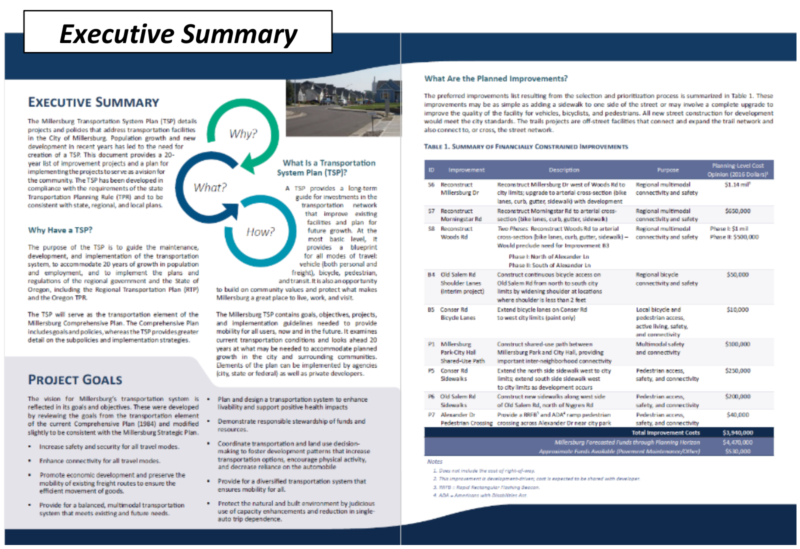
Public Involvement Plan (PIP)

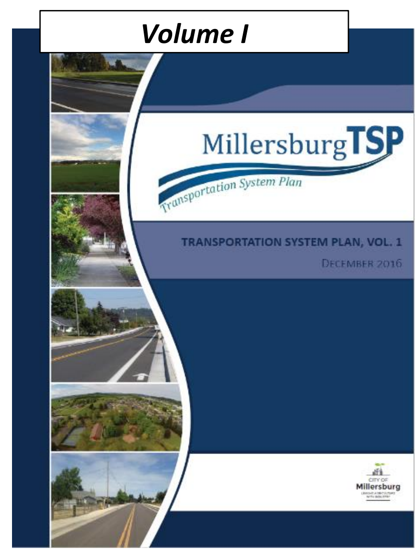
- Goal: active participation with all stakeholders & the public from the very beginning
- Recommendations for stakeholder involvement
- Project decision making
- Public Involvement tasks:
  - Posting project materials to web
  - PAC Meetings
  - Process for PAC input
  - Public Meetings/Open Houses
  - Media and Outreach
- Process for obtaining feedback from public
  - In the process of hiring a new director, will always be an open line of communication
  - John Lazur (City) will be communicating TMs to the PAC, input/feedback can be communicated back to him
  - Everyone is encouraged to provide feedback where they are comfortable. Some of the reports can get into the weeds, but please feel free to provide/not provide feedback according to your comfort level. It is ok to ask questions!
  - Comments for PAC will be consolidated and posted to website with a media release to allow public to give feedback on progress, possibly provide comments and meeting notes at public meetings for people who do not have access to the website

Roseburg "Hot Spots"

- Points of interest (operational concerns, access, safety, multimodal, land use, etc.)
- City/Consultant has a good idea of areas of concerns from previous plans/citizen complaints, personal experience, but want input from other sources as well in order to be as diverse and complete as possible
- A PAC member asked if public complaints could be compiled and given to the PAC – The City let the group know that they are not formally tracked in a way that is easily shared. However, the City mentioned that generally the complaints on the system occur for spot-fixes (pothole, traffic signal out of service, debris in road, lighting out, etc.) not chronic concerns.
- Very limited options to get from one side of town to the other – three interchanges are the only means of crossing I-5. Future of the transportation system should address this.
- Garden Valley Blvd – some drivers avoid on Fridays due to congestion
- A PAC member expressed that the previous TSP was NOT easy to read for the general public (no executive summary, very lengthy) and wants to know what will be done to make the new TSP easier to read – Consultant provided some examples of what newer/updated TSPs look like and that the plan is to includes an executive summary as part of the new TSP, TMs will be listed in Appendices rather than in the TSP document to make the plan less cumbersome.

Sample:





Funding

- The Consultant listed what has been available historically for Roseburg:
  - STIP
  - State shared motor fuel tax
  - Aid to Cities
  - SDC Revenues
- Nikki Messenger (CoR) explained that although some of these resources have been available in the past, not all are still available or will be available in the future.
- Aid to Cities is no longer a funding source
- Pavement management and maintenance: costly, taking up a lot of funding, not leaving much for improvements

- There could be future work done to determine if a local gas tax is a viable option in the future; the residents of Roseburg are not the only users of the transportation system.
- Although there is limited funding, the TSP is expected to show projects totaling more than what we have – more funding is likely to be needed
- Urban Renewal District funding will be gone after 2019
- The intent of the TSP is still to identify feasible projects that guide the transportation system in the direction the community wants to go. Updating the Goals and Objectives will be an important aspect of the TSP as they will be used to evaluate potential projects/improvements

Next Steps

- Presentation and meeting summary will be sent out and available on the website
- Draft TM #1 sent out in the next few weeks for review by the City, ODOT and PAC

Roseburg Transportation System Plan Update

KICK OFF MEETING

Thursday, December 22, 2016

10:00 am - noon

Agenda

- Introductions
- Communication
- Schedule
- Public Involvement Program
- Roseburg Hot Spots
- Funding

Introductions

Project Management Team

City of Roseburg

- John Lazur
- Nikki Messenger
- Community Development Director

David Evans and Associates, Inc.

- Shelly Alexander, PM
- Angela Rogge, Deputy PM

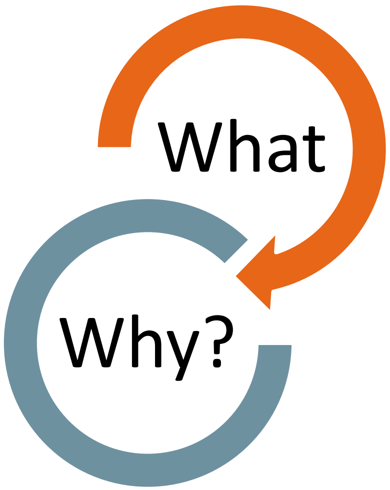
ODOT

- Thomas Guevara Jr., Agency PM – Contract Manager

Project Advisory Committee (PAC)

- Roseburg Public Schools
- UCAN transit
- NeighborWorks Umpqua
- Bike/Walk Roseburg
- Umpqua Valley DisAbilities
- Freight - Umpqua Dairy
- League of Women Voters
- CHI Mercy Hospital
- DC Public Health
- Umpqua Community College
- Cow Creek Tribal Admin
- Douglas County PW
- Douglas County Planning
- COR Staff Public Works
- COR Staff CDD
- COR Staff Admin
- COR Staff Fire Dept.
- COR Staff Police Dept.
- COR City Council
- COR Planning Commission
- COR Economic Development Com
- COR Public Works Commission
- ODOT

First: What is a TSP? Why do we need one?



- At the most basic level, it provides a blueprint for all modes of travel: vehicle (both personal and freight), bicycle, pedestrian, and transit.
- The purpose of the TSP is to guide the maintenance, development, and implementation of the transportation system, to accommodate 20 years of growth in population and employment, and to implement the plans and regulations of the regional government and the State of Oregon, including the Regional Transportation Plan (RTP) and the Oregon TPR.
- The Roseburg Transportation System Plan (TSP) is intended to eventually be adopted as the transportation element of the City's Comprehensive Plan.
  - The City Council adopted the City's first TSP in 2007

Communication

- City of Roseburg staff will manage communication with the PAC
- Consultant staff will work with City to deliver documents
- Consultant staff will provide meeting materials and summaries
- Further details will be discussed when we talk about the Public Involvement Plan

Schedule

PAC — Suggested timing for PAC meeting (yellow border indicates concurrent with Public Open House)

Public Involvement
- Kick-Off Meeting
- PAC Meetings (3 - with Consultant)
- Public Meetings (2)

Definitions and Background (TM #1) — Dec '17
- Policy Review, Project Overview, Goals & Objectives
- Traffic Methodology

Update System Inventory (TM #2) — Feb '17
- Summarizes existing system
- Maps, tables, text summary

Current Transportation System Operations (TM #3) — Apr '17
- Existing operations
- Multimodal
- Safety

Future Baseline Conditions (TM #4) — July '17
- 2035 Baseline conditions
- Assumes funded projects from CIP, STIP, previous TSP, adopted IAMPS

PAC

Concept Evaluation (TM #5) — Oct '17
- Potential system concepts
- Projects not covered by other plans
- Multimodal

PAC

Implementing Ordinances and Codes Changes — Jan '18
- Recommended code changes
- Sample code language

Draft TSP — Feb '18
- Modal plans/Planned improvements
- Implementation/Finance Plan

PAC

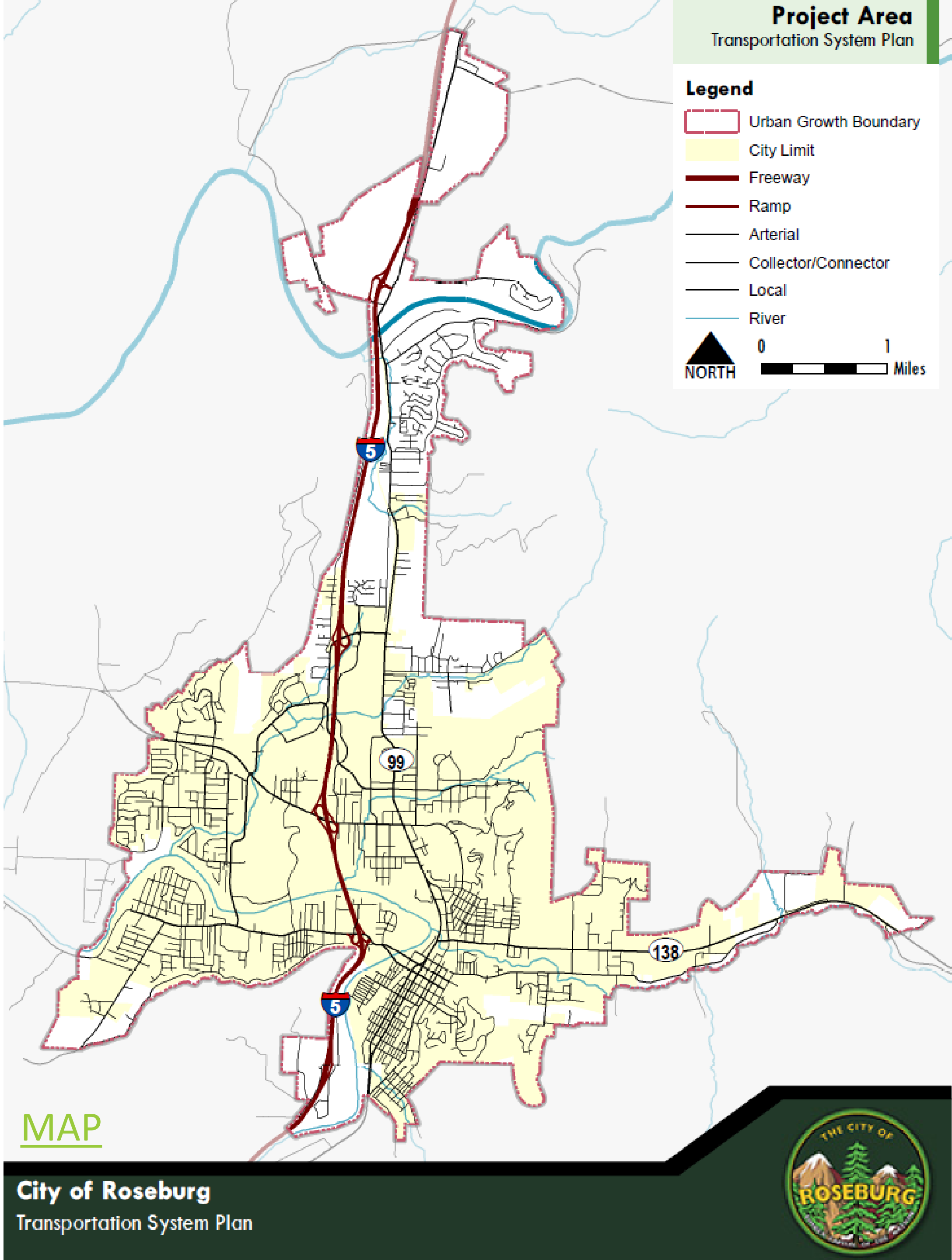
Final TSP — 2018

Public Involvement Plan

- PAC Meetings
  - With City/ODOT
  - With Consultant (3)
- Public Meetings
  - **Public Meeting #1** will introduce the Project to the public and provide an opportunity to give input on existing and future conditions analysis. (aligned with PAC/Consultant meeting #1)
  - **Public Meeting #2** will provide members of the public an opportunity to review and provide input on proposed projects for the TSP. (schedule close to PAC/Consultant meeting #2)
- Distribution and Review of Work Products
- Tools: Website, comment tracking, interested parties/email communications

Hot Spots – Where are your concerns?

- Connectivity?
- Safety?
- Growth?
- Congestion?
- Lack of facilities?



Funding

- Inclusion of a project in the TSP does not represent a commitment by the City of Roseburg or ODOT to fund, allow, or construct the project. Projects in the TSP are not considered “planned” projects until they are programmed in the adopted CIP or STIP
- Historic funding sources:
  - STIP
  - State shared motor fuel tax
  - Aid to Cities
  - SDC Revenues

Thank you!

Public Advisory Committee

Meeting #2: PAC1A

March 14, 2017

1:00 PM – 3:00 PM

Roseburg Public Safety Center

700 SE Douglas Ave.

Portland, OR 97205

Meeting Summary & Notes

Roseburg Transportation System Plan Update: TSP Goal Setting

LOCATION: Roseburg Public Safety Center. 700 SE Douglas Ave.

DATE: Tuesday, March 14, 2017

TIME: 1:00 – 3:00 PM

Attendees:

John Lazur, City of Roseburg (CoR)
Nikki Messenger, CoR
Stuart Cowie, CoR
Angela Rogge, DEA (Consultant Deputy PM)
Shelly Alexander, DEA (Consultant PM)
Alan Snook, DEA (Facilitation)
Thomas Guevara, Jr., ODOT
Virginia Elandt, ODOT
Lance Colley, CoR
Stuart Liebowitz, CoR Public Works Commission
Doug Feldcamp, Umpqua Dairy
Heather Albers, Healthy Communities
Marisa Fink, YMCA
Steve Kaser, Roseburg City Council
Merten Bangemann-Johnson, NeighborWorks Umpqua
Denny Austin, Roseburg Public Schools
Kristi L. Hagey, Umpqua Valley disAbilities Network
Diana Kelly, Umpqua Community College
Jenny Carloni, League of Women Voters Umpqua Valley
Mark Rodgers, CoR Public Works
Cheryl Cheas, UCAN/UTRANS
Jeff Eichenbusch, CoR Police Dept.
Tim Allen, Small Business
Dick Dolgonas, Bike Walk Roseburg/Umpqua Velo Club

Introductions

- Stuart Cowie kicked off the meeting by welcoming those in attendance and explaining his relatively new role as the Community Development Director
- We did a round of introductions for all PAC members in attendance
- Consultant team intros:
    - Shelly Alexander, Consultant Project Manager and primary Consultant contact from David Evans and Associates, Inc. (DEA)
    - Angela Rogge, Consultant Deputy PM and day-to-day Consultant contact. She explained that she was the person on the other end of the line at the kick-off meeting WebEx call.
    - Alan Snook, Consultant Goals and Objectives Meeting Facilitator and Transportation Planner
- Nikki Messenger (CoR) provided an update on current construction and explain how the majority of it is tied to urban renewal funds. The TSP Update will be used to help identify future project needs and potential funding sources.
- Angela reviewed the schedule. The next action item for the PAC will be to review the draft Tech Memo #1 (Goals, Plan/Policy Review)
- There was a quick summary of the definitions of Goals, Policies and Objectives and the group launched into discussing the vision for Roseburg.

Reminder: What is a TSP?

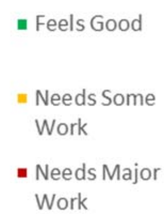
- At the most basic level, it provides a blueprint for all modes of travel: vehicle (both personal and freight), bicycle, pedestrian, and transit.

- Guide the maintenance, development, and implementation of the transportation system, to accommodate 20 years of growth in population and employment
- Compliance with the Oregon Transportation Planning Rule
- Existing plan was "lofty," would like this update to be more realistic. The previous plan identified a list of projects with a combined cost that was not feasible to implement.

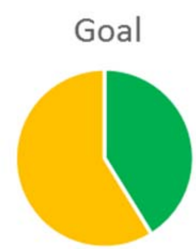
Group Goals Discussion / Activity

Alan led the group in a discussion surrounding the proposed goals, potential policy direction, and desired objectives. The intent of this discussion was to gather information from the PAC about what they would like to see in the Goals for the Roseburg TSP. The Consultant team will them take the information collected from the meeting to draft Goals/Policies/Objectives for Tech Memo #1.

As part of the discussion, Alan explained the "Dot Exercise". After each goal was discussed, the PAC had the opportunity to assign either green (feels good), yellow (needs some work) or red (needs major work) stickers to each goal, proposed policy direction and proposed objectives. The summary of the discussion and dot exercise (shown as pie charts) is provided below:

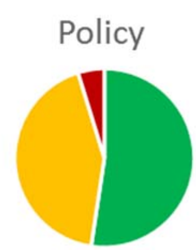


Accessibility



<u>Goal 1</u>: Increase the safety, reliability and efficiency for all travel modes.

- Include comfort and accessibility in Goal text
- It's about a multi-modal system
- Comprehensive



<u>Policy (direction):</u>

- Awareness
- Education
- Engineering
- Balance

<u>Objectives:</u>

- Usage of facilities
- Increase modal connections
- Develop interim checkpoints (don't wait until next TSP to review progress)
- ADA
- "Journey to work" may be a way to measure use

Vibrant Community

<u>Goal 2</u>: Enhance the livability of Roseburg through the location and design of transportation facilities to support positive health impacts and be compatible with the characteristics of the built, social, and natural environment.

- Like words: Vibrant, health, strategic
- Seems too wordy
- Change “compatible” to “enhance”

<u>Policy (direction):</u>

- Redevelopment
- Community development
- Support positive health impacts
- Built, social, and natural environment
- Location/design
- Economic vitality

<u>Objectives:</u>

- Increase QUALITY of existing paths
- Provide social spaces (consider natural environment)
- ADA design
- Safe routes to school
- Utilize riverfront

Land Use (Will not be a standalone goal – should be combined with Vibrant Community)

<u>Goal 3:</u> Coordinate transportation and land use decision-making to maximize the efficiency of Roseburg’s transportation system.

- Seems like a policy
- Accessibility
- Don’t focus on efficiency – effectiveness instead
- Reliability
- Potential
- Integrated

*Did not do “dot exercise” since **this goal was removed as a standalone goal***

<u>Policy (direction):</u>

- Zoning
- **Move this goal to Vibrant Community!**
- Coordinate Land use and transportation

<u>Objectives:</u>

- N/A

Connectivity (Will not be a standalone goal – should be combined with Transportation Options)

<u>Goal 4:</u> Provide a well-planned, comprehensive multi-modal system that serves the needs of the Roseburg UGB and enhances connectivity.

- Seems related to providing transportation options
- Multimodal
- Accessible? Note: Accessibility is not the same as connectivity. Availability/Connectivity = There are choices, but the choices are not necessarily available for everyone to use
  Accessibility = Is everyone able to use the system?

*Did not do "dot exercise" since **this goal was removed as a standalone goal***

<u>Policy (direction):</u>

- N/A

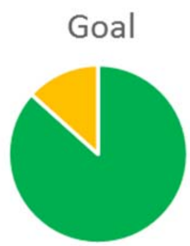
<u>Objectives:</u>

- N/A

Transportation Options

<u>Goal 5</u>: Provide for a diversified transportation system that ensures mobility for all.

- Bring in parts of connectivity goal



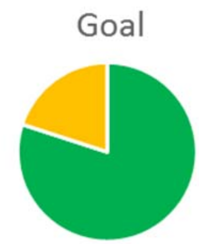
<u>Policy (direction):</u>

- Encourage workplace encouragement of transportation demand management (TDM) options

<u>Objectives:</u>

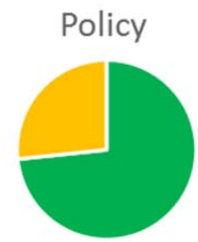
- Include 2006 Goal 4.E: Undertake efforts to reduce per capita vehicle miles traveled (VMT) and single occupancy vehicle (SOV) demand through TDM strategies. (how do we measure?)
- Increase TDM/TSM
- Provide menu of options to encourage mode share (don't have to do this at the expense of commerce)

Economic Development



Goal 6: Facilitate the provision of a multi-modal transport system for the efficient, safe, and competitive movement of goods and services to, from, and within the Roseburg UGB.

- Commerce?
- Remove emphasis on efficiency/movement since it's not always applicable



Policy (direction):

- Link land uses
- Experiences
- Visitors
- Employment
- Manufacturing
- Freight
- Goods/services
- Investments
- Effectiveness

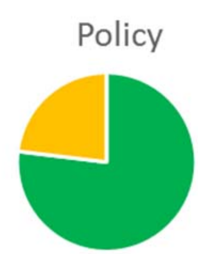
Objectives:

- Place making
- Access to/from/within
- Understand competing interests – balance

Implementation

Goal 7: Demonstrate responsible stewardship of funds and resources to prioritize and implement strategic transportation investments.

- "..and resources USED to prioritize…"
- TRANSPARENCY



Policy (direction):

- Sustainable
- Maintenance
- Public input
- Actively seeking funds
- In alignment with vision/goals

Objectives:

- o Locate additional revenue streams
- o Provide a transparent selection process
- o Have criteria to compare potential projects to

Next Steps

- Consultant will consolidate the 7 Goals to a more manageable 4-5 goals based on the PAC discussion
- Consultant will process info from today's meeting and draft policies/objectives
- Distribute Draft Tech Memo #1 for PAC review
- The homework assignment that was collected from the PAC (review 2006 goals/objectives) will be used to refine policies/objectives for the TSP Update and Tech Memo #1. A summary of the findings will be provided with the memo.

Public Advisory Committee

Meeting #3: PAC1B

December 6, 2017

3:00 PM – 5:00 PM

Roseburg Public Safety Center

700 SE Douglas Ave.

Portland, OR 97205

Roseburg TSP

Public Advisory Committee

March 14, 2017

SIGN IN SHEET

Name	Phone #	Organization
John Lazur	541-492-6750	COR - Comm. Dev.
Cheryl Cheas	541.440.4500	UCAN/UTrans
Stuart Cowie	541-492-6750	COR - CDD
Nikki Messenger	541 492 6730	COR - PW
Tim Allen	541-492-7368	Small Business economic Development
Mark Rodgers	541-492-6892	COR - PW
Steve Kaser	541 673 7461	City Council
Doug Feldkamp	541-672-2638	Umpqua Dairy
Denny Austin	541-440-4050	Roseburg Public Schools
Kristi L. Hagey	541.973-3561	Umpqua Valley disAbilities Network
Stuart Liebowitz	541-672-9819	Public Works
Jenny Carloni	541-672-1914	League of Women Voters
Heather Albers	541.391-1090	Adapt Healthy Communities
Nick Nolgone	541.672.1757	BikeWalk Roseburg
Thomas Guevara	541-957-3692	ODOT
Diana Kelly	541-440-4600	UCC
Lance Colley	541-492-6866	City of Roseburg
Virginia Elandt	541-957-3635	ODOT

Roseburg TSP

Public Advisory Committee

March 14, 2017

Name	Phone #	Organization
Marisa Fink	541-440-9622	YMCA
Marten Bangemann-Johnson	541-673-4909	NeighborWorks Umpqua
JEFF EICHENBUSCH	541 492-6781	ROSEBURG POLICE

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Consider Some Fine-tuning: Revised Goals

Below is an example of what a revised list of goals ***could*** look like. This example is based on the 2006 goals and objectives, with some refinement to align with existing Roseburg policies and the changing economic climate and priorities established today.

Remember: The vision, goals, and objectives can be refined continuously throughout the TSP process.

Accessibility

Goal 1: Increase the safety, reliability and efficiency for all travel modes.

Vibrant Community

Goal 2. Enhance the livability of Roseburg through the location and design of transportation facilities to support positive health impacts and be compatible with the characteristics of the built, social, and natural environment.

~~Land Use~~

~~Goal 3. Coordinate transportation and land use decision-making to maximize~~ the efficiency of Roseburg's transportation system.

~~Connectivity~~

SPLIT TO 1 + 5 as Policy

~~Goal 4. Provide~~ a well-planned, comprehensive multi-modal system that serves the ~~needs of the Roseburg UGB and enhances connectivity.~~

Transportation Options

Goal 5. Provide for a diversified transportation system that ensures mobility for all.

Economic Development

Goal 6. Facilitate the provision of a multi-modal transport system for the efficient, safe, and competitive movement of goods and services to, from, and within the Roseburg UGB.

Implementation

Goal 7. Demonstrate responsible stewardship of funds and resources to prioritize and implement strategic transportation investments.

Next: Policies and Objectives. **Policies** are statements adopted to provide a consistent course of action, moving the community towards attainment of its goals. **Objectives** are attainable targets that the community attempts to reach in striving to meet a goal. An objective may also be considered as an intermediate point that will help fulfill the overall goal.

Goals & Objectives → Evaluation Criteria → Alternatives Prioritization → Roseburg TSP Priorities

Public Advisory Committee

Meeting #3: PAC1B

December 6, 2017

3:00 PM – 5:00 PM

Roseburg Public Safety Center

700 SE Douglas Ave.

Portland, OR 97205

Meeting Summary & Notes

Roseburg Transportation System Plan Update: TSP System Conditions

LOCATION: 700 SE Douglas Avenue – Umpqua Room

DATE: Wednesday, December 6th, 2017

TIME: 3:00 – 5:00 PM

Attendees:

John Lazur, City of Roseburg (CoR)
Nikki Messenger, CoR
Stuart Cowie, CoR
Angela Rogge, DEA (Consultant Deputy PM)
Shelly Alexander, DEA (Consultant PM)
Lance Colley, CoR
Virginia Elandt, ODOT
Mike Baker, ODOT
Jennifer Boardman, ODT RTC
Doug Feldcamp, Umpqua Dairy
Janell Stradtner, ODOT
Gary Garrisi, RFD
Josh Shaklee, Douglas County
Steve Kaser, Roseburg City Council
Merten Bangemann-Johnson, NeighborWorks Umpqua
Denny Austin, Roseburg Public Schools
Jenny Carloni, League of Women Voters Umpqua Valley
Mark Rodgers, CoR Public Works
Elias Minaise
Cheryl Cheas, UCAN/UTRANS
Jeff Eichenbusch, CoR Police Dept.
Dick Dolgonas, Bike Walk Roseburg/Umpqua Velo Club
Jenna Marmon, ODOT
Theresa Mutschler, Douglas Public Health Network

Introductions

Stu Cowie welcomed the PAC members, provided a brief overview of the Roseburg TSP work to-date, and introduced Shelly Alexander the consultant project manager. Shelly briefly reviewed the meeting agenda which includes a PowerPoint (PP) presentation and breakout session, and introduced Angela Rogge, the consultant deputy project manager and lead transportation engineer. The PP is attached and covers the following: TSP process, goals, and, existing and future conditions, funding forecasts, and planned projects.

Presentation

Shelly presented the initial presentation slides (1-6) which covered the overall process, goals (from PAC meeting in February 2017), and inventory topics. There were no comments on these slides as they were primarily review for PAC members.

Angela presented on the existing conditions slides (7-14). The information was primarily a refresher since the previous PAC review during the summer of 2017.The following comments and discussion were had:

1. Slide 10 (Existing Street System):
    a. Clarify types of collectors
    b. Speed reduction measures or alternative routes for bicycle and pedestrian (off of uncomfortable roadways): Garden Valley/Stewart, Garden Valley/Stephens, Garden Valley/BLM Access

2. Slide 11 (Existing Transit System):
    a. Focus is on arterial route stops and routes
    b. Service frequency
    c. Look for improvement opportunities for accessibility and availability (route/frequency)
    d. Cheryl noted that she has many routes and adjustments in mind
3. Slide 12 (Existing Pedestrian System):
    a. Roadway speed (explore speed reductions)and frequent access points were noted as areas to improve pedestrian experience
    b. I-5 was acknowledge as a barrier resulting in lack of connectivity
    c. Diamond Lake (Urban renewal area) was noted as an opportunity to increasing connectivity
4. Slide 13 (Existing Bicycle System):
    a. Trail system is also a pedestrian system
    b. Trails alternative to arterial/collector system
    c. Harvard/Diamond Lake lack facilities (may need to look at parallel opportunities
5. Slide 14 (Safety Review):
    a. I-5 recently had the speed reduced
    b. Contributing factors of collisions: distractions, in attention
    c. How does Roseburg crash rate compare to other cities? *Analysis compared to statewide average*
    d. Each road serves a purpose, Dick Dolgonas commented that LOS is not the best measure for evaluation
6. Slides (15-18) – no comments
7. Slide 19 (Future Transportation System):
    a. Group would like to consider freight (truck %), parking, loading/unloading along congested corridors
8. Slides (20-21): no comments

After the system review of existing and future no-build conditions, Angela introduced the workshop activity. The PAC split into 4 groups, with a consultant or City staff facilitator within each group. Groups took 30 minutes to discuss areas of concern, potential solutions (based on slides 23 and 24), and report out to the larger group. A summary of the group discussion is provided below. The meeting concluded with an update on next steps (slide 25) indicating that the consultant will take the feedback from the workshop, identified concerns from the project and other documents to create a list of alternatives for evaluation. The PAC will reconvene to discuss the initial alternatives and funding forecast alignment.

Themes from Breakout Brainstorming Session

The four groups came up with a long list of ideas for potential improvements that can be broken out into four categories: Bicycle/Pedestrian, Transit, Connectivity/Capacity and Safety. The improvement themes are summarized below for each category.

- Bicycle and pedestrian improvements
  - Garden Valley Boulevard
  - Harvard Avenue
  - Enhanced trail lighting/safety
  - More pedestrian crossings on Harvard
  - Midblock crossings and striped crosswalks
  - Identify locations where travel lanes can be restriped to allow for bicycle lanes or widened bicycle lanes

    - Identify future trail connections
    - Pedestrian Refuges
- Transit
    - Bus pullouts
    - Expanded service
- Connectivity/Capacity
    - Roadway connection between Edenbower Blvd and Garden Valley Blvd
    - Couplet north of Diamond Lake Blvd (Casper to Rifle Range)
    - Add left turn lane to I-5 SB ramp at exit 124
    - Extend SE Ramp St at Souglas Ave
- Safety
    - Access/driveway consolidation
    - Roadway treatments to reduce travel speeds (not speed humps)
    - Maintenance of existing facilities

Roseburg TSP

PAC Meeting

December 6, 2017

~~900~~ 700 SE Douglas Avenue – Umpqua Room

SIGN IN SHEET

Name	Contact Info (Email or Phone)	Organization/Agency
Virginia Elandt	virginia.elandt@state.or.us	ODOT
Jennifer Boardman	jennifer.boardman@odot.state.or.us	ODOT RTC
Elias Miñaise	bruceminaise@gmail.com	PAC
Janell Stradtner	janell.stradtner@ODOT...	ODOT
Jeff Eichenbusch	JEichenbusch@cityofroseburg.org	Police
Mark Rodgers	mrodgers@cityofroseburg.org	Public Works
Jenna Marmon	jenna.marmon@odot.state.or.us	ODOT
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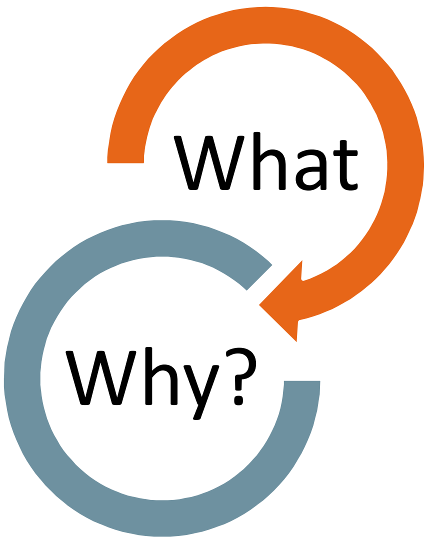
Roseburg Transportation System Plan Update

Transportation System Conditions
Wednesday, December 6, 2017

What is a TSP? Why do we need one?



- It provides a blueprint for all modes of travel: vehicle (both personal and freight), bicycle, pedestrian, and transit.
- The purpose of the TSP is to guide the maintenance, development, and implementation of the transportation system, to accommodate 20 years of growth in population and employment, and to implement the plans and regulations of the regional government and the State of Oregon
- The Roseburg Transportation System Plan (TSP) is intended to eventually be adopted as the transportation element of the City's Comprehensive Plan.

What MUST a TSP Do?

- Provide public transportation services to meet basic needs
- Establish an efficient network of arterials / collectors
- Provide roadway, sidewalk and bikeway standards (layout, spacing, and connectivity)
- Protect facilities and corridors for intended uses
- Develop a financial plan
- Implement code and ordinances

Where We Are in the Process

- Kick-Off Meeting
- Establish Goals, Policies and Objectives
- Goals, Plan and Policy Review
- System Inventory
- Existing Conditions
- Future Conditions
- **Alternatives Development/ Evaluation**
- Ordinances and Code Changes
- Draft TSP
- Final TSP

WE ARE HERE!

Goals of the TSP

Goal 1 - Mobility and Accessibility

- Provide a comfortable, reliable and accessible transportation system that ensures safety and mobility for all members of the community.

Goal 2 - Vibrant Community

- Create an integrated multimodal transportation system that enhances community livability.

Goal 3 - Transportation Options

- Provide for multi-modal transportation system that enhances connectivity.

Goal 4 - Economic Vitality

- Advance regional sustainability by providing a transportation system that improves economic vitality and facilitates the local and regional movement of people, goods and services.

Goal 5 - Implementation

- Provide a sustainable transportation system through responsible stewardship of financial and environmental resources.

Summarize Existing Inventory of Existing Transportation Network

- Land Uses
- Streets/Roadways
- Pedestrian
- Bicycle
- Transit
- Air
- Water
- Rail
- Pipeline
- Natural Resources and Environmental Barriers
- Demographic Data

Existing Conditions

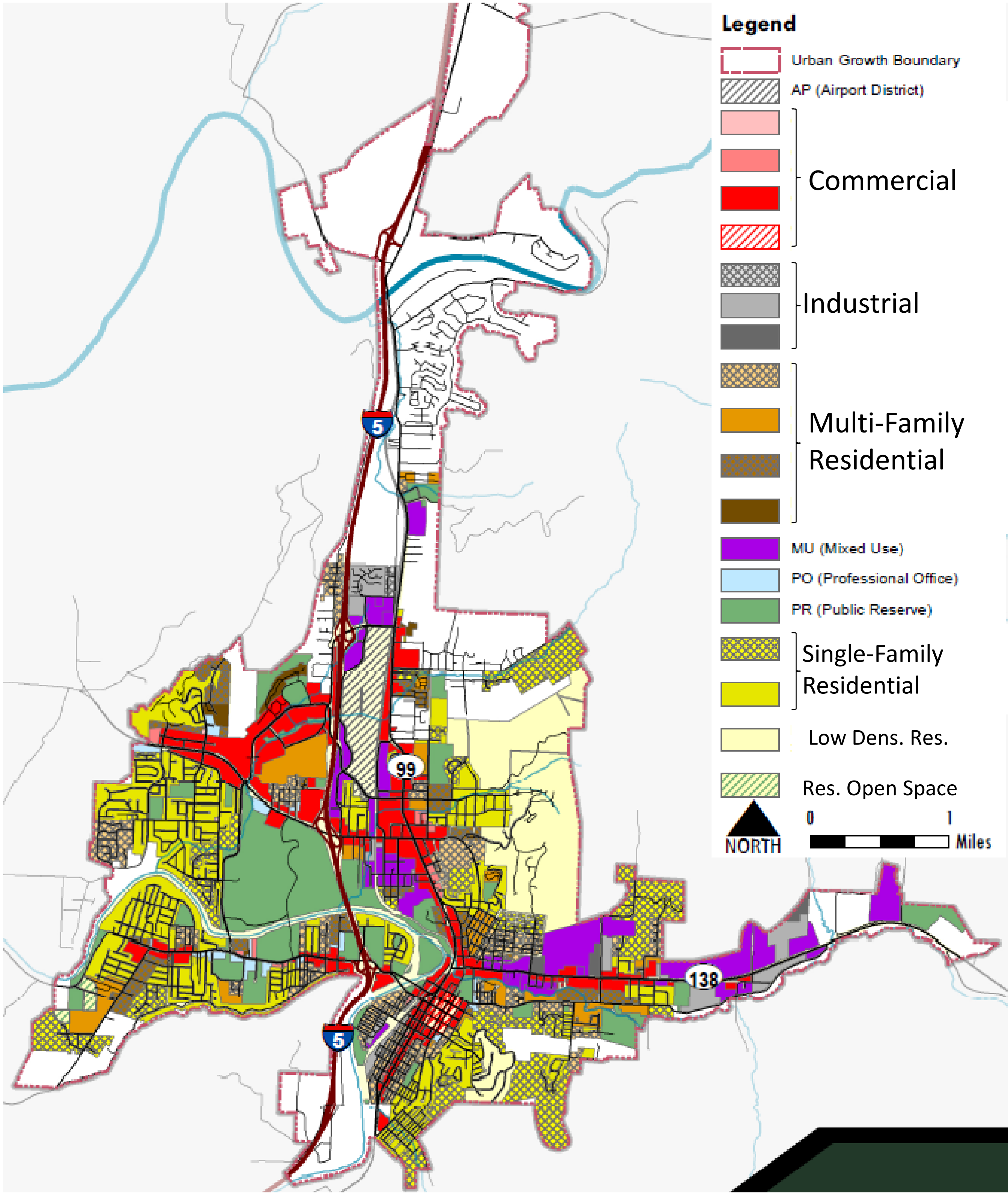
Existing System Conditions

Establishes a baseline for comparison and evaluation of potential solutions

- Multimodal analysis of the transportation system
- Reflects conditions and most recent available data
- Identifies existing gaps in the system

Land Use

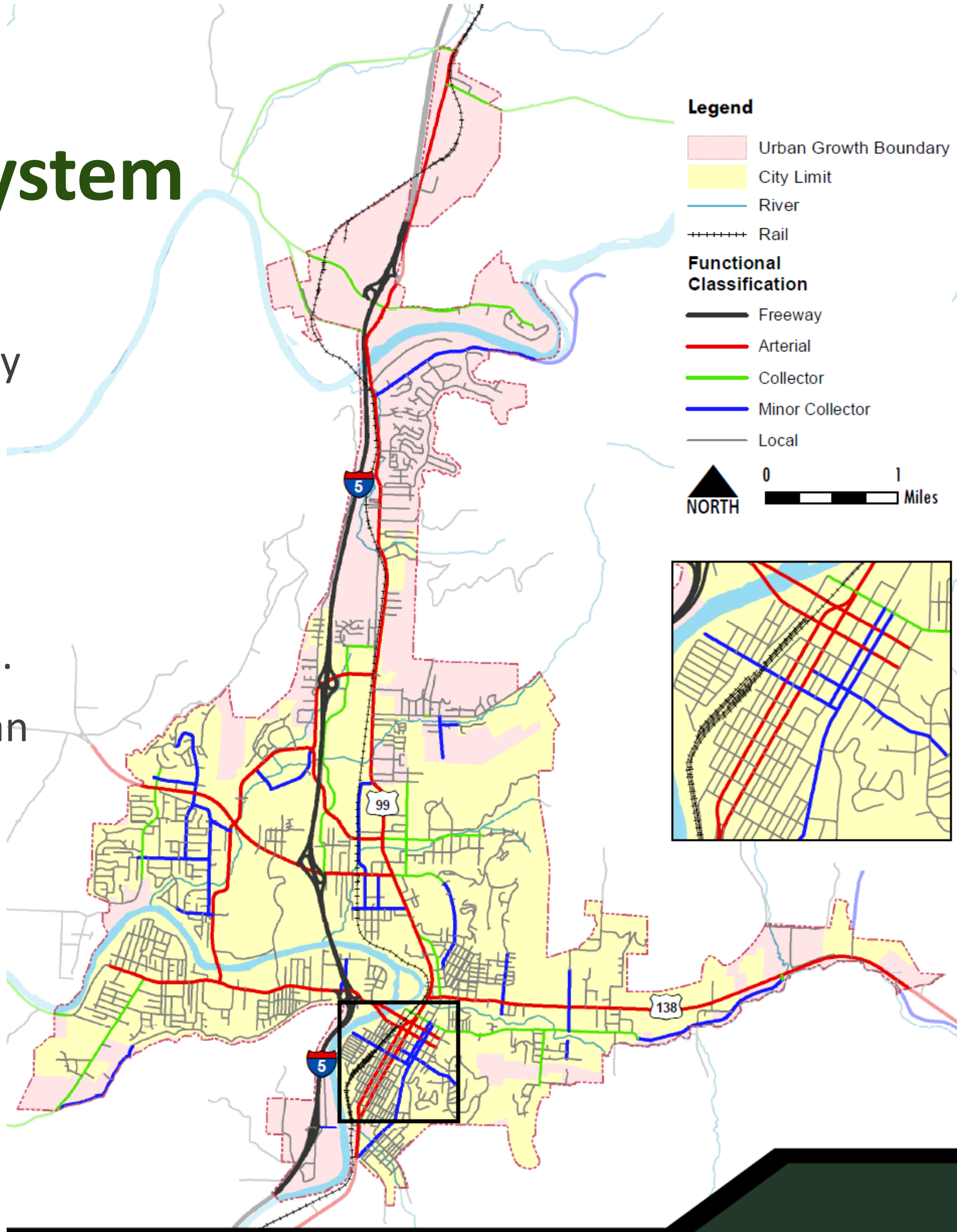
- Observations:
- Commercial areas focus along Garden Valley, Stewart Pkwy and Stephens St
- Mixed use areas can benefit active transportation choices
- Residential areas are segregated from the commercial areas
- Segregated, low-density land uses tend to limit transportation choices



Existing Street System

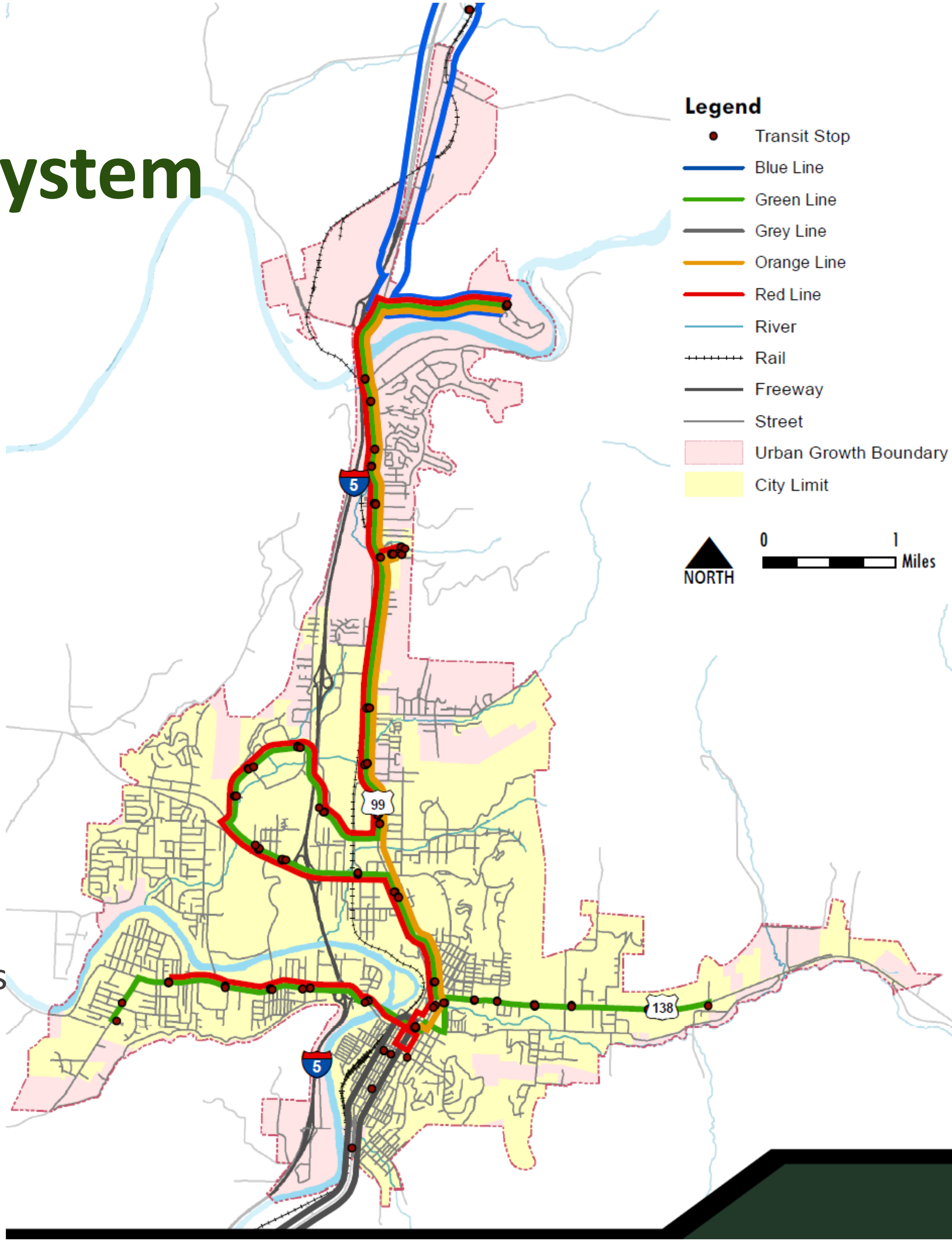
Observations:

- Limited east-west connectivity
- No clear differentiation between minor and regular collectors
- Drivers do not have a choice but to travel certain corridors.
- I-5 is often used by locals as an arterial
- Existing topography and geography limit new connections
- Congestion along Garden Valley, Harvard and Stewart Parkway



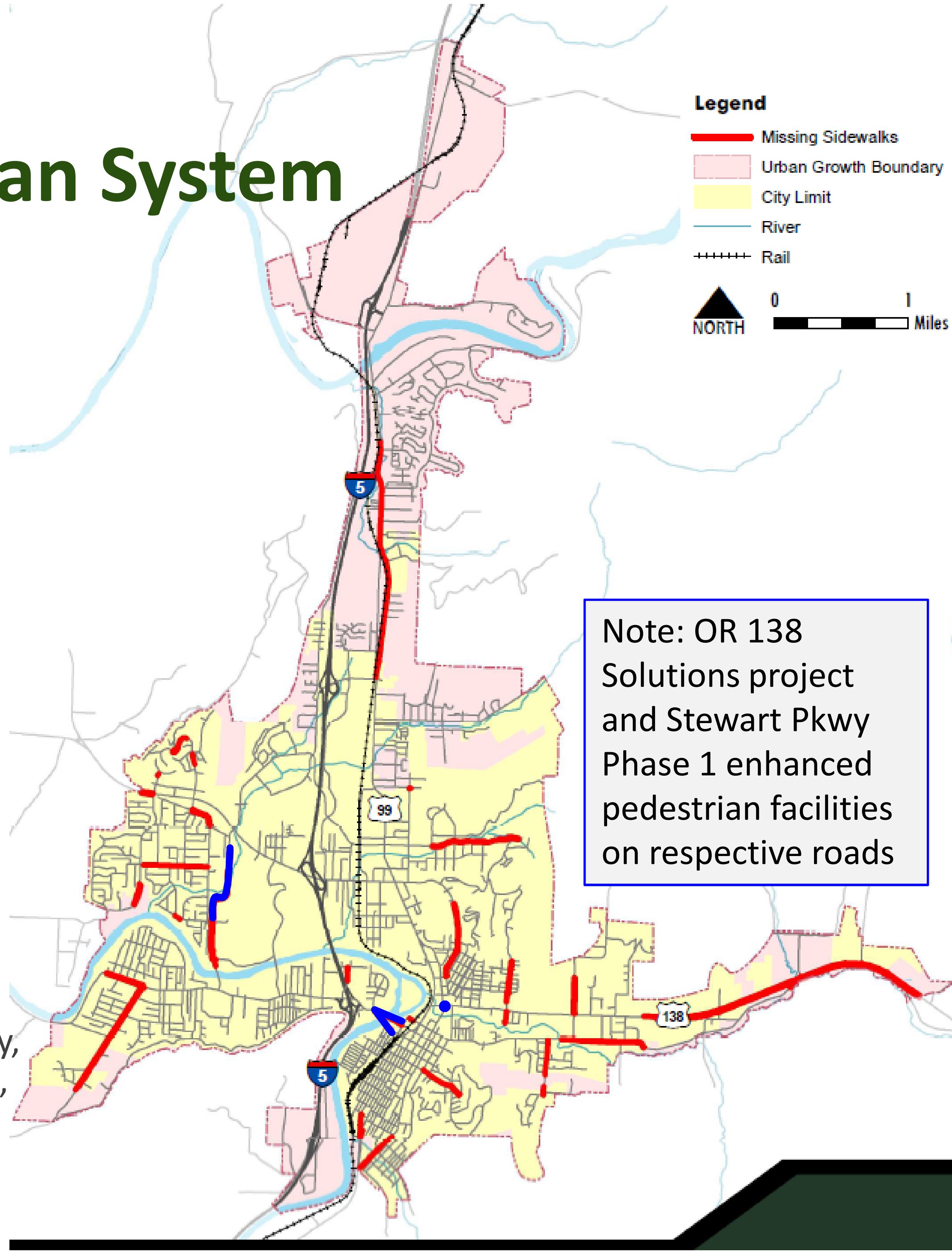
Existing Transit System

- Utrans: Fixed-route & Paratransit
- Observations:
  - Areas with >1 mile walk to bus stop
  - Less than half of the transit stops have shelters with seating amenities (45%)
  - Headways of an hour or greater (most routes are fair or poor)
  - No weekend service
- Douglas County is considering establishing a Transit District to serve Roseburg and other Douglas County cities and destinations.



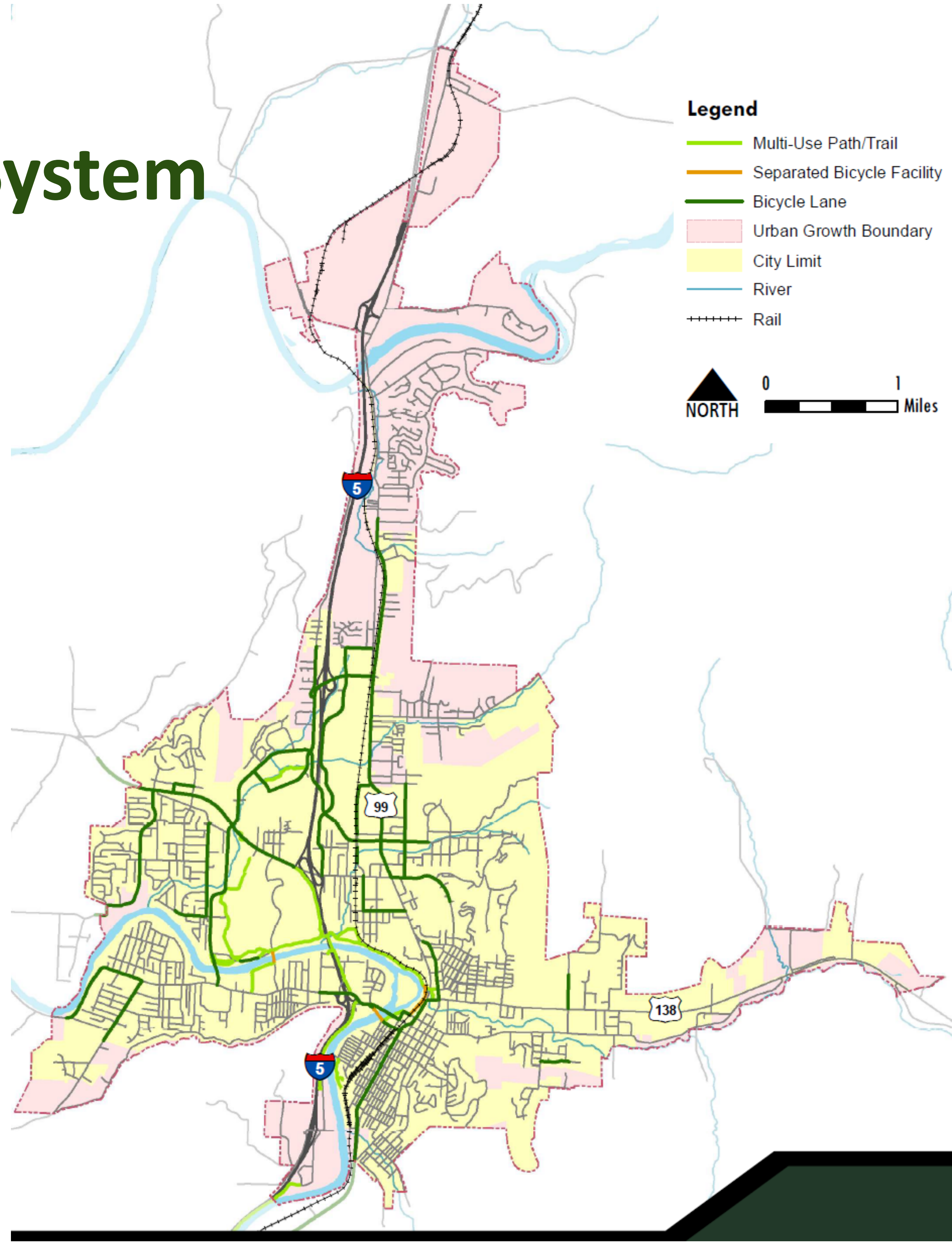
Existing Pedestrian System

- Actively building sidewalks since the 2006 TSP and 2009 Bike/Ped Plan
  - New sidewalks as part of arterial/collector street projects
  - Sidewalks added along street segments where none existed or where only one side previously
- Observations:
  - Limited east-west connectivity
  - Pedestrians must walk alongside high-volume roads to travel
  - Conflict points (accesses/driveways)
  - Bike/Ped Plan identified Calkins, Douglas, Fairmount, Garden Valley, Harvard, Highland, Oak, Stephens, Vine St and Washington Ave as critical routes.



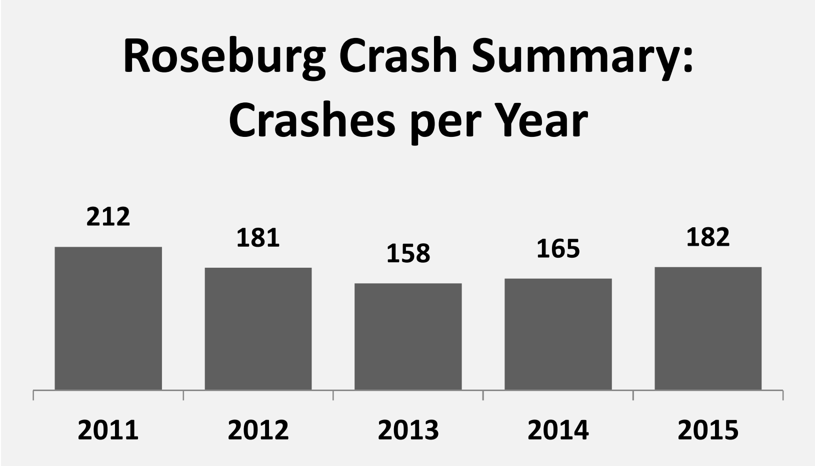
Existing Bicycle System

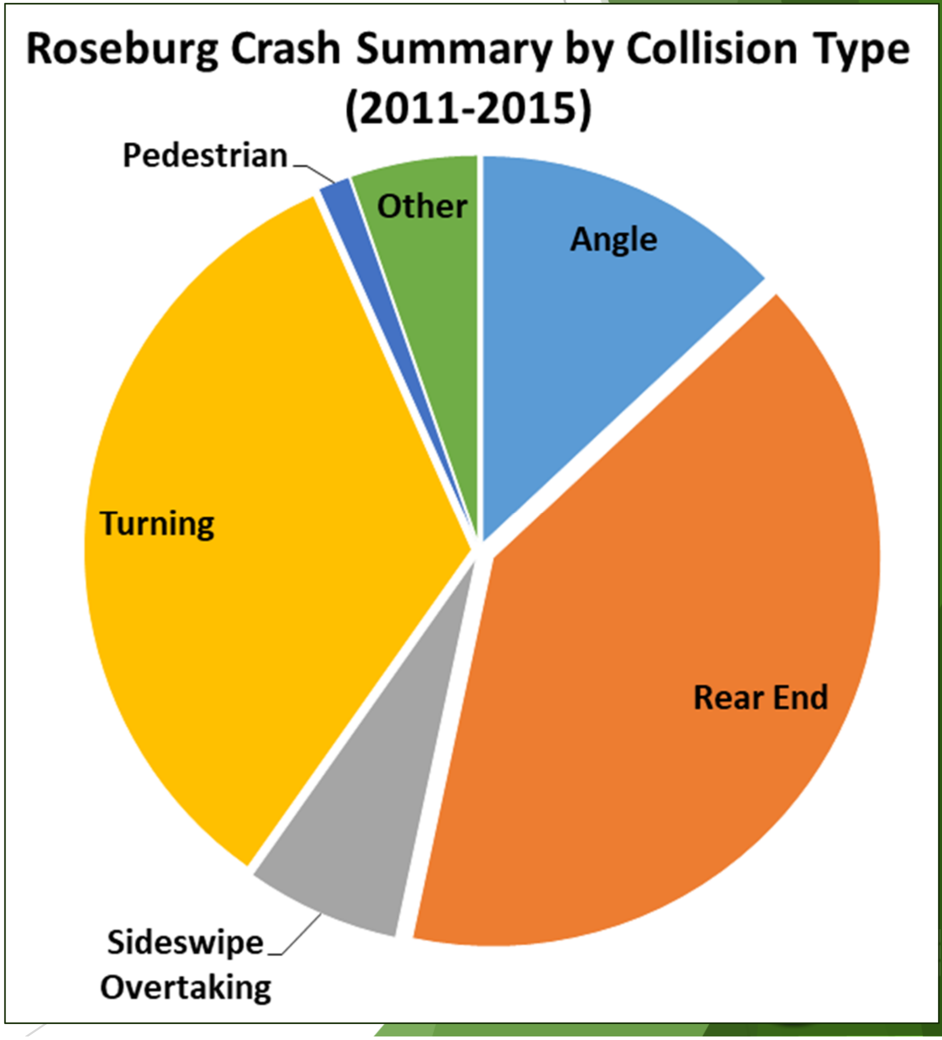
- Efforts to improve bicycle system since 2006 TSP:
  - Bicycle and Pedestrian Plan, 2009
  - Bronze Status bicycle friendly community (League of American Bicyclists)
- Observations:
  - Limited north-south connectivity east of I-5
  - Multi-use paths are concentrated in the parks and near the South Umpqua River.
  - Diamond Lake Boulevard and Harvard Avenue lack bicycle facilities/parallel route



Safety Review

- Most recent 5 years of available data (2011-2015)
- Within Roseburg UGB, 2,008 crashes (898 at study intersections)
- Highest number of crashes:
  - Garden Valley Blvd/Stewart Pkwy (61)
  - Oak Ave/Stephens (45)
- 2017 Oregon Interstate Highway Speed Limit Engineering Investigation (speed reduced)
  - Ramp spacing
  - History of high crash rates





Future Baseline Conditions

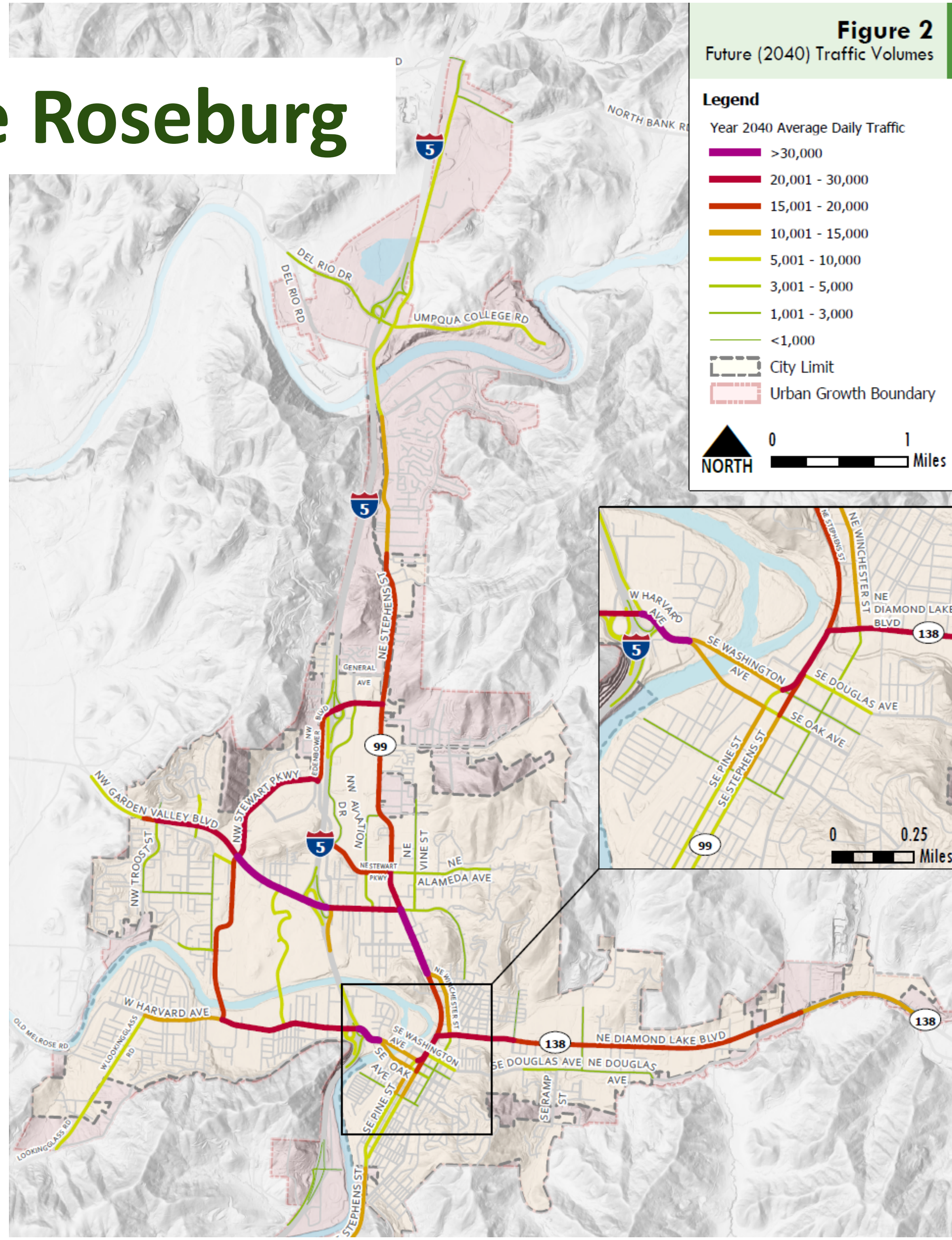
What is the Future Baseline?

- Planning horizon through year 2040
- Baseline (“No Build”):
  - Includes roadway projects and safety improvements that are expected to occur by year 2040 on study area roadways. These projects have **known funding sources.**
  - The long-range regional growth forecasts (households and employment) are consistent with current land use zoning
- Projects without a secured funding source will be considered during the solutions development phase of the TSP update.
  - City’s Capital Improvement Plan (CIP)
  - City’s Bicycle and Pedestrian Plan

Snapshot of Future Roseburg

- Households:
  - NW Roseburg (Garden Valley/Troost)
  - SW Roseburg (Lookgglass/Harvard)
  - Northern UGB
  - Winston
- Employment:
  - Bound by Stewart Pkwy, Harvard, Stephens
  - Near City Hall area
  - Urban Renewal
  - Winston/Dillard

Description	Percent Change (2017-2040)
Household	41%
Employment	37%
Roseburg Model area includes UCC, Winchester, Melrose, Riversdale, Winston, Green	



Funded Projects

City of Roseburg

- Stewart Parkway Widening – Under Construction
- Garden Valley Boulevard/Stewart Parkway Intersection Improvements – Under Construction
- Edenbower Boulevard/Stewart Parkway Intersection Improvements
- ADA Transition Plan
- Parks and Recreation – Deer Creek Path Stabilization

ODOT / County

- I-5: Exit 124 Signal Upgrades & Bellows Street Realignment
- North Bank Road Reconstruction
- Douglas County Warning Sign Upgrades
- Roseburg Pedestrian Upgrades (RRFB, Countdown signals)
- Parks and Recreation – Riverfront Park Trail Improvement
- Douglas County Hwy 99 Improvements - City Limits to Winchester Bridge

Future Transportation System

Streets/Roadway System:

- Garden Valley Boulevard, Stephens Street, Harvard Avenue and I-5
- Signal timing and progression could change by year 2040
- Queuing can be impacted by increased traffic demand, access spacing, capacity (number of lanes), adequate signage and travel speeds

Pedestrian System:

- Continue to add facilities with development
- Expand multiuse path system north of Garden Valley
- Safety/comfort

- ***Bicycle System:***
  - Cyclist comfort
  - Gaps on Garden Valley Blvd, Stephens St, Harvard Ave and along most of Diamond Lake Blvd.
  - Increased employment and households forecasted north of Garden Valley
- ***Transit System:***
  - Areas of >1 mile walk to transit
  - Service gaps
- ***Freight (Truck/Rail) System:***
  - Maintain geometry for trucks
  - I-5/ramp terminal congestion impacts truck freight

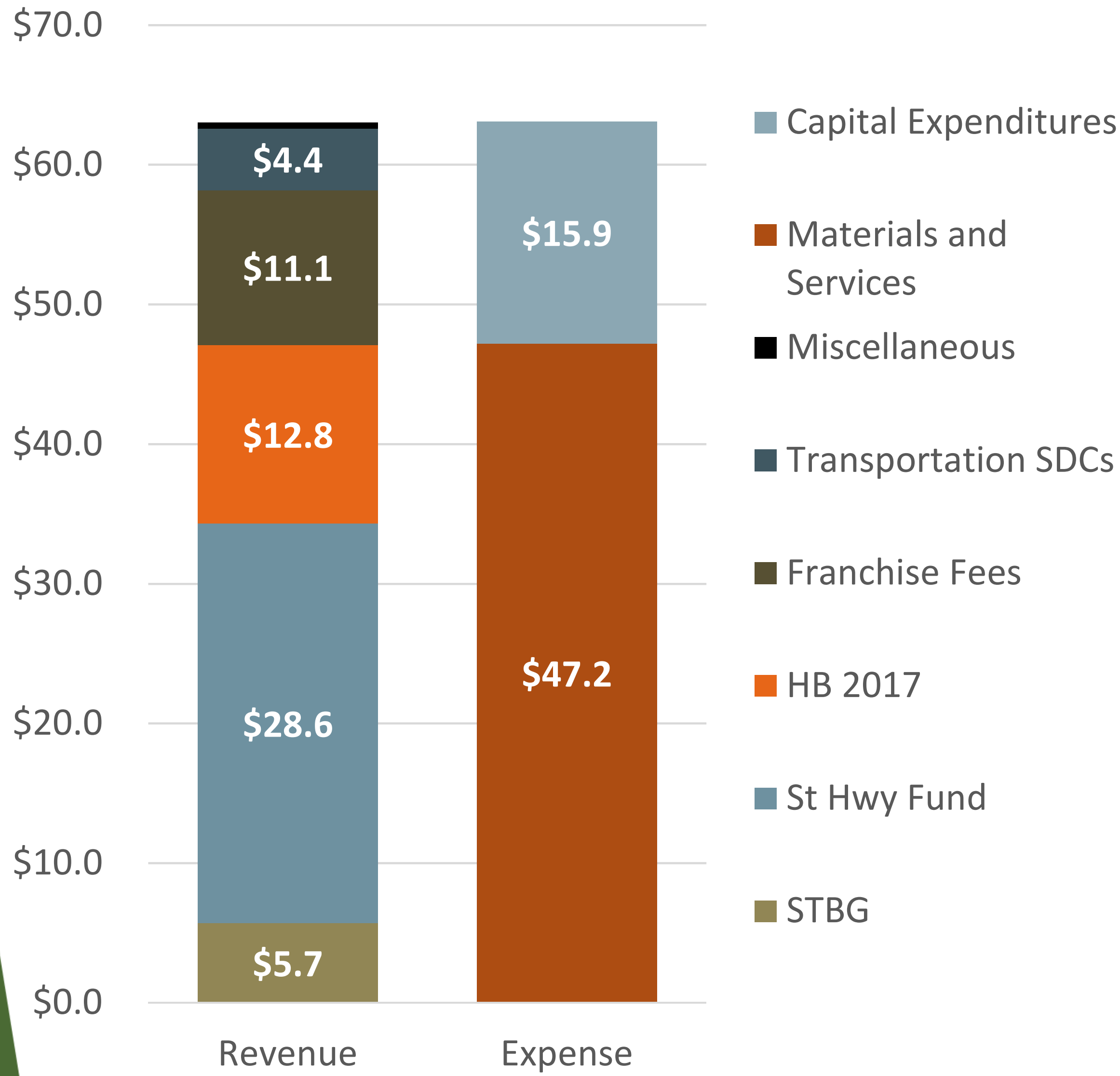
Roseburg Revenue and Expense Fiscal Year 2017-2018

Revenue	
STBG	$260,000
Gas Tax	$1,301,514
HB 2017	$248,886
Franchise Fees	$507,100
SDC Revenues	$200,000
Miscellaneous	$20,000
	$2,537,500

Expense	
Materials and Services	**$2,146,024**
Capital Expenditures	**$331,440**
	$2,477,464

- Douglas County data not yet available to be evaluated.
- All figures in 2018 dollars only.

Transportation Funding Revenue & Expense Estimate: 2018-2040



- Douglas County data not yet available to be evaluated.
- All figures in 2018 dollars only.

22-Year Revenue is approx. $63 million
(subject to refinement)

Brainstorming Activity

Examples of Transportation Solutions

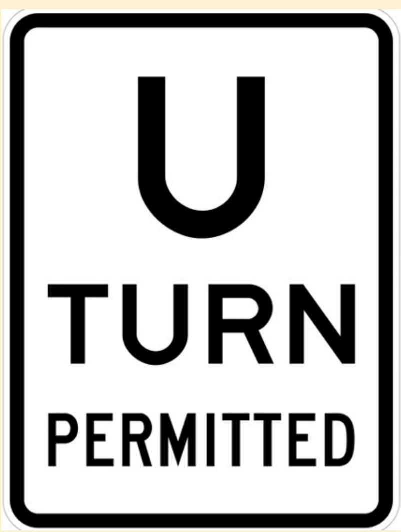
- Transportation Systems Management (TSM)
  - Signal Timing (flashing yellow, overlaps, coordination)
  - Access Management (u-turns, turn restrictions)
  - Traffic Calming (curb extensions)
  - Signing/striping
  - Consolidate approaches
- Capacity (within City standards)
  - Turn lanes
  - New street connections
  - Improve/create parallel routes
- Encourage bicycle, pedestrian and transit (demand management)
  - Improve trail amenities (lighting, width, surface)
  - Safe crossing opportunities (Flashing beacons, ped refuge)
  - Bus pullouts
  - Employer based incentives/ change
  - Shared lane markings/signs
  - Buffered bicycle lanes
  - Wayfinding signage
  - Bike-only entry
  - Pedestrian furniture

Pedestrian Refuge and Traffic Calming

Driver Expectancy Signage

Share the Road Signage

Access Management



Transit Center

Buffered Bike Lane

Next Steps

- Consultant will process info from today's meeting and draft alternatives within current funding forecast
- Draft TM 5: Alternatives Evaluation and accompanying ordinances/code changes (if applicable)
- Next PAC meeting with Consultant likely in early May 2018

Public Advisory Committee

Meeting #4: PAC2A

January 30, 2019

1:00 PM – 3:00 PM

Roseburg Public Safety Center

700 SE Douglas Ave.

Portland, OR 97205

Transportation System Plan Basics

What

A TSP describes a transportation system and outlines projects, programs, and policies to meet its needs now and in the future based on the community's aspirations.

A TSP must be consistent with other TSPs and planning documents governing the region it serves and with the Oregon Transportation Plan and its modal and topic plans. TSPs are required by the Transportation Planning Rule documented in the Oregon Administrative Rule 660-012-0015.

Why

- Plot a clear course for your community (Goals, planned land uses, right-of-way needs, projects and services)
- Attract and secure funds (Statewide Transportation Improvement Program, grants)
- Work toward goals (collaboration with region, agency coordination)
- Make improvements through small, affordable steps

Solution Development & Evaluation

Development

In preparing a TSP, a jurisdiction must develop and evaluate solutions that address the transportation system needs identified from the existing and future conditions analyses.

A jurisdiction's needs may vary significantly based on the size of the community, the anticipated change in population and employment, and the characteristics of the transportation system.

> "The TSP shall be based upon evaluation of potential impacts of transportation system solutions that can reasonably be expected to meet the identified transportation needs in a safe manner and at a reasonable cost with available technology." OAR 660-012-0035

Evaluation

At a minimum, the preliminary evaluation criteria should help identify environmental constraints, engineering feasibility constraints, funding constraints.

Evaluation of the solutions should result in a list of preferred solutions for inclusion in the TSP. The preferred list of solutions should:

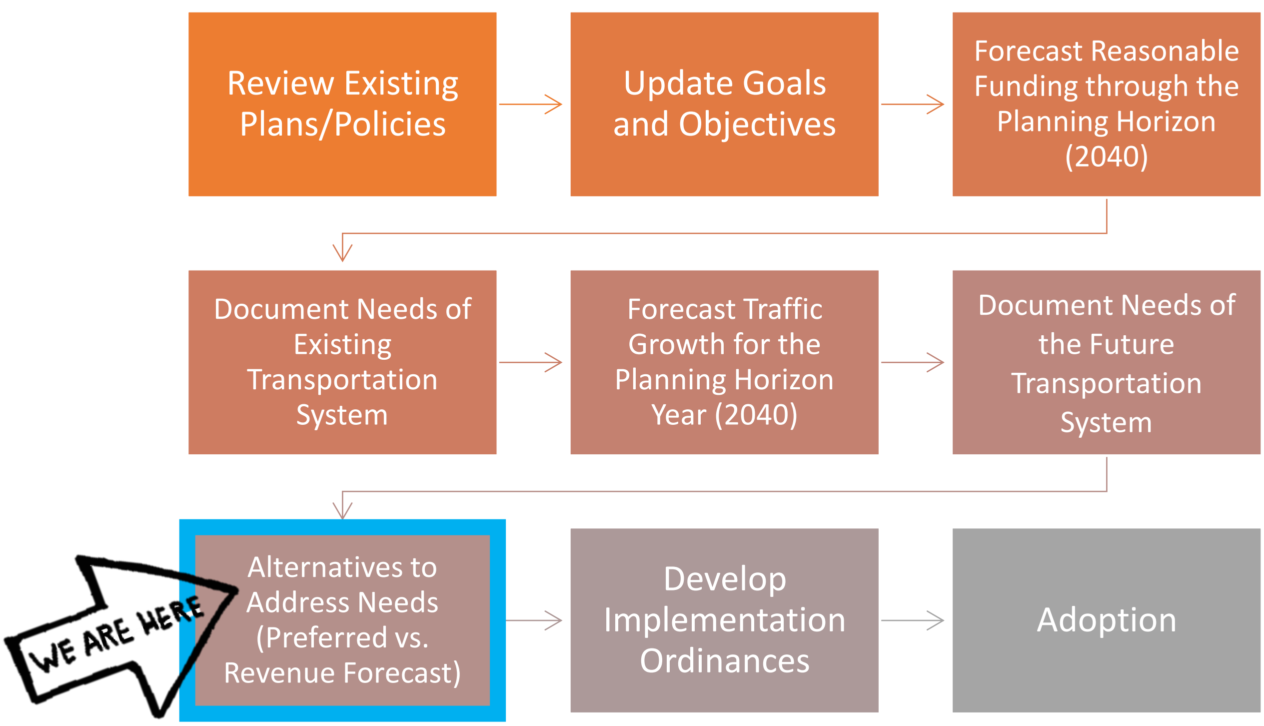
- Address the needs determined as local priorities.
- Prioritize based on how well they address the goals and objectives of the TSP
- Be consistent with the TPR and be technically, environmentally, politically, and financially implementable.
- Provide the local government with a viable package of solutions for the transportation problems facing the community over the 20-year planning horizon.
- Maintain the mobility of the state highway system in part by providing for a system of streets for making short distance trips and by incorporating the needs of alternative transportation modes.

Final Plan

The TSP document is the culmination of the planning process that identifies the goals and objectives of the TSP update and the new policies, plans, programs, and projects that will shape the transportation system over the planning horizon. With regards to actual content, the Transportation Planning Rule defined in Oregon Administrative Rule 660-012 outlines specific content that is required to be included in all TSPs.

Per OAR 660-012-0020, the following plan elements ***Shall*** be addressed in a TSP. For each of the applicable elements, the TSP must document the needs, functions, modes, and general location of planned improvements.

- Air
- Bicycle
- Marine
- Pedestrian
- Pipeline
- Rail
- Roadway
- Transit
- Truck Freight
- TSM/TDM Policies/Strategies
- Policies, Ordinances and Funding Plans



ROSEBURG TRANSPORTATION SYSTEM PLAN UPDATE

TECH MEMO 5 SYSTEM CONCEPTS

John Lazur - Associate Planner
jlazur@cityofroseburg.org
Stuart Cowie – Community Development Director
Nikki Messenger – Public Works Director
Tom Guevara –ODOT
Angela Rogge – DEA

Wednesday
January 30, 2019
1:00-3:00pm

700 SE Douglas Ave
Umpqua Room

Tech Memo 5 – System Concepts

- The Focus of the PAC review:
  - Multimodal project concepts
  - Support / Opposition to projects
  - Funding feasibility

- Where are we?

Tools in the Toolbox

Transportation System Management (TSM)

Getting more use out of our existing infrastructure

Traffic Calming

- Increasing safety through design

Access Management

- Driveway spacing, Turn lanes, medians, turn restriction

Intelligent Transportation Systems

- Signal timing, variable speed limits

Transportation Demand Management (TDM)

Strategies to change travel behavior

- Ride sharing
- Employer-based incentives
- Investing in ped/bike facilities
- Transit improvements

Multimodal System Concepts

Where do these come from?

- 2006 TSP Projects
- Public Feedback and identified deficiencies
- System and Demand Management Strategies
- Does not include IAMP 124/125 intersections
  - Recommend IAMP update in future

Multimodal Concepts

- BP1 – East Roseburg Bike Facilities and Sidewalks
  - Option A: Douglas Avenue Sharrows and Sidewalk – $3.35 Million
    - Option A would provide sharrows along Douglas Avenue without affecting on-street parking and construct sidewalks from Deer Creek to the eastern city limit.
  - Option B: Douglas Avenue Bike Lanes and Sidewalk - $3.35 Million
    - Option B would provide striped 6-foot bike lanes along Douglas Avenue and construct sidewalks from Deer Creek to the eastern city limit. This concept would require removal of on-street parking on both sides to fit a bike lane in each direction.

Multimodal Concepts

- BP2 – Roseburg Bicycle Route Wayfinding
  - Network of multi-use paths, striped bicycle lanes, and sharrows
  - Alternative, parallel routes to major destinations like schools, crosswalks, parks, and public buildings.

Multimodal Concepts

- BP3 – Garden Valley Boulevard Bike Facility
  - Option A: Bike lanes –
    - Option A would require center/turn lane removal to fit bike lanes in each direction given the current roadway width.
  - Option B: Widen sidewalks – $1.5 Million
    - Option B The roadway is constrained and instead of repurposing travel lanes for bike lanes, a widened sidewalk would provide a better facility for bicyclists and pedestrians. Adding an additional five feet to the existing sidewalk would provide a ten-foot wide facility on both sides of the street.

Multimodal Concepts

- BP4 – Stephens Street Bike Facility – $400,000
  - This concept would add bike lanes on Stephens Street from Garden Valley Boulevard to Diamond Lake Boulevard. To provide bike lanes within the current width of the roadway, some space would have to be repurposed from vehicles to bicycles, likely by narrowing the lane widths.

Multimodal Concepts

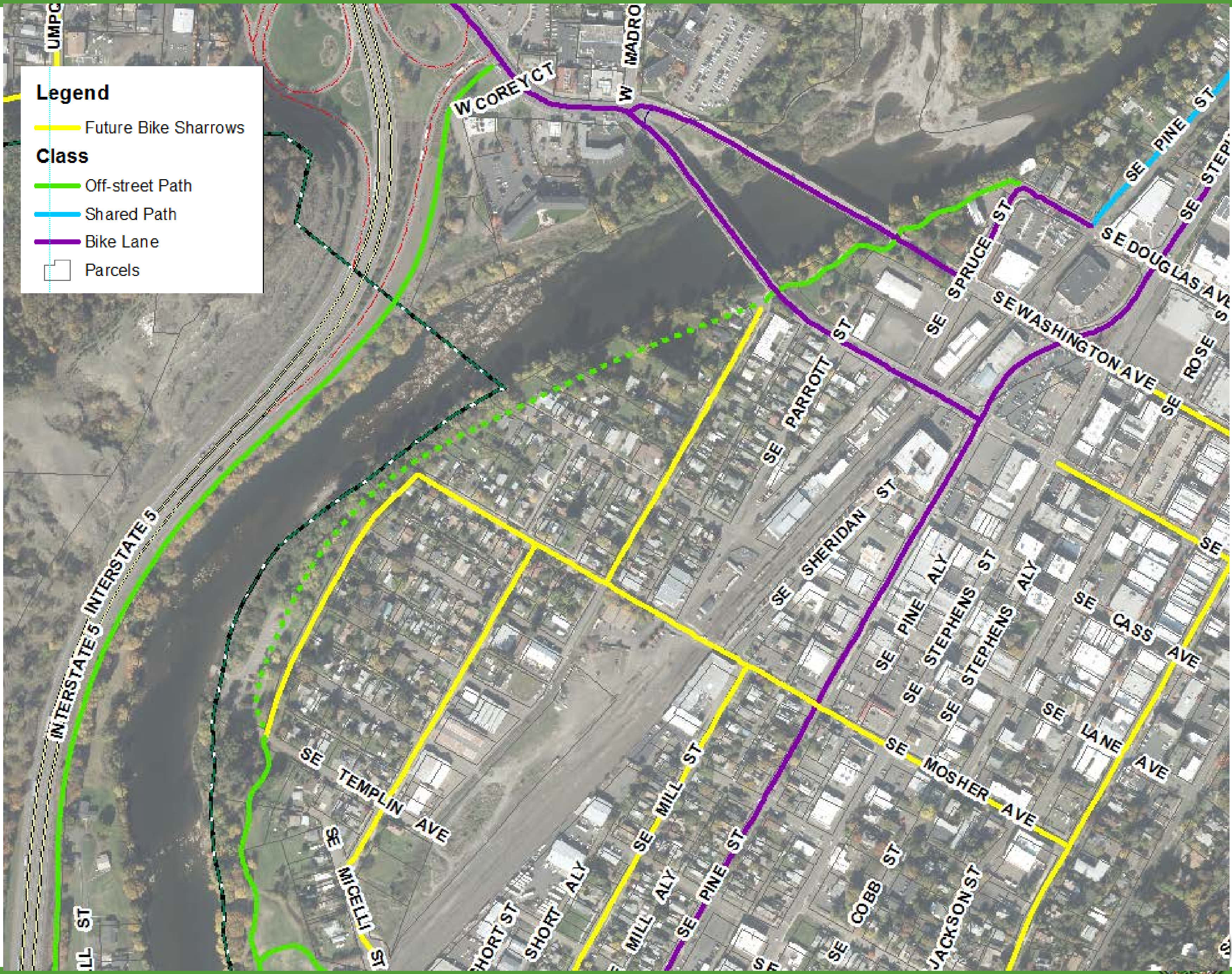
- BP5 – West Harvard Avenue Bike Facilities
  - Option A: Bike lanes. Would provide bike lanes along Harvard Avenue between Lookingglass Road and Umpqua Street. This facility would require center/turn lane removal to fit bike lanes in each direction given the current roadway width. - $TBD
  - Option B: Widen sidewalk. Create a 10 foot wide sidewalk. This provides a direct connection to the two facilities on the north side of Harvard Avenue that provide north-south access. Additional wayfinding signage would be here to guide people to these connections, complimenting the current wayfinding signage project. - $1.1 Million

Multimodal Concepts

- BP6 – Stephens at Winchester Intersection Bike/Ped Crossings
  - Consolidate crossing to a single location on Winchester Street just east of where the road splits. The crossing could be made more visible through signage and pavement markings. - $TBD

Multimodal Concepts

- BP7 – South Umpqua River Multi-Use Path
  - This multi-use path would continue south from the existing path that ends at Oak Avenue.


Legend
Future Bike Sharrows
Class
Off-street Path
Shared Path
Bike Lane
Parcels
W COREY CT
W MADRO
SE PINE ST
SE STEP
SE SPRUCE ST
SE DOUGLAS AVE
SE WASHINGTON AVE
SE ROSE
SE PARROTT ST
SE SHERIDAN ST
SE PINE ALY
SE STEPHENS ST
SE STEPHENS ALY
SE CASS AVE
SE LANE AVE
SE MOSHER AVE
SE TEMPLIN AVE
SE MICELLI ST
SE MILL ST
MILL ALY
SE PINE ST
SE COBB ST
JACKSON ST
SHORT ST
SHORT ALY
INTERSTATE 5
UMPQ

Multimodal Concepts

- BP8: Fulton Street Sidewalks and Bike Facility – $750,000
  - Upgrade the street to minor collector standards and provide important bicycle and pedestrian facilities on both sides of Fulton Street from Diamond Lake Boulevard north to the end of the public street

Multimodal Concepts

- BP9 – Ramp Road to Terrace Drive Multi-Use Path and Ramp Road
  - Add sidewalks on the west side of Ramp Road and a multi-use path connection through the undeveloped area west of Ramp Road to connect to Terrace Drive - $560,000

Multimodal Concepts

- BP10 – Pine Street Sidewalks
  - Adds sidewalk to the east side of Pine Street south of existing sidewalks to the city limit provide access south of Rice Street.

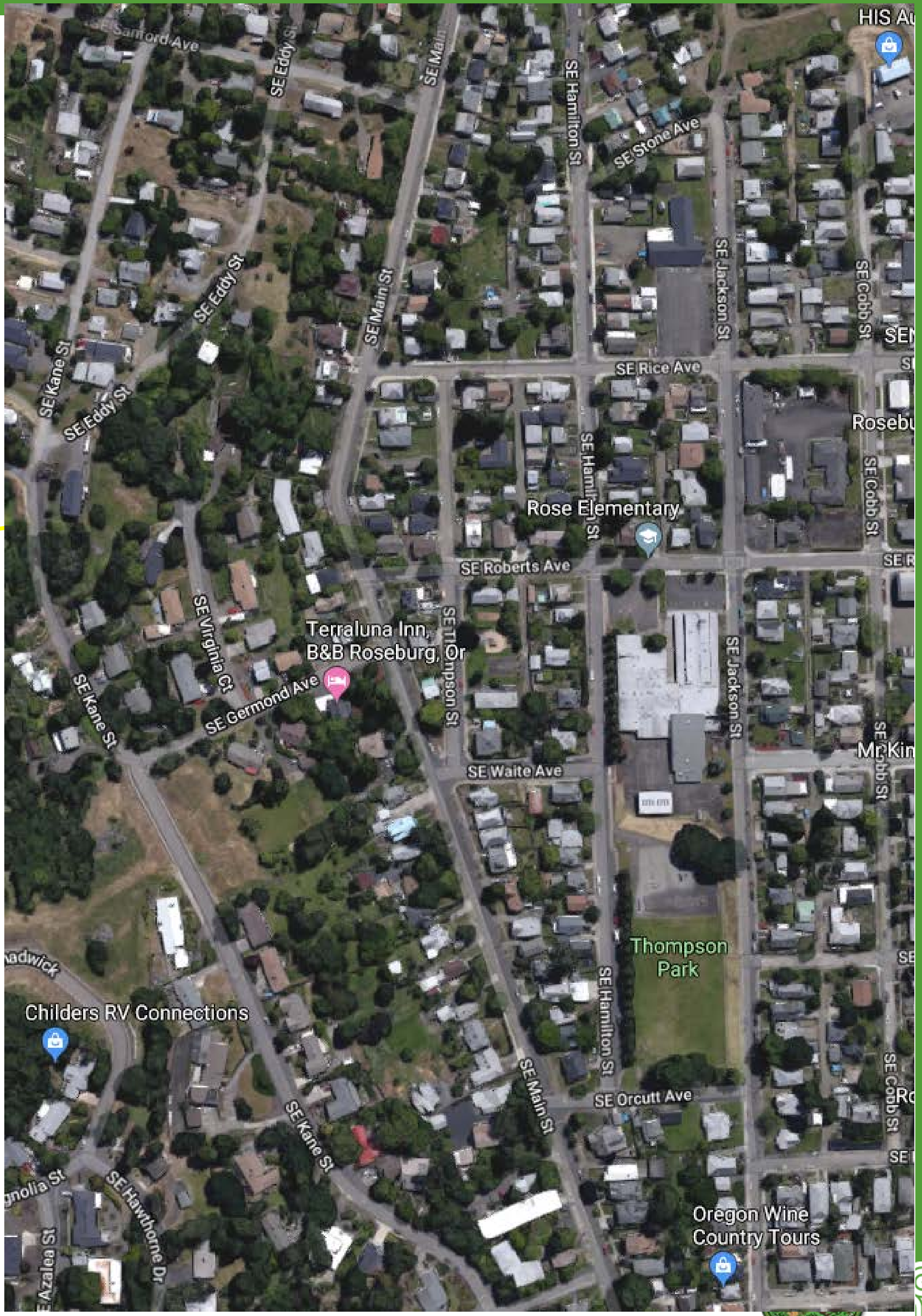
Multimodal Concepts

- BP11 – Main Street Sidewalks and Bike Facility
  - Add bicycle facilities on Main Street. New sidewalk would be added on the east side of Main Street from Rice Avenue to Marsters Avenue, and on the west side from Hamilton Street to Marsters Avenue.
  - Option A: Sharrows and Sidewalk
    - Sharrows along Main Street from Douglas Street to Lane Street. This facility would be implementable given the current striping. Sidewalk added on the east side of Main Street from Rice Avenue to Marsters Avenue and on the west side from Hamilton Street to Marsters Avenue.
  - Option B: Bike Lanes and Sidewalk
    - Bike lanes along Main Street. Would require parking removal to fit a bike lane in each direction given the current roadway width. Sidewalk would be added on the east side of Main Street from Rice Avenue to Marsters Avenue, and on the west side from Hamilton Street to Marsters Avenue.


SE Main St


SE Main St

Old Soul Pizza



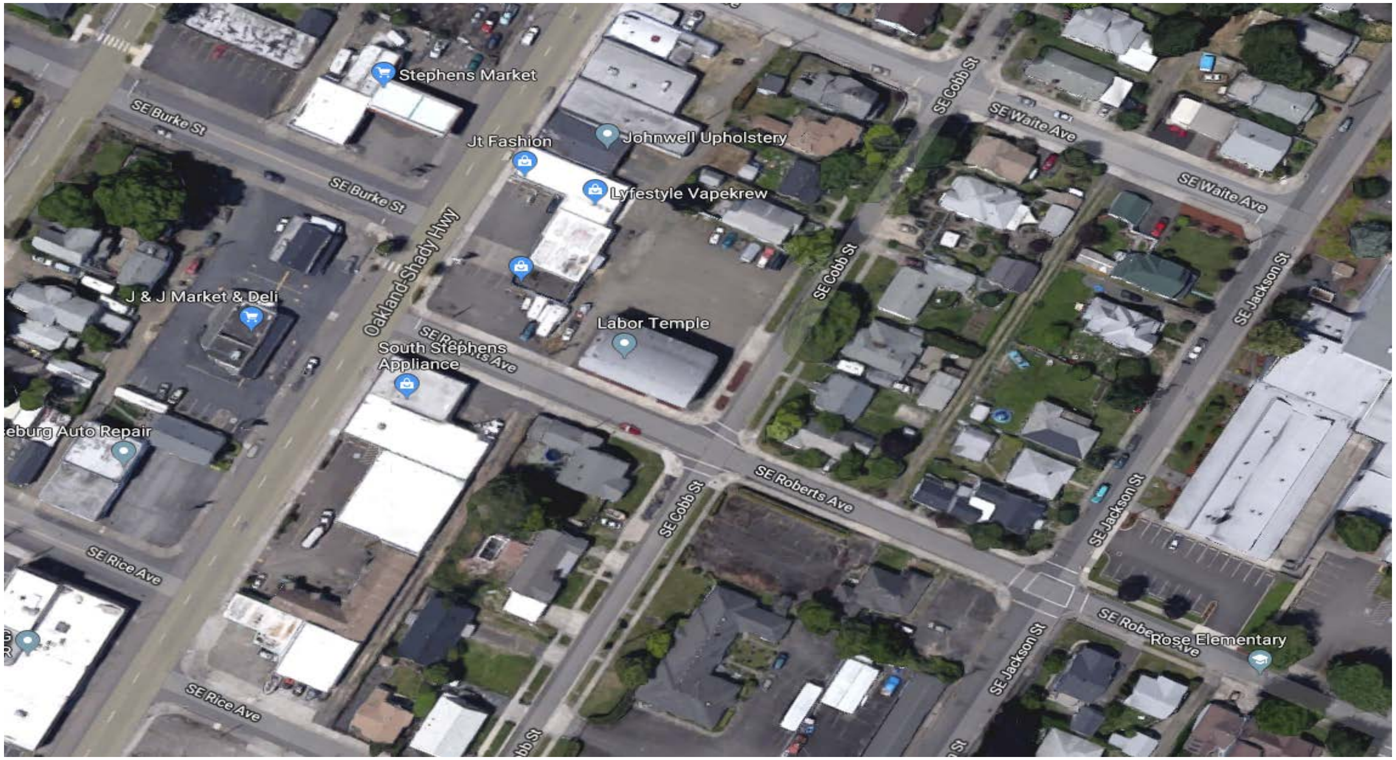
SE Stone Ave
SE Rice Ave
Rose Elementary
SE Roberts Ave
Terraluna Inn, B&B Roseburg, Or
SE Germond Ave
SE Waite Ave
Thompson Park
Childers RV Connections
SE Orcutt Ave
Oregon Wine Country Tours
SE Kane St
SE Eddy St
SE Main St
SE Hamilton St
SE Jackson St
SE Virginia Ct
SE Hawthorne Dr
SE Azalea St

Multimodal Concepts

- BP12 – Mosher Avenue Bike Facility
  - Option A: Sharrows
    - Option A would provide sharrows and signage near the railroad crossing to provide guidance to bicyclists and motorists to share the road. - $10,000
  - Option B: Bike Lanes
    - Option B would provide bike lanes from Main Street to the South Umpqua River. This would require parking removal on one side of the street. - $400,000

Multimodal Concepts

- BP13 - Burke Street/Roberts Avenue Sharrows
  - Sharrows on Burke Street and Roberts Avenue. This would provide an east-west connection to the southbound bicycle lane that already exists on Pine Street and links residences west of the couplet with commercial businesses on Stephens Street and the school east of the couplet on Roberts Avenue. - $270,000 (includes ramp upgrades)



Multimodal Concepts

- BP14: Jackson Street Bike Facility
  - Option A - Sharrows
    - from Diamond Lake Boulevard to Douglas Avenue. This facility would be implementable given the current striping, since sharrows do not provide a separate facility for bicyclists. South of Douglas Avenue to Mosher Avenue, sharrows would be added to the roadway. - $54,200 (includes ramp upgrades)
  - Option B: Bike Lanes
    - From Diamond Lake Blvd to Douglas Ave. Would require parking and/or turn lane removal to fit a bike lane in each direction given the current roadway width. South of Douglas Avenue to Mosher Avenue, sharrows would be added to the roadway. - $63,000 (includes ramp upgrades)


SE Jacks
ROSEBURG
OPEN


SE Jackson St

Multimodal Concepts

- BP15: : Stewart Parkway Multi-Use Path
  - Create a multi-use path on the east side of Stewart Parkway between Harvard Avenue and Stewart Park Drive. This would include a cantilevered structure along the existing bridge and striping of sharrows on Stewart Park Drive to connect the facility on Stewart Parkway to the existing trail system within Stewart Park. - Cost Opinion: $1.4 million

Multimodal Concepts

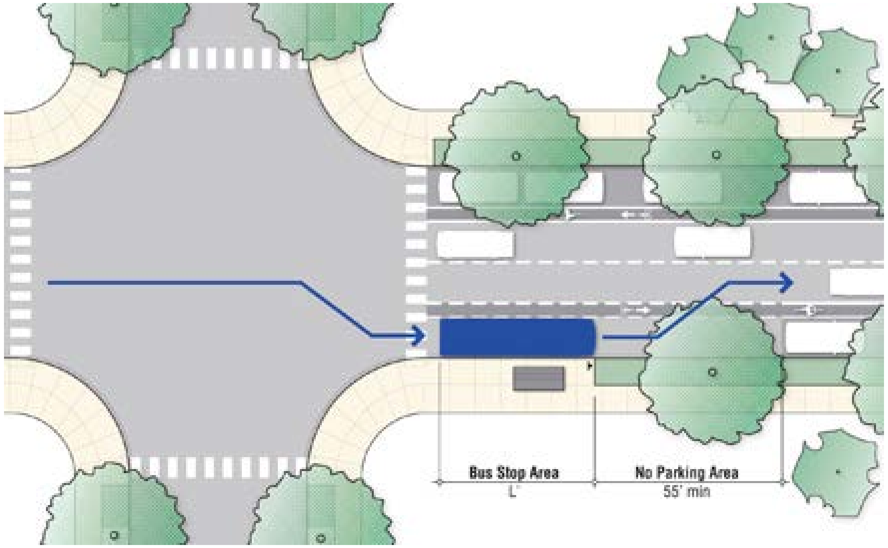
- BP16: Trail Wayfinding and Connections
  - Option A: Duck Pond Street
    - Connection between Garden Valley Boulevard to the multi-use path through Stewart Park. The path on the west side of the parking would be formalized with signage to establish the area as a multi-use path.
  - Option B: Gaddis Park
    - To provide facility along Chestnut Ave and Highland Street to the existing trail south of the parking lot, the left-turn lane on Chestnut Avenue and one side of on street parking would need to be removed.
  - Option C: Pine Street
    - links Deer Creek Park along Pine Street, Douglas Avenue, and Spruce Street to the existing one-way bike lane along Stephens Street. The multi-use path would continue on the north side of Pine Street, and then a bike lane along Douglas Avenue to connect to the existing multi-use path along the South Umpqua River.
  - $1.6 million (includes path construction and lighting)

Multimodal Concepts

BP16: Trail Wayfinding and Connections

Multimodal Concepts

- BP17: Garden Valley Boulevard and Stephens Street Transit Stops
  - This concept would involve a code change to require developers to provide transit stop amenities and an update to include in-lane far-side transit stops at least 30 feet from intersection to avoid bus interference with side street traffic flow. - $80,000 each



Multimodal Concepts

- BP18: Calkins Avenue Sharrows
  - Sharrows on Calkins Avenue between Grove Lane and Keasey Street. This road is also an ideal candidate for a bicycle boulevard, which would likely benefit from traffic calming measures to slow traffic speeds and direct bicyclists to nearby bicycle facilities. $200,000 (includes ramp upgrades)

Multimodal Concepts

- BP19: Garden Valley Boulevard Midblock Crossing
  - Installing a signalized midblock crossing near Garden Valley Boulevard at Fairmount Avenue/Highland Street. It would also install sharrows on Fairmount Avenue and Highland Street to formalize a bicycle route. - $200,000 (includes ramp upgrades)

Multimodal Concepts

Transit Concepts

	UTrans	Roseburg	Nature of City Support
Capital Improvements			
T1: Purchase of Additional Buses	Lead	N/A	None.
T2: New Transit Center	Lead	Support	Potential planning and financing partnership (e.g., through Tax increment financing (TIF)), assistance securing needed land and ROW
T3: New Maintenance Facility	Lead	Support	Potential planning and financing partnership (e.g., through TIF), assistance securing needed land and ROW
T4: Stop Amenities and Accessibility	Support	Support	Assistance securing needed ROW, City implementation of bike and pedestrian improvements
Operations and Service Improvements			
T5: Increased Frequencies	Lead	N/A	None.
T6: New Routes	Lead	N/A	None.
T7: Transit ITS	Support	Support	Coordination of City/ODOT operated traffic controls

Multimodal Concepts

Roadway Concepts

- R1: Aviation Drive/ Stewart Parkway
  - Option A - Dedicated southeast right-turn lane from Stewart Parkway to Mulholland Drive. Does not address the safety concern.
  - Option B - Dedicated southeast right-turn lane and flashing yellow left-turn arrows
  - Option C - Dedicated southeast right-turn lane and realign intersection
- Options A and B - $600,000

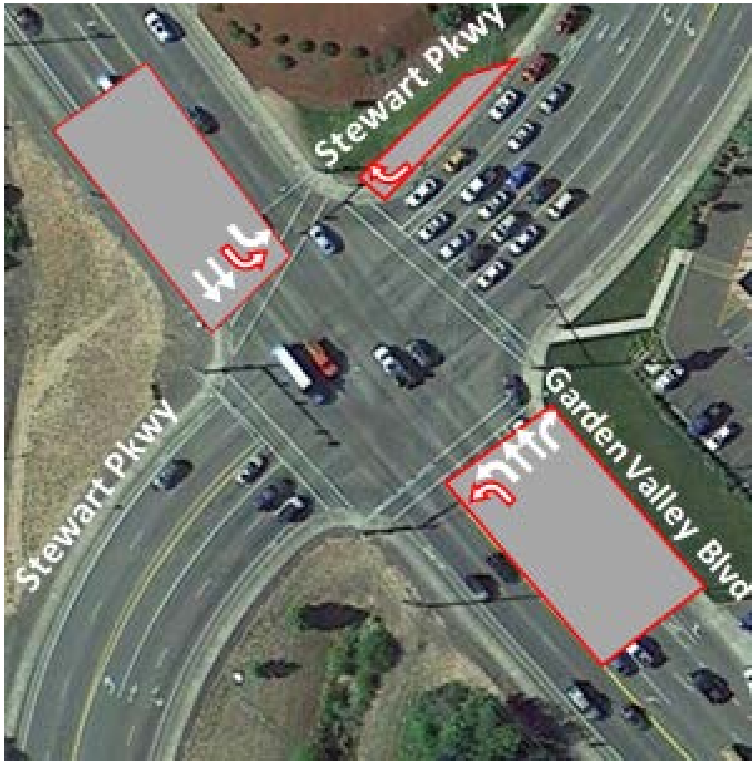
Option A

Option B

Multimodal Concepts

Roadway Concepts

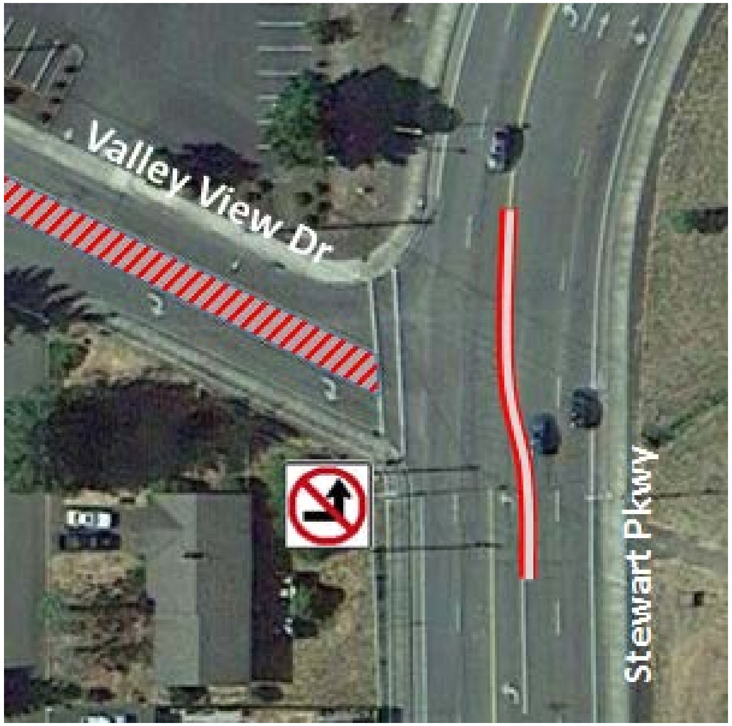
- R2: Garden Valley Boulevard at Stewart Pkwy
  - Dual eastbound and westbound left-turn lanes and dual southbound right-turn lanes
  - This level of improvement would allow the intersection to operate within the City's mobility target. $$ To be determined.



Multimodal Concepts

Roadway Concepts

- R3: Stewart Parkway at Valley View Drive
  - Prohibit eastbound left-turns off Valley View Drive
  - To improve safety and reduce delay at the intersection, this concept proposes restricting the eastbound left-turns from Valley View Drive to Stewart Parkway; all other movements would still be permitted. - $40,000



Multimodal Concepts

Roadway Concepts

- R4: Stewart Parkway at Stephens Street
  - Option A: Dual northbound left-turn lanes
  - Option B: Dedicated westbound and southbound right-turn lanes
  - $1.7 million

Option A

Option B

Multimodal Concepts
Roadway Concepts

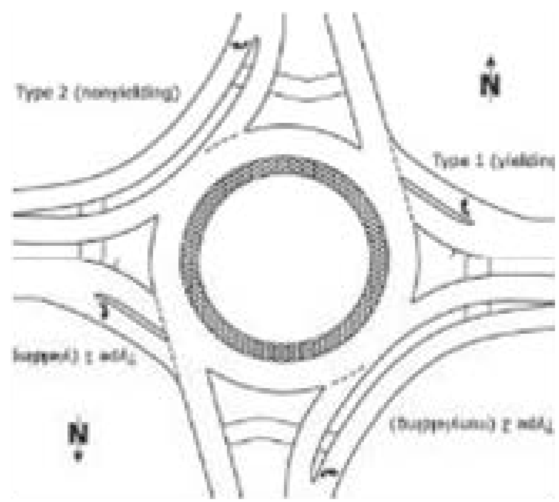
- R5: Garden Valley Boulevard at Stephens Street
  - Dual eastbound left-turn lanes, dedicated southbound and northbound right-turn lanes - $2 million

Multimodal Concepts

Roadway Concepts

- R6 Harvard Avenue at W Broccoli Street
  - Option A: Traffic Signal - $400,000
    - Although ODOT's preliminary signal warrants were not met, future conditions may warrant signalization.
  - Option B: Roundabout - $TBD
    - Option B provides an alternative to signalization by installing a roundabout.

Option A

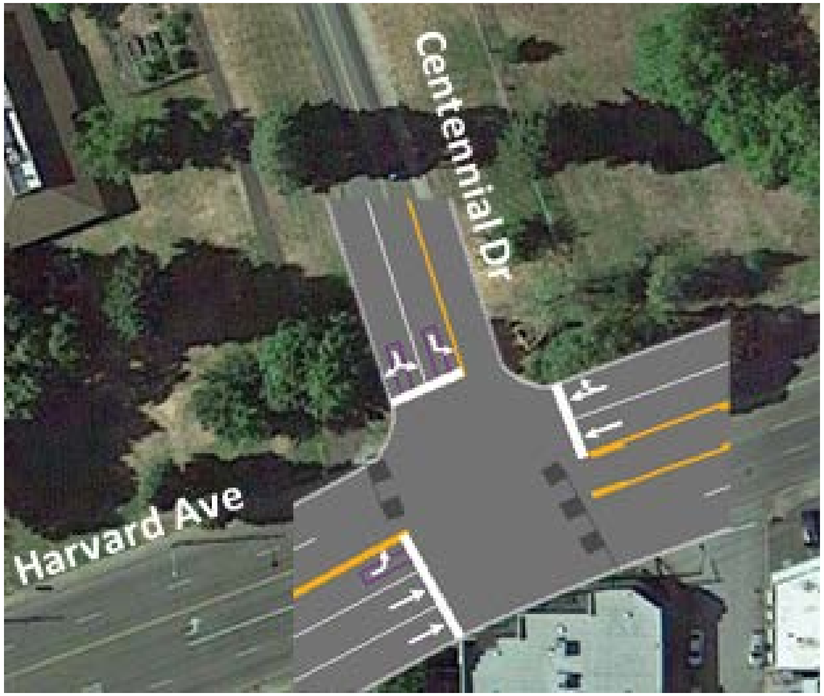


Option B

Multimodal Concepts

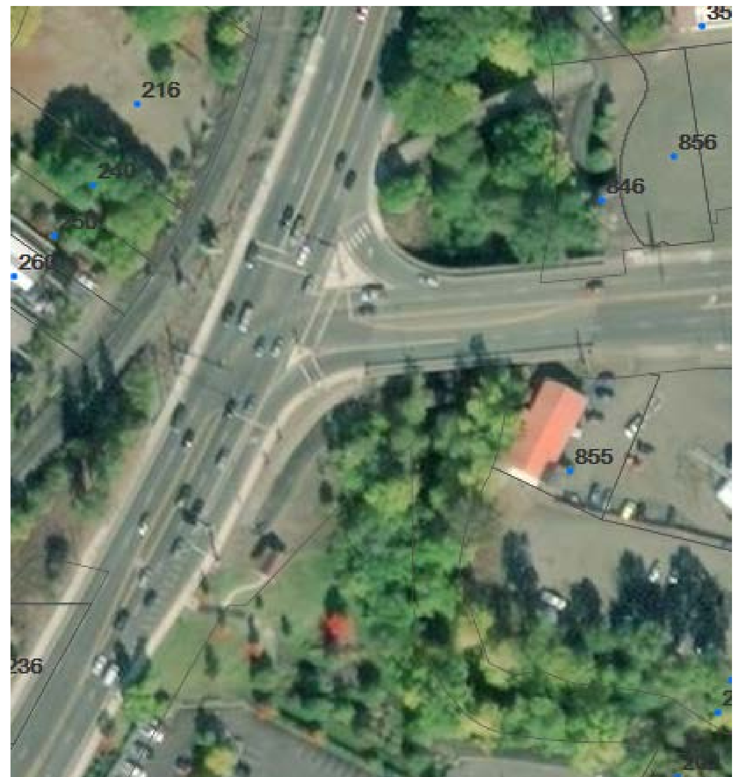
Roadway Concepts

- R7 Harvard Avenue at Centennial Drive/Stewart Park Drive
  - Concept R7 – Restripe southbound right-turn lane to a shared southbound left/right-turn lane
  - Restripe the north leg of the intersection to allow for dual southbound left-turns. Centennial Drive/Stewart Park would be striped as a southbound left and southbound left/right-turn lane. - $50,000



Multimodal Concepts
Roadway Concepts

- R8 Diamond Lake Boulevard at Stephens Street
  - Dual southbound left-turn lanes - $1.2 million

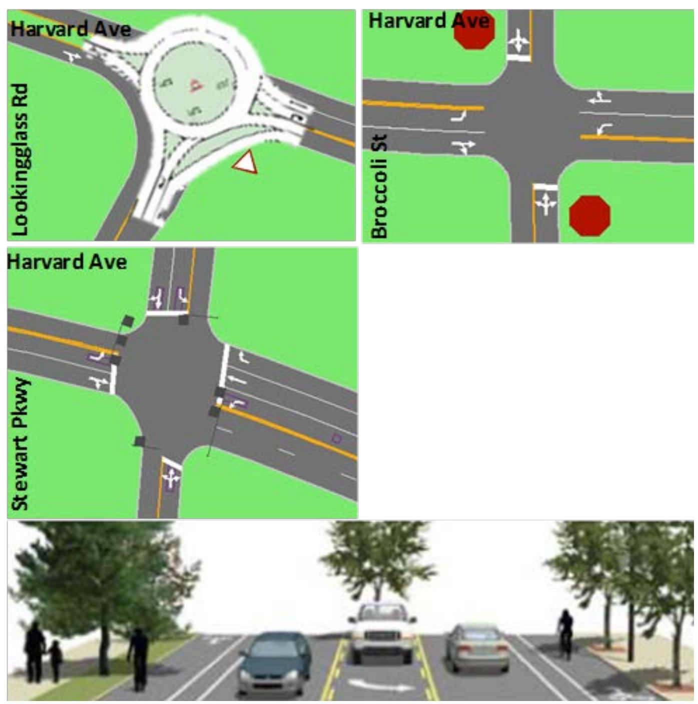


Multimodal Concepts
Roadway Concepts

- R9 Washington Avenue at Spruce Street
  - Option A: Traffic Signal
    - ODOT’s preliminary signal warrants were not met, future conditions may warrant signalization.
  - Option B: Access management
    - This option would attempt to combat the cut-through drivers attempting to avoid the traffic signals . - $TBD.

Multimodal Concepts
Roadway Concepts

- R10 Harvard Ave: Stewart Parkway to Lookingglass Road
  - Restripe Harvard Avenue as three lanes from Stewart Parkway to Lookingglass Road in order to provide bicycle lanes on Harvard Avenue
    - A three-lane cross-section of Harvard Avenue, Lookingglass would need to be a roundabout with two circulatory lanes on the north side to accommodate the anticipated westbound traffic. Broccoli Street would need to be signalized, similar to concept R6. - $TBD.



Multimodal Concepts
Roadway Concepts

- R11 Stephens Street at Winchester Street
  - Option A: Directional signage to Downtown Roseburg and formalized turn lanes on Stephens Street between Winchester and Diamond Lake Boulevard
  - Option B: Realign intersection to a T-intersection
  - Option C: Signalize, realign and provide dual WBR
    - Preliminary signal warrants are met at this intersection.

Option A

Option B

Option C

Multimodal Concepts
Roadway Concepts

- R12 Fulton Street at Diamond Lake Boulevard
  - Install a traffic signal - $600,000
    - To provide a protected pedestrian crossing of Diamond Lake Blvd and anticipate future development. Although the preliminary signal warrants are not met at this location, future traffic demand may warrant a change in traffic control.

Multimodal Concepts

Roadway Concepts

- R13 Harvard Avenue at Lookingglass Road
  - Option A: Install a traffic signal
    - To address the northbound left-turn operations. Preliminary signal warrants are not met at this location and it is unlikely that future traffic demand may warrant a signal.
  - Option B: Install a roundabout with a westbound bypass lane - $$ TBD

Option A

Option B

Any Questions?

Comments from PAC or Public

jlazur@cityofroseburg.org

- Comments Due next Friday

Public Advisory Committee

Meeting #5: PAC2B

August 22, 2019

3:00 PM – 5:00 PM

Roseburg Public Safety Center

700 SE Douglas Ave.

Portland, OR 97205

Meeting Summary & Notes

Roseburg Transportation System Plan Update: TSP System Conditions

LOCATION: 700 SE Douglas Avenue – Umpqua Room

DATE: Thursday, August 22nd, 2019

TIME: 3:00 – 5:00 PM

Attendees:

- Tom Guevara, ODOT (APM)
- John Lazur, Associate City Planner, City of Roseburg
- Nikki Messenger, City Manager, City of Roseburg
- Stu Cowie, Community Development Director, City of Roseburg
- Loree Pryce, Public Works Engineer, City of Roseburg
- Angela Rogge, DEA (Consultant Deputy PM)
- Shelly Alexander, DEA (Consultant PM)
- Dick Dolgonas, Bike Walk Roseburg
- Dr. Bob Dannenhoffer, Douglas County Health
- Jenny Carloni, League of Women Voters Umpqua Valley
- Matt Droscher, Umpqua Valley Disabilities Network
- Jessica Hand, Blue Zones

Introductions

Shelly briefly reviewed the meeting agenda which includes a PowerPoint (PP) presentation, and introduced Angela, the consultant deputy project manager and lead transportation engineer. The PP is attached and covers the following: the basics of a Transportation System Plan (TSP), why it is needed, the current stage of the process, the draft outline, and code recommendations.

Presentation

Shelly presented the initial presentation slides (1-4) which covered the basics of a Transportation System Plan (TSP), why it is needed, and at what stage of the process things stand currently. The draft TSP outline was reviewed. The framework for updating the City code to be consistent with the TSP and Transportation Planning Rule (TPR) was discussed.

Angela presented on the outline of the TSP draft, TSP Guidance, and the code recommendations (slides 5-16). The following were the *comments (shown in blue italic font)* and points of discussion:

1. Slide 5 (Draft TSP Outline):
    a. The TSP is to provide guidance and not a mandate;
    b. It's a tool to help the City build projects;
    c. The local street system is not the focus of the TSP (rather collector and arterial roadways); but provides a toolkit for improvements;
    d. Future look (20-year planning horizon): looks at employment, population, operations and connections (discussed by mode), and funding;
    e. Funding plan (TM 5, CIP, available funding): reconcile and prioritize;
    f. Aspirational projects can be funded later (typically with grants).
2. Slide 6 (TSP Guidance):
    a. Can a proposed project be implemented with the current code?

b. Functional classifications and planned connections.
3. Slide 7 (Code Recommendations):
    a. Get the code, planned projects/standards on the same page.
4. Slide 8 (Big Picture):
    a. Code changes/updates need to be implemented.
    b. If needed, City will take the suggested language and write new code language to amend the code.
    c. Can Angelo Planning Group (APG), a subconsultant specializing in code/policy, add a column to Table 1 that includes a 4th column "Why Policy XX" 1A, for example?
    d. Dick Dolgonas would like a correlation between Draft TM 6 and the policy.
5. Slide 9 (Code Recommendations 1):
    a. ADA Language:
        i. Not ADA transition plan
        j. Overlap between TSP and ADA Transition Plan
        k. Is there an ADA deficiency? If so, the nexus of the ADA transition plan is needed to address it.
        l. Strengthen language for land use development re: ADA (Universal Design); new term "intersectionality"- opportunity to "get ahead of the curve".
6. Slide 10 (Code recommendations 2):
    a. Suggest expanding the code language to provide parking for all non-vehicular mobility devices (bikes, scooters, etc.)
7. Slide 11 (Code Recommendations 3):
    a. Recommendation 8 ("crosswalks" in parking area) not needed, but may facilitate non-vehicular modes.
    b. Recognition that "code trumps policy"
    c. Suggest utilizing references in the code to the policy. For example, "include design standards by reference".
    d. Recommendation 11 explicitly states bike/ped as options for off-site improvements-strengthens code to provide bike/ped facilities.
8. Slide 13 (Code Recommendations 5)
    a. Recommendation 15: provide consistency between City groups (Parks is installing shared-use paths).
    b. Skinny Streets (for consideration): cross section samples (for example, 40' ROW); current minimum ROW width is 60'.
    c. Recommendation 16: ODOT submittal of a land use application may want further discussion. *Tom suggested making the language more general (road authorities) and not specific to ODOT.*
    d. Tom provided comments on various aspects for consideration, such as mixed use zones, trip increases.
    e. Intent of TM 6: Flag current code that could not facilitate implementation of the selected projects in its current form (or is missing)
        i. TM 6 to note: "why" it is needed (see comment 4c above)
        j. Management actions are the next steps: deficiency that is not addressed by a project in TSP may result in a new management action and/or policy.
        k. 2 page summary of management actions (1. Mobility targets; 2. IAMPs; 3. Reduced lane widths)

9. Slide 16 (Next Steps):
    a. The PAC will provide comments on TM 6 and the Consultant will work to address comments from City, ODOT and PAC.
    b. *Request to have the comment log circulated. Project team will distribute comment log to date.*
    c. *Add policy to address acceptable congestion.* Consultant notes that the TSP provides updated Mobility Targets that streamline the current standards and focus analysis on the entire hour instead of the peak 15 minutes.
    d. There will be a draft TSP for review in September
    e. PAC and Open House meeting will review draft TSP

Roseburg TSP
PAC Meeting

August 22, 2019

700 SE Douglas Ave (Public Safety Center)

SIGN IN SHEET

Name	Organization/Agency
1. Loree Pryce	C.O.R
2. Dick Dolgonas	BikeWalkRoseburg
3. Bob Dannenhoffer	Public Health
4. Matt Droscher mattd@uvdn.org	Umpqua Valley Dis. Network 736 SE Jackson, Rsbg.
5. Denny Austin	Roseburg Schools
6. Jenny Carloni	LWVUV
7. Jessica Hand	Blue Zones
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Roseburg Transportation System Plan Update

Public Advisory Committee Meeting
Thursday, August 22, 2019

Agenda

- Project Recap
  - What/Why
  - Schedule
- TSP Draft Outline
- TSP Guidance
- **Code Recommendations**
- Additional Compliance Review
- Next Steps

What is a TSP? Why do we need one?

WHAT

- A blueprint for all modes of travel
- Must be consistent with other TSPs and planning documents governing the region it serves and with the Oregon Transportation Plan.
- TSPs are required by the Transportation Planning Rule documented in the Oregon Administrative Rule 660-012-0015.
- Eventually adopted as the transportation element of the City's Comprehensive Plan.

WHY

- Attract and secure funds (Statewide Transportation Improvement Program, grants)
- Plot a course for your community (Goals, planned land uses, right-of-way needs, projects and services)
- Work toward goals
- TSP must document the needs, functions, modes, and general location of planned improvements.

Where We Are in the Process

Draft TSP Outline

- Executive Summary
- Background and Process
  - Public Involvement
  - TSP What/Why/How
- Roseburg Today
  - Snapshot of existing condition, land use, population and employment
- Roseburg's Future Needs
  - Forecasted growth
- Modal Plans
  - Bicycle, Pedestrian, Vehicular, Transit, Freight, Rail, Air, Marine, Pipeline
  - Deficiencies, Recommended projects
- Guidelines and Standards
- Implementation and Finance Plan
  - Funding forecast
  - Funded and Aspirational Projects

In process as part of Draft TSP

TSP Guidance

- TSP Update will require updates to code to maintain consistency
  - Mobility targets
  - Access spacing
  - Sample street cross-sections
  - Proposed projects
- TSP Update provides guidelines and toolboxes as references
  - Transportation System Management "Toolkit"
  - Functional classification map
  - TSP Goals and Objectives

Code Recommendations

- *Implementing Ordinances and Code Changes* Memo
  - Outline approach for amending the Land Use and Development Regulations ("Code") to ensure consistency with relevant provisions of the Oregon Transportation Planning Rule and reflect the goals and objectives of the Roseburg TSP update.
  - Address development-related transportation issues that have been raised during the TSP update process.
  - Proposes regulatory updates based on an evaluation of code consistency with TPR requirements and Draft TSP recommendations.
- After City review, sample code language can be translated into adoption-ready code amendments

BIG PICTURE

- Once adopted, TSP will be transportation element of the Roseburg Comprehensive Plan
- Updates to the code will be needed to implement the TSP
- Recommendations are just that, recommendations. Adoption ready code language will need to be refined by the City

Code Recommendations

	RECOMMENDATION	CITATION/WHY
1.	Permit transportation improvements outright that are consistent with the adopted TSP, including modifying the definition of public uses, adding footnotes to zoning district use regulation tables, and adding a new provision to Planned Unit Development use allowances.	OAR 660-012-0045(1)(a) and (b) Consistency with TPR
2.	Ensure that existing access spacing standards and block size standards in the Code are consistent with recommendations in the updated TSP.	OAR 660-012-0045(2)(a) TSP Recommendation
3.	Ensure that existing mobility standards in the Code are consistent with recommendations in the updated TSP.	OAR 660-012-0045(2)(b) TSP Recommendation

Code Recommendations

	RECOMMENDATION	CITATION/WHY
4.	Require that transportation agencies be included in pre-application conferences.	OAR 660-012-0045(2)(d) and (f) Consistency with TPR Newly Formed Transit District
5.	Augment existing criteria for plan amendments and zone changes to specifically refer to TPR (Section 660-012-0060) criteria.	OAR 660-012-0045(2)(g) and OAR 660-012-0060 Consistency with TPR
6.	Require commercial uses in the Central Business District (CBD) provide or contribute to providing bicycle parking.	OAR 660-012-0045(3)(a) Current code language outdated
7.	Add bicycle parking requirements for transit transfer stations [transit station/hub] and park-and-ride facilities.	OAR 660-012-0045(3)(a) TSP Recommendation (Transit Station)

Code Recommendations

	RECOMMENDATION	CITATION/WHY
8.	Require “crosswalks” (walkways) through parking areas over a certain size.	OAR 660-012-0045(3)(b)
9.	Add references to street design standards (cross sections and table) from the updated TSP in Land Division and associated provisions.	OAR 660-012-0045(3)(b) TSP Recommendation
10.	Add reference to street design standards (cross sections and table) from TSP and/or Public Works Standards in Planned Unit Development (PUD) provisions.	OAR 660-012-0045(3)(b) • TSP Recommendation • City interest in preventing substandard streets in PUDs
11.	Add pedestrian and bicycle improvements to list of possible off-site improvements in Section 12.12.010(J).	OAR 660-012-0045(3)(c)

Code Recommendations

	RECOMMENDATION	CITATION/WHY
12.	Create new transit-supportive development requirements including coordination and provision of transit stop amenities and orientation of building entrances toward transit streets.	OAR 660-012-0045(4)(a) OAR 660-012-0045(4)(b) Consistency with TPR
13.	Add targeted preferential parking provisions for carpool/vanpool parking to off-street parking provisions.	OAR 660-012-0045(4)(d) Consistency with TPR
14.	Provide allowances for redevelopment of parking areas for transit uses.	OAR 660-012-0045(4)(e) Consistency with TPR

Code Recommendations

	RECOMMENDATION	CITATION/WHY
15.	Maintain options allowing for minimized pavement in street design standards. Ensure that existing street design standards in the Code are consistent with the updated TSP.	OAR 660-012-0045(7) TSP Recommendation
16.	Specify that Oregon Department of Transportation (ODOT) and other road authorities have the authority to submit a land use application without a property owner signature.	Project scope (Task 8.1)
17.	Include a reference in land division code to the connectivity or network plan in the updated TSP.	City interest in complete street networks

Additional Compliance Review

- In addition to OAR 660 Division 12 Section -0045 and -0060, the Roseburg Development was also reviewed for conformance with the following TPR sections:
    - OAR 660-012-0005 – Definitions
    - OAR 660-012-0050 – Transportation Project Development
    - OAR 660-012-0065 – Transportation Improvements on Rural Lands
    - OAR 660-012-0070 – Exceptions for Transportation Improvements on Rural Lands

Additional Compliance Review

CITATION	REVIEW
OAR 660-012-0005 – Definitions	Provides a list of definitions applicable to the TPR. ***Roseburg Development Code in conformance*** ✓
OAR 660-012-0050 – Transportation Project Development	TPR calls for consolidated review of land use decisions and proper noticing requirements for affected transportation facilities and service providers. Section 12.10.010(F) states that "An applicant may apply at one time for all development approvals required by this Code for a single development or use." ***Roseburg Development Code in conformance*** ✓
OAR 660-012-0065 – Transportation Improvements on Rural Lands OAR 660-012-0070 – Exceptions for Transportation Improvements on Rural Lands	TPR identifies transportation facilities, services, and improvements that may be permitted, or permitted through a Rule exception, on rural lands. The updated TSP identifies a limited number of roadway extensions that extend outside of the UGB (Harvard Bridge project and new connection between Weyerhaeuser Dr to Forest Glen Ln) ***Roseburg Development Code in conformance. The projects identified in the TSP are preliminary and have not identified a need for a Rule exception; a Rule exception would be addressed as project design development advances.*** ✓

Next Steps

- Draft TSP early September
- Finalize TM 6
- Meet with PAC again in mid-late September to review Draft TSP

Public Advisory Committee

Meeting #6: PAC2B

October 10, 2019

1:00 PM – 3:00 PM

Roseburg Public Safety Center

700 SE Douglas Ave.

Portland, OR 97205

Meeting Summary & Notes

Roseburg Transportation System Plan

Public Advisory Committee Meeting: Draft TSP

LOCATION: 700 SE Douglas Avenue – Umpqua Room

DATE: Thursday, October 10, 2019

TIME: 1:00 – 3:00 PM

Attendees:

Angela Rogge, DEA (Consultant Deputy PM)
Shelly Alexander, DEA (Consultant PM)
Tom Guevara, ODOT (APM)
John Lazur, City Planner, City of Roseburg
Stu Cowie, Community Development Director, City of Roseburg
Nikki Messenger, City Manager, City of Roseburg
Dr. Bob Dannenhoffer, Douglas County Health
Jenny Carloni, League of Women Voters Umpqua Valley
Denny Austin, Roseburg Schools
Jessica Hand, Blue Zones

Introductions

Stu Cowie briefly reviewed the meeting purpose and introduced the consultant team (David Evans and Associates, Inc.). Angela Rogge, the consultant deputy project manager and lead transportation engineer reviewed the agenda. The PowerPoint is attached and covers the following: the basics of a Transportation System Plan (TSP), a review of the process, the draft outline, funding implications and modal plans.

Presentation

Angela presented on all slides for the presentation (slides 1-22). The following were the comments and points of discussion:

1. Slide 1: Agenda
2. Slide 2: What/Why
    a. The TSP is a plan to guide the transportation system and is not meant to design every project detail/element
    b. Idea of where community needs/gaps exist
    c. Compared to funding outlook, what can the City realistically build and where do they need to search for resources
3. Slide 3: Project Timeline
4. Slide 4: TSP Goals
    a. Angela reminded PAC about the various goals and that they were developed through a specific meeting with the PAC
5. Slide 5: Draft TSP Outline
6. Slide 6: TSP Planning Area

7. Slide 7: Ongoing Planning Processes
    a. Reminder of other area projects: Bottleneck and IAMPs
    b. Recognition that Garden Valley will continue to be a need for the City
8. Slide 8: Project Development and Evaluation
9. Slide 9: Funding
    a. Committed Funding (Diamond Lake Urban Renewal Plan and Capital Improvement Plan)
10. Slide 10: Funding
    a. $6.6M, actually ~$2.2M for new projects
        i. State Highway Find (STBG)
        ii. State Operating Grants
        iii. Gas Tax Receipts
        iv. Franchise Fees
        v. SDC
        vi. Other
        vii. Does not include grant funding that City could apply for
            1. City/Council will identify grant opportunities (Public Works and planning)
            2. Diamond Lake development may expedite/or slow area TSP projects
            3. Urban Renewal Projects are predominately in Tier 1
            4. If a Tier 2 or other need is identified, it may be implemented BEFORE a Tier 1 project. (see disclaimer in presentation)
            5. Limited unless new funding sources, grant opportunities
    b. City may need to look for additional funding sources
    c. Question: Does forecast include increase in PERS over the future years? Response: No – John/Stu think that money will come from a different funding source
11. Slide 11: Project list
    a. Transit District – any City guidance on Transit location/improvements/etc.,
    b. Douglas County Transit Master Plan (Thomas Guevara writing scope now)
    c. Feedback desiring transit plan account for George Fox U coming in for Med Ed w/ Mercy
        i. New Building, routes to support, hub nearby
        ii. Question: Add specific language? Answer: Not currently included, but could be if City would like to add.
        iii. Student Athletes with UCC
        iv. Add language to "new routes" section
            1. Increase frequency to UCC/Downtown
            2. YMCA
        v. TPR requires jurisdictions to identify transit
            1. Transit Master Plan establishes policy
            2. TSP policies support transit
    d. Tier 2 (needed but no funding sources)
12. Slide 12: Bicycle/Pedestrian Tier 1
    a. CIP/Diamond Lake UR plans
    b. Projects in Tier 1 list that are not Diamond Lake UR or CIP:
        i. Fir Grove – connectivity to paths/trails system
        ii. Main St sidewalks
        iii. Pine St sidewalks – complete last of downtown s/w network
        iv. Totals just under $2M to allow for inflation/project definition
13. Slide 13: Bicycle/Pedestrian Tier 2

   a. Tier 2 has no current funding, but there are options:
      i. If project is near a school – could apply safe routes to school (SRTS) funds
      ii. Repaving – maybe striping a bike lane or restriping lane widths can be worked into the repaving project
14. Slide 14: Transit
15. Slide 15: Roadway Tier 1
    a. No new projects with TSP
    b. All are either in CIP or Diamond Lake UR plan
16. Slide 16: Roadway Tier 2
    a. How many can be implemented by developer?
       i. Just a few, such as Charter Oaks and new roadway connections/extensions
    b. Tier 1 – Champion Site may have development associated, but predominately City funds
17. Slide 17: Roadway Functional Classification Plan
18. Slide 18: Typical Roadway Cross-Section Guidelines
    a. X-section guidelines provide minimum widths
    b. Arterials/Collectors are required to provide s/w and bike lanes (this is not new, has been in TSP)
19. Slide 19: Traffic Calming Toolbox
20. Slide 20: Other modes
    a. Roseburg Regional Airport – Master Plan underway, in FAA review currently (large entity, has own special plan)
    b. Rail – Mosher improvement may require coordination with Rail
    c. Pipe/Water – no new projects
21. Slide 21: Disclaimer
    a. 20 years is a long time. Technology, development, goals may change
    b. Specific details are part of the project design refinement process
22. Slide 22: Next Steps
    a. Plan ready for the City to take through adoption
    b. Comments needed from PAC for finalizing to prepare
    c. Headline: Slow but steady progress
    d. Looking for a City gas tax, have been working with City Council

Miscellaneous:

- How did the open house get advertised? *Advertised twice by the City*
- October 31, 2019 the Final TSP will be ready
- Planning Commission: Likely in December
- Council (2 meetings) – Likely January/February
- Package TSP: Build around exciting community growth, we have a plan to support it, join us (answer – what is in it for "us")
- Douglas County is currently planning an update to their TSP
  Roseburg goal: Wants a bike/ped community (shows with Tier 2 project list); expanding/enhancing the roadway system is a victim of land use and topography.
- 138E corridor (and parallel routes) will be part of a Diamond Lake Corridor Plan being put together by ODOT. This will use the TSP projects to refine the project needs.

Roseburg TSP

PAC Meeting

October 10, 2019

900 SE Douglas Avenue – Umpqua Room

SIGN IN SHEET

Name	Organization/Agency
1. Bob Dannenhoffer	Public Health
2. Jessica Hand	BZP
3. Jenny Carloni	LWVUV
4. JENNY AUSTIN	Roseburg Schools
5. Tom Guevara	ODOT
6. NIKKI MESSENGER	COR
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Roseburg Transportation System Plan

Public Advisory Committee Meeting
Thursday, October 10, 2019

Agenda

- Overview of a TSP
- Project Process and Timeline
- Goals and Objectives
- Draft Plan
  - Organization
  - Funding
  - TSP Projects/Modal Plans
- Next Steps

What is a TSP? Why do we need one?

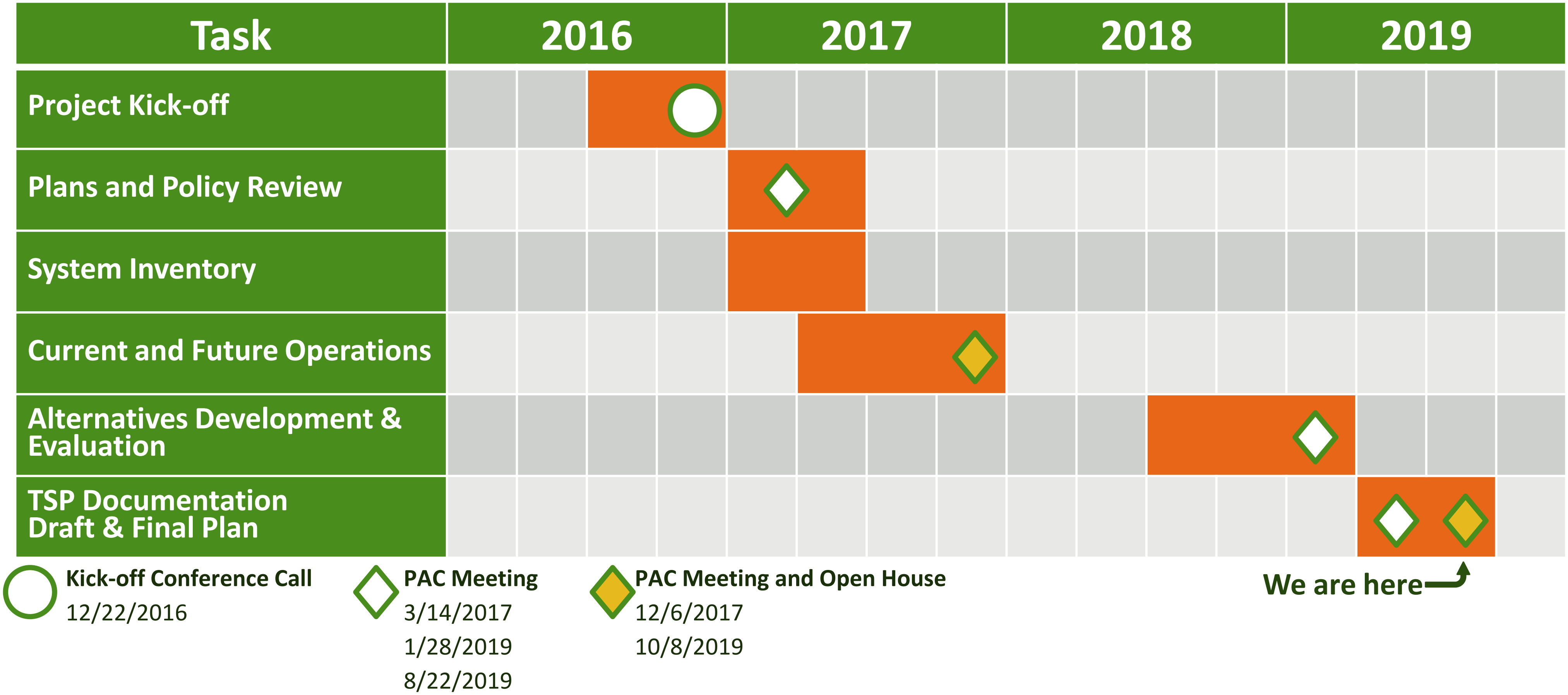
WHAT

- A blueprint for all modes of travel
- Must be consistent with other TSPs and planning documents governing the region it serves and with the Oregon Transportation Plan.
- TSPs are required by the Transportation Planning Rule documented in the Oregon Administrative Rule 660-012-0015.
- Eventually adopted as the transportation element of the City's Comprehensive Plan.

WHY

- Attract and secure funds (Statewide Transportation Improvement Program, grants)
- Plot a course for your community (goals, planned land uses, right-of-way needs, projects and services)
- Work toward goals
- TSP must document the needs, functions, modes, and general location of planned improvements.

Project Timeline



- **Next Steps**
  - Address comments on Draft TSP
  - Finalize Report by Oct 31, 2019
  - Begin City adoption process

TSP Goals

- **Goal 1. Mobility and Accessibility**
  Provide a comfortable, reliable, and accessible transportation system that ensures safety and mobility for all members of the community.
- **Goal 2. Vibrant Community**
  Create an integrated multi-modal transportation system that enhances community livability.
- **Goal 3. Transportation Options**
  Provide for a multi-modal transportation system that enhances connectivity.
- **Goal 4. Economic Vitality**
  Advance regional sustainability by providing a transportation system that improves economic vitality and facilitates the local and regional movement of people, goods, and services.
- **Goal 5. Implementation**
  Provide a sustainable transportation system through responsible stewardship of financial and environmental resources.

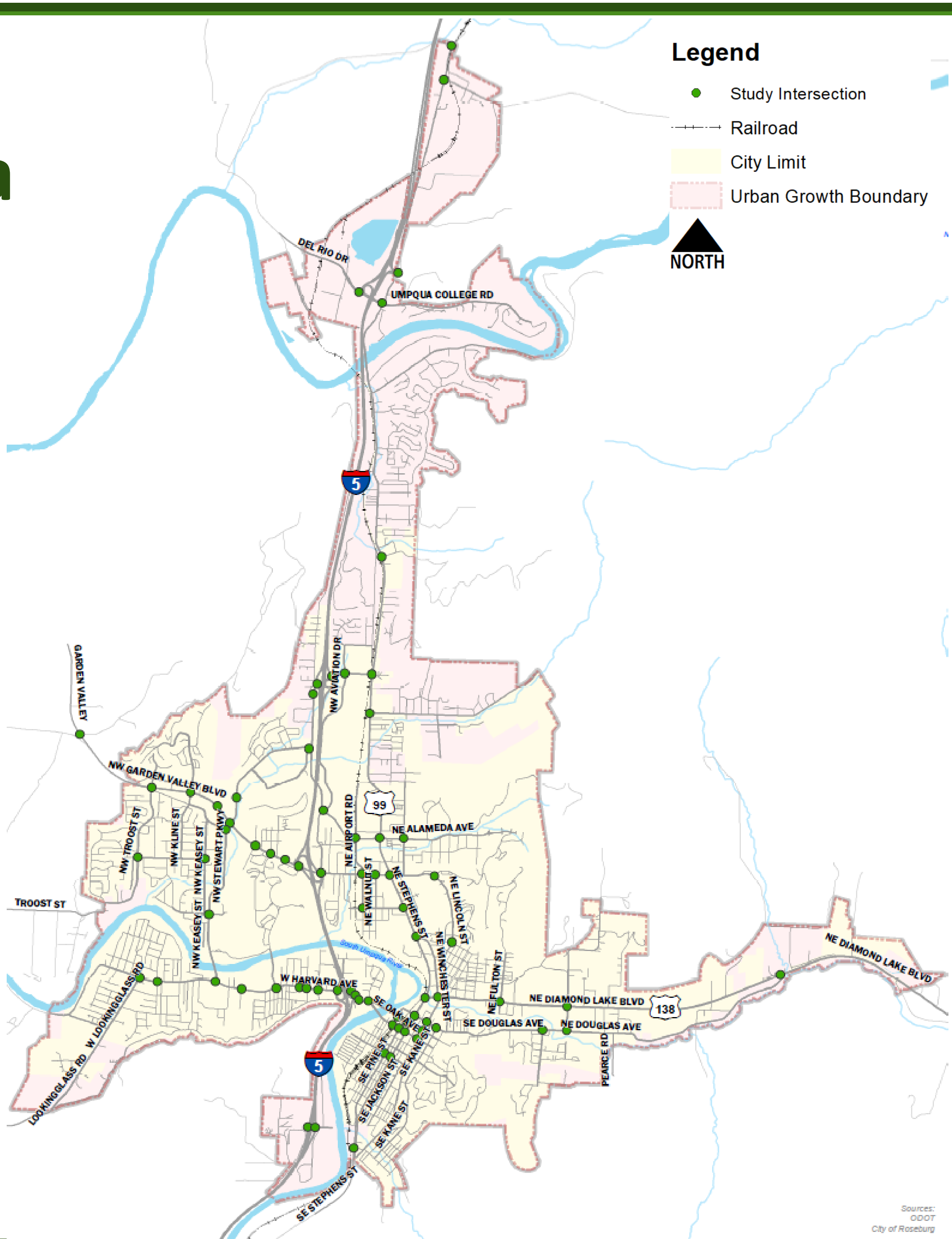
Draft TSP Outline

- Executive Summary
- Background and Process
- Goals and Objectives
- Roseburg Today
  - Snapshot of existing conditions, land use, population and employment, network deficiencies
- Roseburg's Future Needs
  - Forecasted growth and anticipated impacts
- Modal Plans
  - Pedestrian, Bicycle, Transit, Roadway, Air, Water, Rail, Pipeline
- Standards and Guidelines
- Implementation and Finance Plan: The Projects

TSP Planning Area

Planning Area Includes:

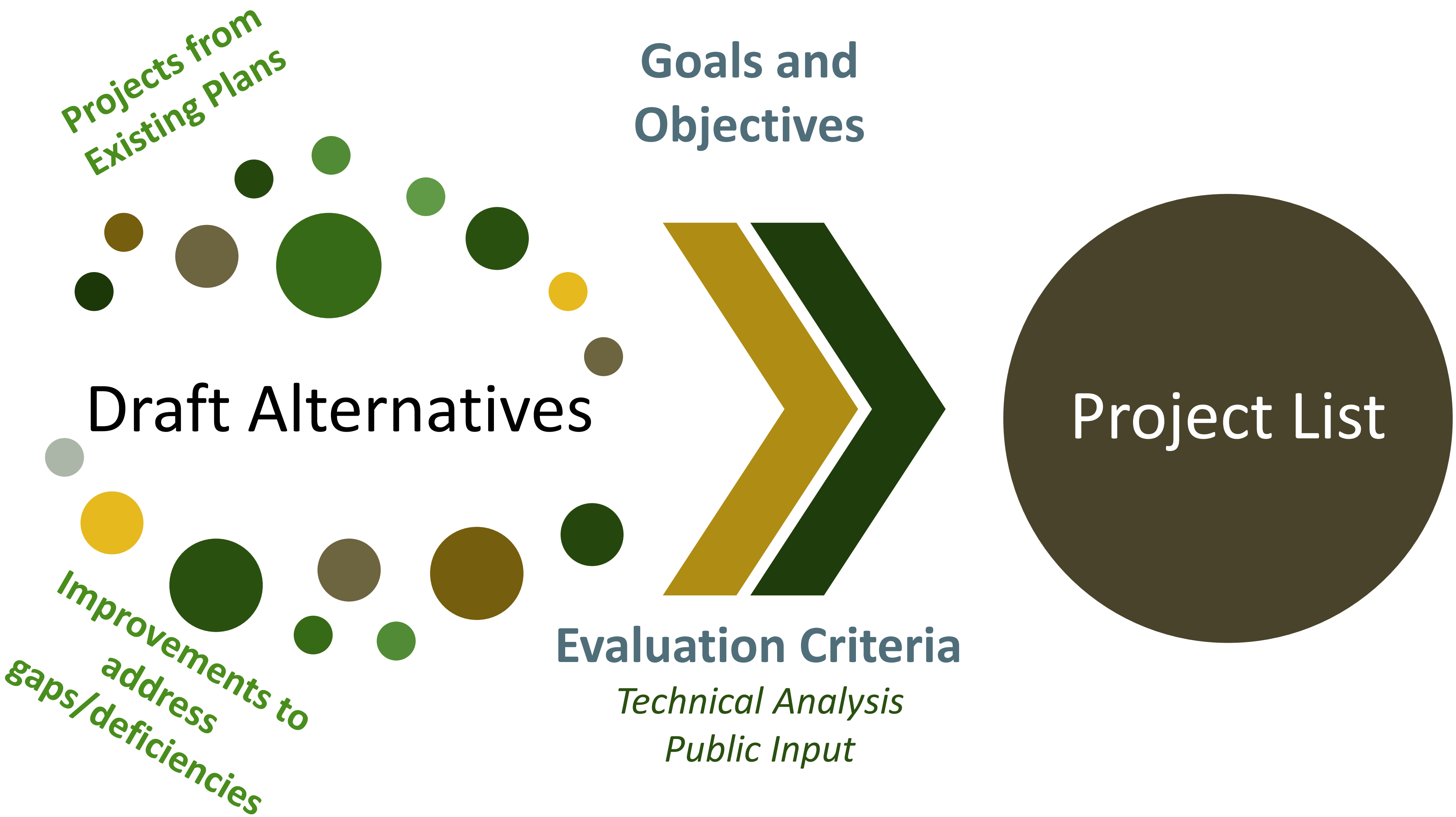
- City Limits – all of the area currently incorporated
- Urban Growth Boundary – Areas currently identified for future growth in the Comprehensive Plan
- 76 study intersections - mostly arterials/collectors



Ongoing Planning Process

- The TSP process avoided duplicating analysis efforts of facilities included in the other studies.
- The full impact of these planning processes is undetermined at this time, as such, there may be projects identified in the future that could influence how Roseburg chooses to fund improvements to its transportation system.
  - The I-5: Roseburg Bottleneck Corridor Segment Plan: Seeks low cost potential improvements to the interstate corridor, including ramps and bridges, to improve safety and congestion.
  - Interchange Area Management Plans (IAMPs) for I-5 Exit 124 and Exit 125: Expected to identify preferred solutions within a 20-year planning horizon in order to maintain the integrity of the interchanges and the roads that serve them.
- The TSP expects the outcome of these other planning studies to identify potential solutions that could benefit city facilities, specifically Garden Valley Boulevard. Although not included in the Tier 1 project list, the Tier 2 list notes the importance of upgrading key transportation corridors such as Garden Valley Boulevard, Harvard Avenue and Diamond Lake Boulevard to improve connectivity and operations for all modes.

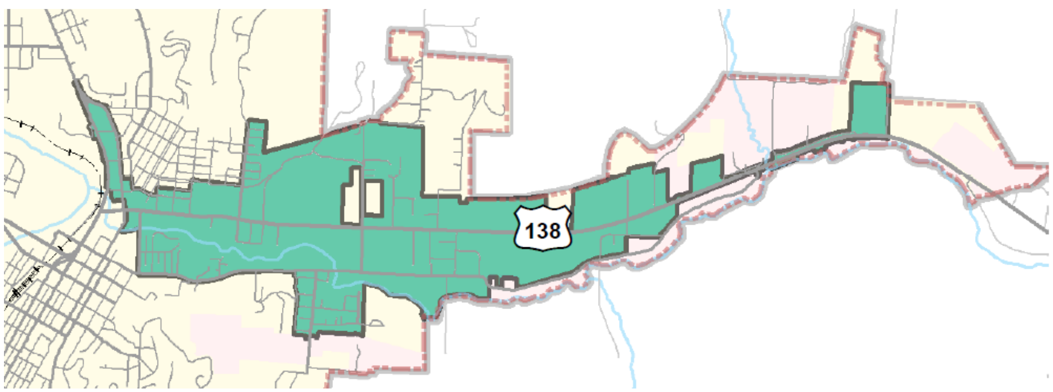
Project Development and Evaluation



Funding Considerations

Diamond Lake Urban Renewal Plan

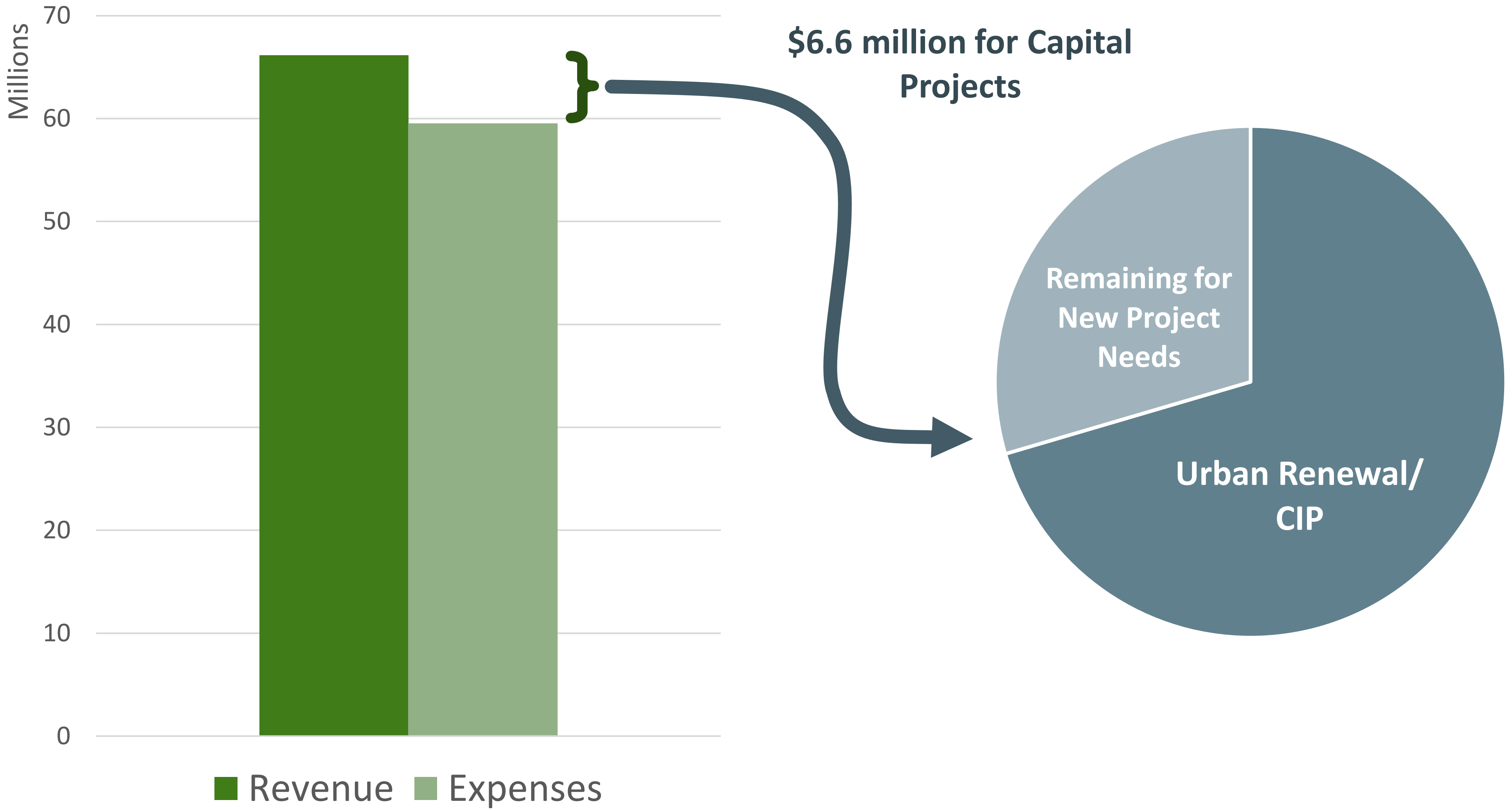
- Adopted by the City of Roseburg in 2018
- Tax increment financing will be used to borrow against future growth in the area's tax base to pay for the improvements
- Includes transportation and other infrastructure and beautification improvements



Capital Improvement Plan (CIP)

- City commitments to ADA Transition Plan, capital projects and grant matches

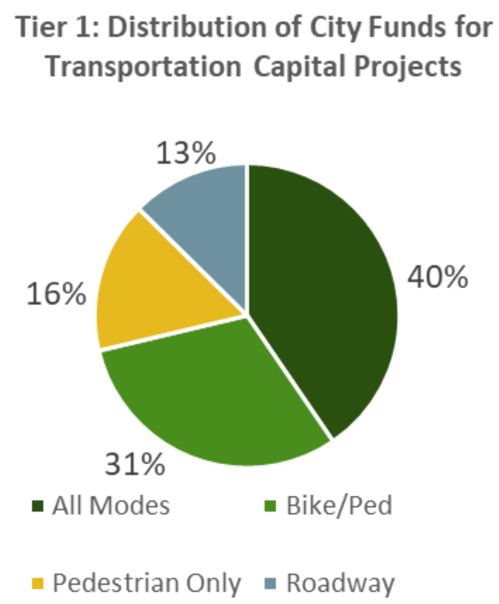
Funding Forecast through 2040



Note: All values are rounded and in 2018 dollars

The Project Lists

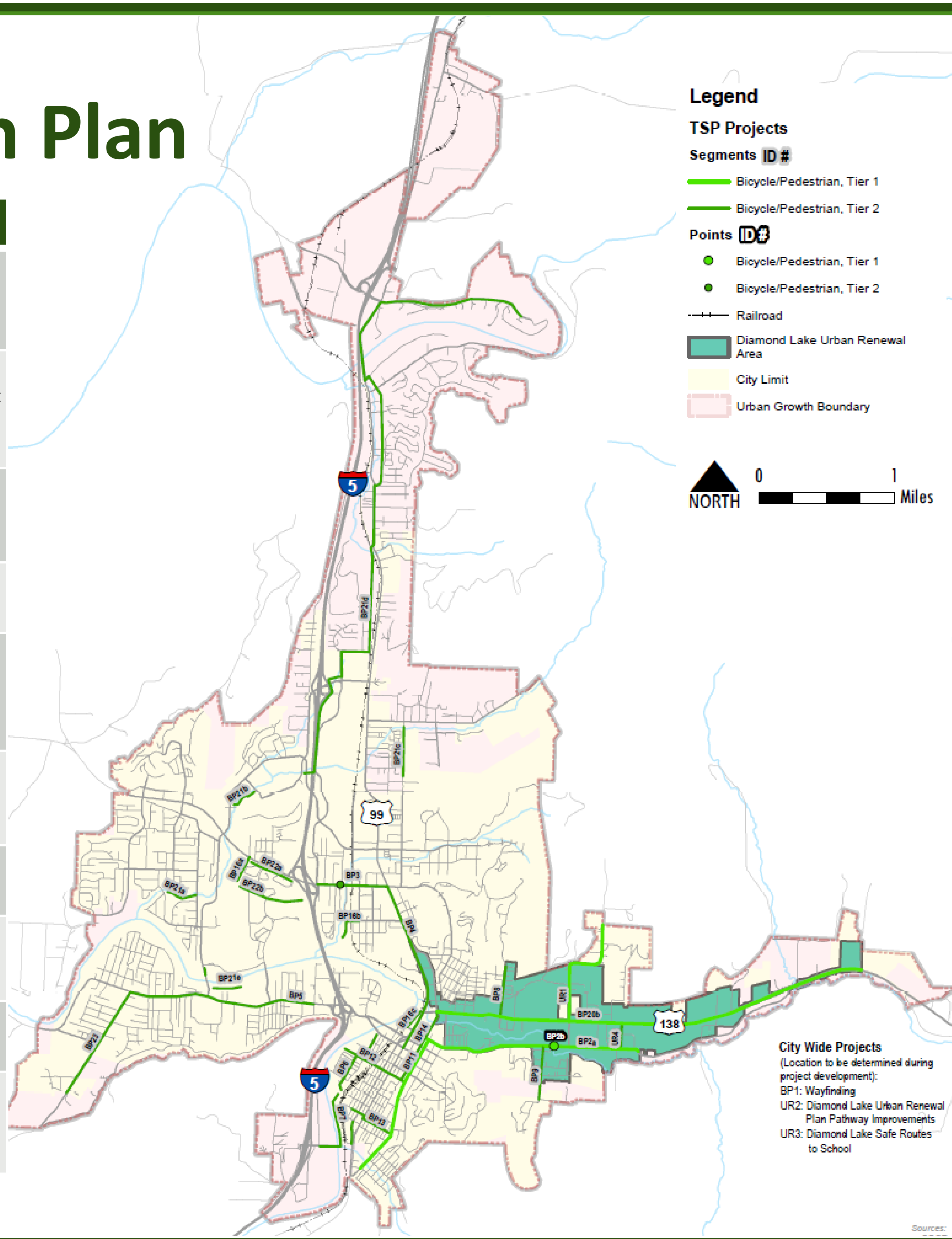
- Tier 1 (Financially Constrained): Projects that have a reasonable likelihood of being funded with existing sources
  - 27 projects identified
  - 16 of the projects were already identified in the Urban Renewal Plan or City Capital Improvement Plan
  - City contribution totals just under $6.6 million – *Transit projects expected to be funded through Transit District*



- Tier 2 (Needed but Unfunded): Projects which would require new funding sources for implementation
  - 58 projects identified
  - All projects without committed funding, could apply for grants or create new revenue sources
  - Range from signal timing modifications to river crossings

Bicycle/Pedestrian Plan

ID	Tier 1 Projects
BP1	**Citywide Bicycle Wayfinding:** Design and implement a wayfinding project to enable visitors to identify their location and destinations in and around the Heart of Roseburg.
BP2a	**Douglas Ave Bike Facilities and Sidewalks:** Add sidewalk on both sides from Deer Creek to city limits and bike facilities from Fowler St to city limits. Given the slopes found along Douglas Ave, a mix of bike facility types may be most appropriate.
BP2b	**ODOT Bridge Replacement Matches: Douglas Ave (Preliminary Engineering)** Provide preliminary engineering to replace/rehab functionally obsolete structure and provide multi-modal facilities.
BP10	**Pine St Sidewalks:** Sidewalks on the east side of Pine St south of existing sidewalks.
BP11	**Main St Sidewalks and Bike Facility:** Sidewalk on the east side of Main St from Rice Ave to Marsters Ave, and on the west side from Hamilton St to Marsters Ave as well as sharrows along Main St from Douglas Ave to Lane St.
BP20b	**Diamond Lake Blvd Sidewalks, power poles, easements:** This concept proposes local participation in the redevelopment of Diamond Lake Blvd multi-modal improvements.
BP21e	**Fir Grove Park Multi-Use Path:** Multi-use path connection paralleling the river between Fir Grove Park and Stewart Pkwy.
UR1	**Rifle Range St north of Diamond Lake Blvd:** Provide full street/multi modal improvements to Rifle Range St from Diamond Lake Blvd to the city limits.
UR2	**DLURP Pathway improvements:** Local participation in pathway improvement in the urban renewal area/district.
UR3	**Safe Routes to School Diamond Lake Blvd to Douglas Ave** Provide local participation in “Safe Routes to Schools” in the Area (pedestrian bridge).



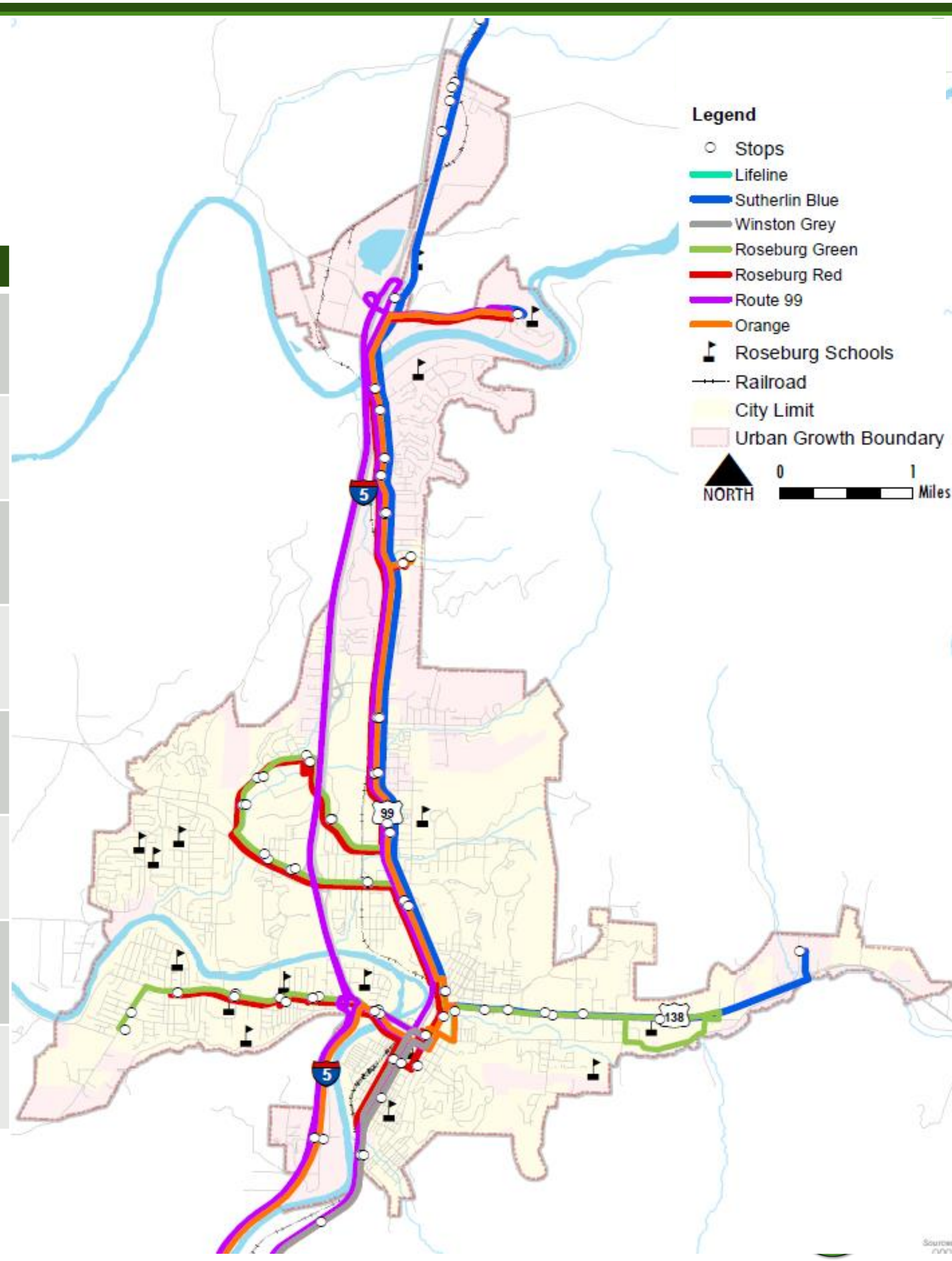
Bicycle/Pedestrian Plan

ID	Tier 2 Projects
BP3	**Garden Valley Blvd Shared Use Sidewalks:** Widen sidewalk to 10' (both sides).
BP4	**Stephens St Bike Facility (Alternate Route):** Provide bicycle facilities on local system as alternate route to Stephens St.
BP5	**West Harvard Ave Shared Use Sidewalk:** Widen sidewalk to 10' on north side.
BP6	**South Umpqua River Sharrow Connections through Downtown:** Sharrows would continue south from the north end of Flint St, where the existing multi-use path terminates, and extend to Micelli Park via Flint St, Mosher Ave, and Fullerton St.
BP7	**South Umpqua River Multi-Use Path and Portland Ave River Crossing:** This concept would build a new multi-use path river crossing at Portland Ave and a new multi-use path connection from this bridge to the new bike facilities in Micelli Park.
BP8	**Fulton St Sidewalks and Bike Facility:** Upgrade the street to minor collector standards with bike/ped facilities.
BP9	**Ramp Road Sidewalk:** Add sidewalks on the west side of Ramp Road.
BP10	**Pine St Sidewalks:** Sidewalks on the east side of Pine St south of existing sidewalks.
BP12	**Mosher Ave Bike Facility and Railroad Crossing Improvements:** Sharrows on Mosher Ave, improved pedestrian facilities at the railroad crossing. Signage would be added to provide guidance to bicyclists and motorists to share the road.
BP13	**Burke St/Roberts Ave Sharrows:** Sharrows on Burke St and Roberts Ave Enhanced wayfinding signage may be necessary to direct travelers to the existing crossings of Pine St and Stephens St.
BP14	**Jackson St Bike Facility:** Sharrows along Jackson St from Diamond Lake Blvd to Douglas Ave as well as along the one-way portion of Jackson St from Douglas Ave to Mosher Ave.
BP16a	**Duck Pond Trail Wayfinding and Connections on Existing Infrastructure:** The path on the west side of the parking would be formalized with signage to establish the area as a multi-use path. The remaining connection to Garden Valley Blvd would be a continuation of the multi-use path on the west side of Duck Pond St.
BP16b	**Gaddis Park Trail Wayfinding and Connections on Existing Infrastructure:** Sharrows connection along Chestnut Ave and Highland St to fill in gap between existing facilities on Cedar St (north of Chestnut Ave) and on Chestnut Ave (east of Cedar St) and the trails in Gaddis Park.
BP16c	**Pine St Trail Wayfinding and Connections on Existing Infrastructure:** Links the trail through Deer Creek Park along Pine St, Douglas Ave, and Spruce St to the existing one-way bike lane along Stephens St The multi-use path would continue on the north side of Pine St, and then a bike lane along Douglas Ave to connect to the existing multi-use path along the South Umpqua River.
BP17	**Garden Valley Blvd and Stephens St Transit Stops:** Require developers to provide transit stop amenities and an update to the include in-lane far-side transit stops at least 30 feet from intersection to avoid bus interference with side street traffic flow.

ID	Tier 2 Projects
BP18	**Calkins Ave Sharrows:** Sharrows on Calkins Ave between Grove Lane and Keasey St with wayfinding to nearby trail system.
BP19	**Garden Valley Blvd Midblock Crossing:** Midblock HAWK crossing near Garden Valley Blvd at Fairmount Ave/Highland St, providing an interconnect with the I-5 Exit 125 ramp signal. Widen the sidewalks on Garden Valley to more comfortably accommodate cyclists and install sharrows on Fairmount Ave and Highland St to formalize a bicycle route.
BP20a	**Garden Valley Blvd Arterial Upgrade:** This concept proposes more detailed study of opportunities to improve traffic flow and provide multimodal accommodations.
BP20c	**Harvard Ave Arterial Upgrade:** This concept proposes more detailed study of opportunities to improve traffic flow and provide multimodal accommodations.
BP21a	**Newton Creek New Multi-Use Paths:** Multi-use path paralleling Newtown Creek between Jefferson St and Keasey St.
BP21b	**Charles Gardiner Park New Multi-Use Paths:** Extend the existing multi-use path that parallels Newton Creek through Charles Gardiner Park. This option would extend this path west of Renann St, paralleling Newton Creek to the Stewart Pkwy access to the Walmart Supercenter.
BP21c	**Vine St to Newton Creek New Multi-Use Paths:** New multi-use path between the north end of Vine St and Newton Creek Road.
BP21d	**I-5 Frontage New Multi-Use Paths:** New multi-use path connections: roughly parallel I-5 and Stephens St and provide connections to existing facilities in the existing bike network where possible, including the existing path paralleling I-5 between Garden Valley Blvd and the river.
BP21e	**Fir Grove Park to Stewart Pkwy New Multi-Use Paths:** Multi-use path connection paralleling the river between Fir Grove Park and Stewart Pkwy.
BP22	**New Bike Connection – Duck Pond St to I-5 Multi-use Path:** This concept would provide a separated bike facility, such as a multi-use path or two-way cycle track, to connect the existing multi-use path facilities found along Duck Pond St and I-5. Option A: Within GVB right of way (cycle track or multi use path); Option B: Through VA campus
BP23	**Lookingglass Rd sidewalks:** Add sidewalks to both sides of the street.
UR6	**MUP north of and parallel to Douglas:** Multi-use path north of and parallel to Douglas Ave.

Transit Plan

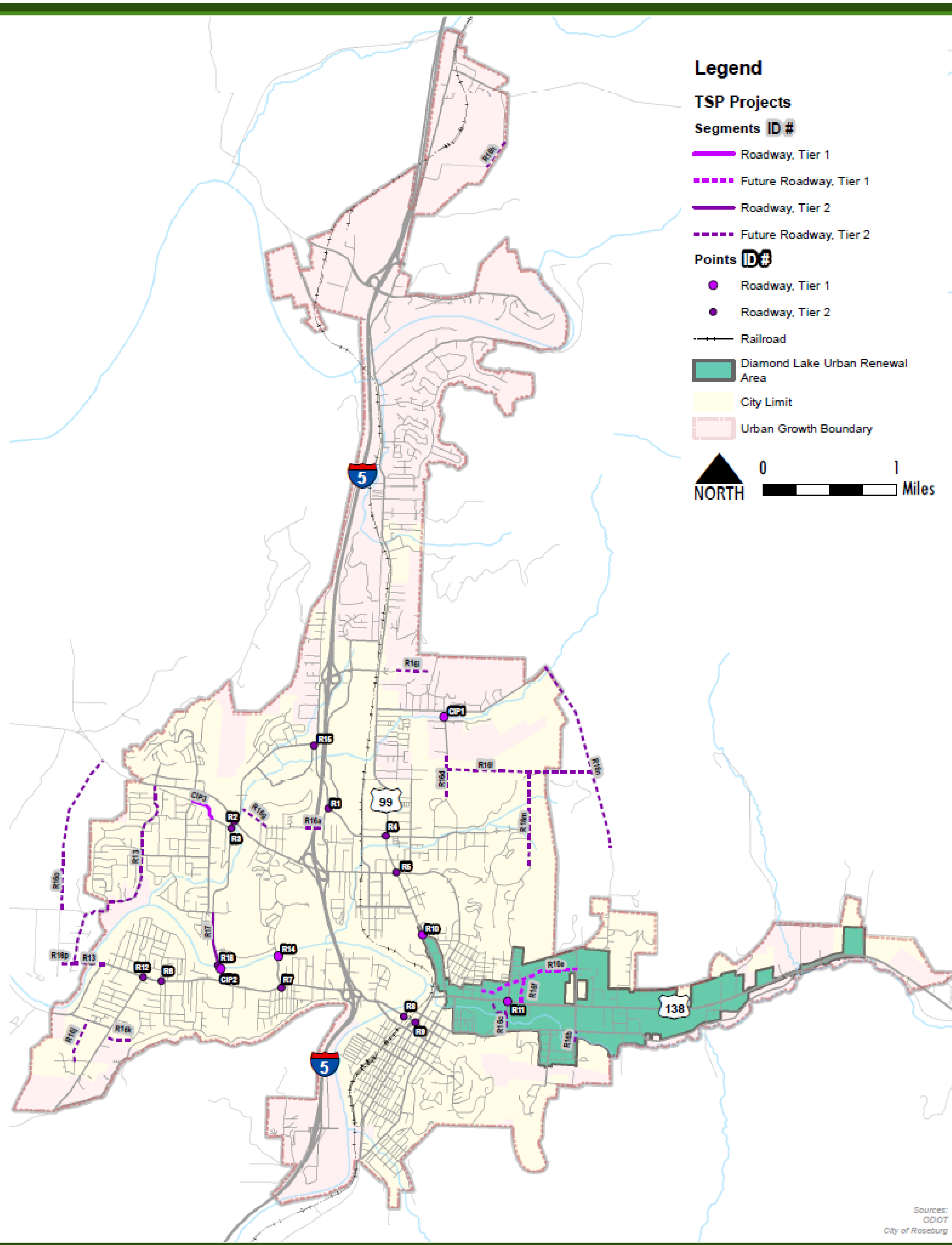
ID	Tier 1 Projects
T1	**Purchase of Additional Buses:** Add buses to existing fleet.
T2	**New Transit Center:** Construct a new transit center in or near the downtown area.
T3	**New Maintenance Facility:** Construct a new maintenance facility.
T4	**Stop Amenities and Accessibility:** Add shelters, seating, lighting, waste bins, and/or traveler information.
T5	**Increased Frequencies:** Increase transit frequency (reduced headways).
T6	**New Routes:** Expand transit service through new routes.
T7	**Transit ITS:** Transit Signal Priority (systems that seek to improve schedule adherence by reducing bus delay at signalized intersections) and communication of real-time bus arrival information to rider.
T8	**Increased Dial-a-Ride Service:** This concept would provide increased Dial-a-Ride service hours and increased coordination with existing and future fixed route services.



Note: Douglas County Transit District will be the primary funding source for the transit projects identified in the TSP, with City support.

Roadway Plan

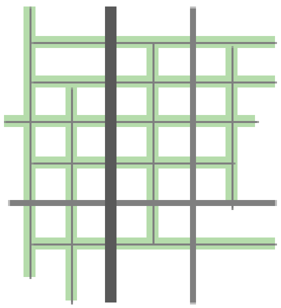
ID	Tier 1 Projects
R10	**Winchester St/Stephens St Intersection:** Option A: Realign intersection to a T-intersection (stop-control) Option B: Signalize, realign and provide dual westbound right turns.
R11	**Fulton St or Lake St Traffic Control:** Install a traffic signal to provide a protected pedestrian crossing of Diamond Lake Blvd.
R14	**ODOT Bridge Replacement Matches, Stewart Park Dr:** Replace/rehab functionally obsolete structure.
R16e	**Commercial Ave Extension:** Extend Commercial Ave between Fulton St and Rifle Range St.
R16f	**Champion Site Connection to Diamond Lake (Klamath Ave Extension:** Extend Klamath Ave between Fulton St and Rifle Range St.
R17	**Stewart Pkwy - Harvey South Design:** This project would design the final phase of the Stewart Pkwy Improvements (multi-modal facilities and new structure).
CIP1	**ODOT Bridge Replacement Matches, Parker Rd:** Replace/rehab functionally obsolete structure.
CIP2	**Stewart Pkwy Bridge Approaches:** This project will address the issues with the bridge approaches.
CIP3	**Valley View Dr Improvements:** This project would improve Valley View Dr between Keasey St and Kline St.



Roadway Plan

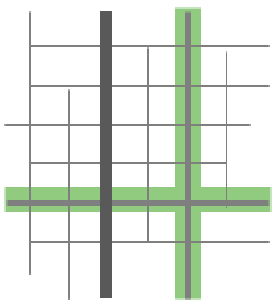
ID	Tier 2 Projects
R1	**Stewart Pkwy at Aviation Dr/Mulholland Dr Operations and Safety:** Add a dedicated southeast right-turn lane from Stewart Pkwy to Mulholland Dr.
R2	**Garden Valley Blvd at Stewart Pkwy Dual Turn Lanes:** Add eastbound and westbound dual left-turns from Garden Valley Blvd to Stewart Pkwy and dual southbound right-turn lanes from Stewart Pkwy to Garden Valley Blvd.
R3	**Stewart Pkwy at Valley View Dr Access Management:** Restrict the eastbound left-turns from Valley View Dr to Stewart Pkwy (Right-in/Right-out/Left-in)
R4	**Stewart Pkwy at Stephens St turn lanes:** Option A: Add dual northbound left-turn lanes; Option B: Dedicated westbound and southbound right-turn lanes
R5	**Garden Valley Blvd at Stephens St Turn Lanes:** Dual eastbound left-turns on Garden Valley Blvd and dedicated southbound and northbound right-turn on Stephens St Project would provide an opportunity for access management of impacted driveways.
R6	**Harvard Ave at Broccoli St traffic control:** Install either traffic signal or roundabout if side street delays become a concern in the future.
R7	**Harvard Ave at Centennial Dr/Stewart Park Dr Restriping:** Restripe the north leg of the intersection to allow for dual southbound left-turns. Centennial Dr/Stewart Park would be striped as a southbound left and southbound left/right-turn lane
R8	**Washington Ave at Spruce St Access Management:** Eliminate northbound movements by creating a curb extension or bulb-out to prevent the movements and adding “No outlet” signage at the intersection of Oak Ave and Spruce St Another variation of this option may be to prohibit vehicles from turning left from Oak St onto Spruce St, which would dramatically reduce the number of northbound vehicles at the Washington Ave intersection
R9	**Stephens St at Washington Ave Pedestrian Timing:** This concept extends the pedestrian time from 23 to 30 seconds for pedestrians traveling east-west.
R12	**Harvard Ave at Lookingglass Road Traffic Control:** Install a roundabout with a westbound bypass lane
R13	**Harvard Ave Bridge:** Construct a new bridge to carry Harvard Ave across the South Umpqua River, forming a new connection with Charter Oaks Dr With this new bridge connection, improvements to Charter Oaks Dr and Troost St would formalize this route
R15	**Northbound Receiving Lanes Extension at Stewart Pkwy and Edenbower Blvd:** Extend the northbound receiving lanes at the intersection of Stewart Pkwy and Edenbower Blvd.
R16a	**NW Hill extension:** Extend NW Hill between Stewart Pkwy and Mulholland Dr.
R16b	**Rifle Range St connection:** Construct a new bridge to carry Rifle Range St over Deer Creek
R16c	**Fulton St Connection:** Construct a new bridge to carry Fulton St over Deer Creek
R16d	**Full Connection between Sunset St and Parker Rd:** Construct a new full street connection between the current north end of Sunset St and the current south end of Parker Road
R16e	**Commercial Ave Extension (Phase 2):** Extend Commercial Ave between Fulton St and Rifle Range St.
R16f	**Champion Site Connection to Diamond Lake (Klamath Ave Extension) (Phase 2):** New street connection from Lake St north of Diamond Lake Blvd to Champion Site and Klamath Ave.
R16h	**Forest Glen Ln extension:** Extend Forest Glen Lane between N Bank Road and Weyerhaeuser Dr.
R16i	**Roadway Connections and Extensions:** Extend Edenbower Blvd between Stephens St and Hughes St.
R16j	**Basil St Extension:** Extend Basil St from Rosemary Ave to Goedeck Ave.
R16k	**Harris Hills Dr Extension:** Extend Harris Hills Dr to Lookingglass Road
R16l	**East Roseburg Connectivity:** New east/west connection east of Parker Rd, similar to alignment of Clover Ave or Meadow Ave.
R16m	**Rocky Ridge Dr north Extension:** Extend Rocky Ridge Dr north
R16n	**Rifle Range Rd north extension:** Extend Rifle Range Road north
R16o	**West Roseburg Connectivity:** Provide a new north/south connection between Troost St and Garden Valley Blvd.
R16p	**Cloake St to Charter Oaks Dr:** Connect Cloake St to Charter Oaks Dr (after Charter Oaks/Harvard Ave bridge).
R17	**Stewart Pkwy Phase 2:** This project would construct the final phase of the Stewart Pkwy Improvements (multimodal facilities and new structure).
UR4	**Patterson Street:** Provide multi-modal improvements that will provide an enhanced travel connection between Diamond Lake Blvd and Douglas Ave.
UR5	**Fleser Connection:** Provide local participation in a project to provide a connection between Diamond Lake Blvd and Fleser St as outlined in the Diamond Lake Access Management Plan.
UR7	**Fulton to Rocky Participation:** To participate in widening and multi-modal improvements to connect Rocky Dr and Fulton St in conjunction with developers/property owners.

Roadway Functional Classification Plan



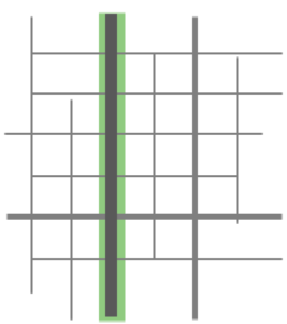
Local Streets:

Intended for low volumes and to serve adjacent land without carrying thru traffic. Encourage low-speed travel while reducing ROW needs, construction costs, stormwater runoff, and vegetation clearance. Generally improve neighborhood aesthetics.



Major and Minor Collectors:

Primarily intended to serve abutting lands and the local access needs of neighborhoods, including residential, commercial, industrial, or mixed land-use. Carry limited amounts of thru traffic.



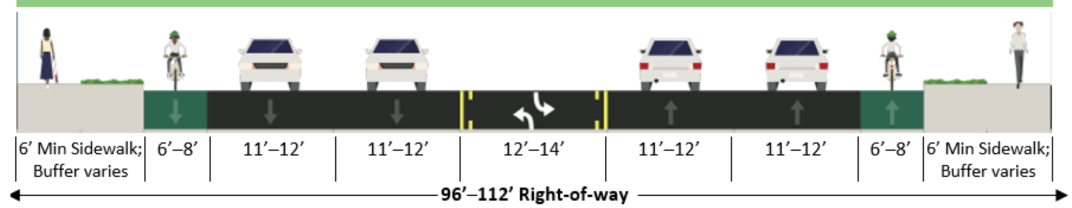
Principal and Minor Arterials:

Form the primary roadway network within and through a region. Provide continuous roadway system that distributes traffic between neighborhoods and districts, with limited access to abutting land, and a focus on traffic movement and mobility.

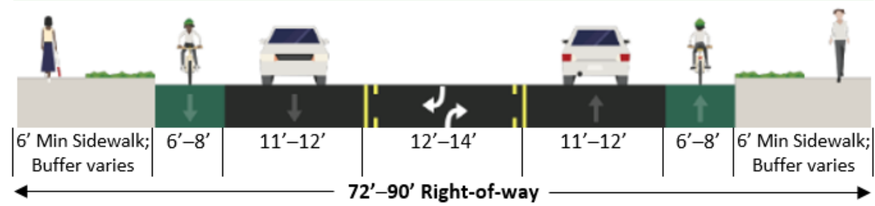
Typical Roadway Cross-Section Guidelines

- Apply to new and reconstructed roadways
- Cross-sections provide flexibility within the right-of-way
- Provides minimum requirements (widths) in order to serve a multi-modal system
- Arterial and collectors must provide sidewalk and bicycle lanes

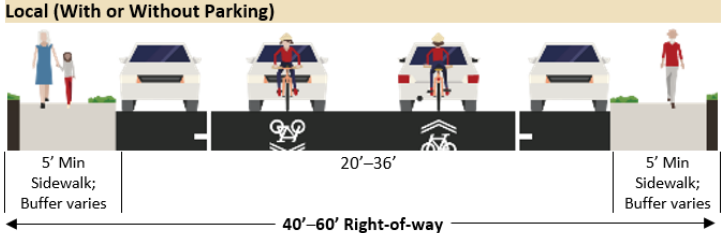
5-Lane Arterial



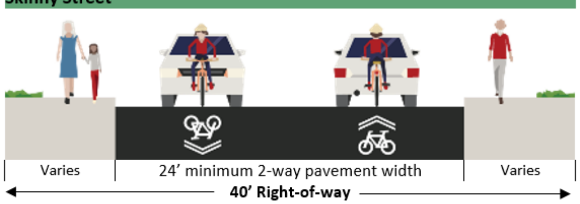
3-Lane Arterial



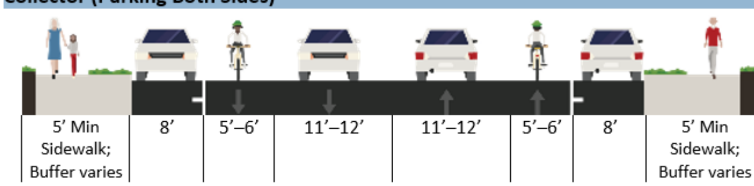
Local (With or Without Parking)



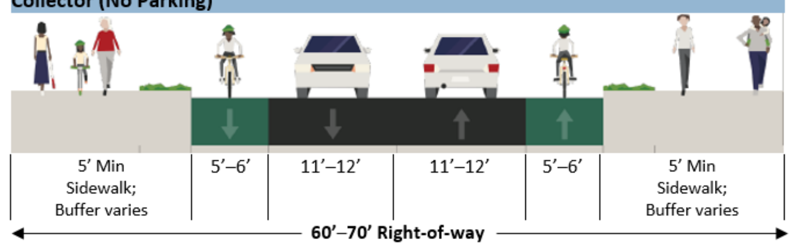
Skinny Street



Collector (Parking Both Sides)



Collector (No Parking)



Traffic Calming/Toolbox

Traffic Calming (encouraged for developing a bicycle boulevard or neighborhood greenway)

Gateway (Curb Bulb-out)

Google, May 2018 image capture

Pinch Point (Curb Extension)

Nacto.org Urban Street Design Guide

Diverters

Nacto.org Urban Bikeway Design Guide

Raised Crosswalk

pedbikeimages.org/PennsylvaniaDOT

Speed Cushions

Nacto.org Urban Street Design Guide

Speed Management Median

Nacto.org Urban Bikeway Design Guide

Pedestrian Median Refuge

pedbikeimages.org/DanBurden

Chicanes

Nacto.org Urban Street Design Guide

Traffic Circle (Mini)

Oregon Bicycle and Pedestrian Design Guide

Signing and Striping

Sharrow

Nacto.org Urban Bikeway Design Guide

Wayfinding

Nacto.org Urban Bikeway Design Guide

Share the Road

Mutcd.fhwa.dot.gov

Bicycle Network Enhancements

Bicycle Lanes

Nacto.org Urban Bikeway Design Guide

Buffered Bicycle Lanes

Nacto.org Urban Bikeway Design Guide

Shared-use Paths

FHWA.dot.gov

Cycle Tracks

Nacto.org Urban Bikeway Design Guide

Sharrows

Nacto.org Urban Bikeway Design Guide

Other Travel Modes

- **Air Transportation**
  - The Roseburg Regional Airport (designated airport code of RBG) is owned and operated by the City of Roseburg (no commercial flights)
  - Nearest commercial service airports to RBG are the Eugene Airport and the Rogue Valley International – Medford Airport
  - 2018 Airport Master Plan outlines details of the airport conditions and future goals
- **Rail Transportation**
  - One railroad line passes through Roseburg: The Central Oregon and Pacific Railroad (CORP) is a short line railroad.
  - Currently, the railroad line is exclusively for freight, with 90% percent of its delivery consisting of forest products.
  - Projects identified in the TSP that may require coordination with Rail:
    - Mosher Ave Bicycle Improvements (Project BP 12)
- **Pipeline Transportation**
  - No changes planned
- **Water Transportation**
  - No changes planned

The City is not required to implement projects identified on the Financially Constrained Projects list first. Priorities may change over time and unexpected opportunities may arise to fund particular projects. The City is free to pursue any of these opportunities at any time.

The purpose of the Tier 1 Financially Constrained Projects list is to establish reasonable expectations for the level of improvements that will occur, and give the City initial direction on where funds should be allocated. The project design elements are identified for the purpose of creating a reasonable cost estimate for planning purposes. The actual design elements for any project are subject to change and will ultimately be determined through a preliminary design and final design process, and are subject to City, Douglas County, and/or ODOT approval.

Next Steps

- Consider comments and public input
- Revise Draft TSP as needed
- Finalize TSP
- City adoption of TSP into Roseburg Comprehensive Plan

Open House

Meeting #1

December 6, 2017

5:30 PM – 7:30 PM

Roseburg Public Safety Center

700 SE Douglas Ave.

Portland, OR 97205

Open House Summary & Notes

Roseburg Transportation System Plan Update: TSP System Conditions

LOCATION: 700 SE Douglas Avenue – Umpqua Room

DATE: Wednesday, December 6th, 2017

TIME: 5:30 – 7:30 PM

Attendance: 13 persons (7 members of the community and 6 project team members), per sign-in sheet

Format:

- **Shelly, Angela, City and State staff** answered resident questions as they walked through the open house stations, and encouraged residents to provide comments (either on the map or with comment cards) for improving the transportation system (bike/ped, vehicular, safety, etc.)

Findings:

- Several people inquired about coordination with the Blue Zone effort
- Generally, most of the feedback focused on improving/preserving bicycle and pedestrian connectivity and the character of the community
- **Safety:**
  - Speeds should be lowered globally
  - Access consolidation is an opportunity
  - Uncomfortable to be a bicyclist/pedestrian (lighting, buffer from traffic, rumble strips/paint)
- **Bicycle/Pedestrian:**
  - Would like wider multimodal options (shoulders, sidewalks, bike lane) with buffer from vehicular traffic (Harvard, Douglas, Diamond Lake, Highland/Fairmont, Garden Valley, Stewart)
  - Would like better connectivity for sidewalks, trails, bicycle lanes (to parks, across I-5, to schools, between neighborhoods)
  - Requested open streets events through summer months
  - Recreational paths/trails are desired
  - Interest in bike share program
  - Build more sidewalks on residential streets

- **Transit:**
  - Increased frequency and service coverage is desired
  - Service outside of Roseburg is desired (Greyhound)
  - Bus turnouts on major roadways
- **Vehicular:**
  - Limited connectivity, primary routes (the box: Stephens, Stewart, Harvard, Garden Valley)
  - Land use congregates commercial uses and necessitates users to traverse limited primary routes contributing to congestion at major intersections
  - Revisit turn restrictions
- **Other**
  - Many residents commented on a lack of landscaping; additionally some noted lack of inviting atmosphere (Diamond Lake and Stephens) when arriving to City

Roseburg TSP

Public Open House

December 6, 2017

900 SE Douglas Avenue – Umpqua Room

Name	Phone #	Email
John PATRICK	541-784-8883	—
John McLean	—	jaymac3@charter.net
Susan Uravich		
Debra McLean		
Kirk Blaine	541-912-8626	kblaine15@gmail.com
Burt Tate	541-670-6156	burttate@msn.com
John Dimof	541 530 7716	john.dimof@shorecare.com

ROSEBURG TRANSPORTATION SYSTEM PLAN UPDATE

OPEN HOUSE #1

Please join us for the first public meeting to discuss the Transportation System Plan Update.

Representatives from City of Roseburg and their transportation engineering consultant will be on hand to share project updates and collect community input on how to shape the future of Roseburg's transportation system.

Wednesday
December 6, 2017
5:30-7:30pm

900 SE Douglas Ave
Umpqua Room

Comment card responses from Roseburg TSP Update Open House #1: 12/6/2017

No.	Name	Affiliation	Own Property in Project Area?	Live in Project Area?	Have a Business in Project Area?	If Have a Business Other Than Your Address, Where?	Comment	Mode	Responder	Response
1	Cheryl	Utrans					Harvard: -Access consolidation -Turn restrictions -Pedestrian refuge island	All	Consultant	Alternatives will consider improvements to address documented concerns
2							Garden Valley: -Turn restrictions	Vehicle		
3							Transit: -Duplication of routes --> expanding/serving new areas of town	Transit		
4							Bike path --> lighting --> increase usage/safety	Bike		
5							Diamond Lake Boulevard --> alternative route --> Douglas	All		
6							Funding	All		
7							Charter Oaks Bridge	All		
8							The Box: -Stephens, Stewart Parkway, Harvard, GV	Vehicle		
9							I would most like to see the following improvements (choose up to 3): -Enhanced signing/striping -Enhanced trail system -New bicycle lanes	Bike/Ped		
10							Roadway Network: Road diet where justified --> Harvard west of Stewart Parkway	Vehicle		
11							Bicycle System: Encourage more use- lighting, signage, programs --> bike pool	Bike		
12							Pedestrian System: Pedestrian islands on Harvard. Safe Routes to School. Walking school bus.	Ped		
13	Stan Olzaski		✓	✓			Safety barriers along bike lanes and road shoulders to allow for safe distance between cars and bicyclists. Too many pass too close. OR green painted rumble strips adjacent to bike lanes to alert drivers that they are too close. As a bike rider, we could even hear approaching vehicles if they are about to pass unsafely. Thank you, Stan Olzaski	Bike	Consultant	Bicycle enhancements will be considered during the alternative development Applying rumble strips may require a code/policy change and would require adequate pavement width to meet min. lane widths for vehicles AND bicyclists. Signage and striping may be a more economical alternative.
14	Georgie Pulman-Olzaski		✓	✓			Open streets riding - close streets for bikes a couple of Sundays during summer.	Bike	Consultant	This type of alternative could be included as an opportunity for TDM/TSM but not a capital project - this program type likely requires coordination with other City departments and support through local businesses
15							Build bike/foot paths in areas that don't have housing yet so we have places to ride. Maybe get businesses to sponsor different paths.	Bike/Ped	Consultant	alternative development will consider bike/ped connectivity and placement opportunities.
16							Rumble strips next to bike lanes to prevent drivers encroaching on bike lane.	Bike	Consultant	Bicycle enhancements will be considered during the alternative development
17							Introduce traffic cameras for speeding drivers, as in Europe. It is also a great way to raise money for town/bike projects.	Vehicle		Noted. In Oregon, this type of solution is usually implemented in areas with high safety concerns. The use of traffic cameras would need support from community/city council.

Comment card responses from Roseburg TSP Update Open House #1: 12/6/2017

No.	Name	Affiliation	Own Property in Project Area?	Live in Project Area?	Have a Business in Project Area?	If Have a Business Other Than Your Address, Where?	Comment	Mode	Responder	Response
18	Debra McLean		✓	✓			Lower speeds on all streets to 35.	Vehicle	Consultant	Unfortunately this is not as simple as it seems; speeds are set based on functional classification, roadway function, current speed. What may be more beneficial are methods to encourage slower speeds and improve safety (medians, pinchpoints, chicanes, lane shifts, midblockcrossing/speed hump combo, street trees, roundabouts, signing and striping) but would be dependent on appropriate design.
19							Harvard Avenue more bike friendly	Bike	Consultant	Bicycle enhancements will be considered during the alternative development
20							Trees/shrubs along sidewalks- shade	Ped	Consultant	Roadway cross sections will be reviewed during alternative development -- landscaping can help improve the pedestrian environment and encourage slower speeds (if designed correctly), but require continued maintenance
21	Burt Tate	Small Planet Solutions	✓	✓	✓		Emphasize active transportation (walking, biking)	Ped	Consultant	all modes will be considered during the alternative development
22							Slow down automobiles: 20-30 mph maximum in residential areas.	Vehicle	Consultant	Noted - Can suggest traffic calming to encourage slower speeds and improve safety (medians, pinchpoints, chicanes, lane shifts, midblockcrossing/speed hump combo, street trees, roundabouts, signing and striping) but would be dependent on appropriate design.
23							Provide "protected" bike paths where auto speeds exceed 25 mph, in shared roads.	Bike	Consultant	Roadway cross sections will be reviewed during alternative development. Requires adequate right-of-way and coordination with access control
24							Use roundabouts at key intersections to keep flow of traffic and improve pedestrian safety	Vehicle	Consultant	Roundabouts are part of the evaluation toolbox; ROW and other features may impact implementation
25							Plan for connected bike/ped paths to access all areas of Roseburg.	Ped	Consultant	The Bike/Ped Master Plan looks at the larger system and is the foundation of the enhanced TSP elements for this update
26							Road diets for major streets (Harvard, Stevens, Stewart Parkway, Garden Valley) and slowing.	Vehicle	Consultant	Speeds are set based on functional classification; roadway function (and speed) may be revisited to address safety, connectivity, or operational concerns
27							Provide trees for shade, and landscaping on ALL roads, street.	Ped	Consultant	Roadway cross sections will be reviewed during alternative development -- landscaping can help improve the pedestrian environment and encourage slower speeds (if designed correctly), but require continued maintenance
28							More Open Streets events	Ped		Noted - This type of alternative could be included as an opportunity for TDM/TSM but not a capital project - this program type likely requires coordination with other City departments and support through local businesses
29	John McLean	Bike Walk Roseburg	✓				Bike lanes are needed on Douglas Ave on both uphill portions to facilitate bicyclists that must use that route to avoid the dangerous high speed traffic on Diamond Lake Blvd. which has no bike lanes and totally inhospitable sidewalks.	Bike	Consultant	alternatives will consider improvements to address documented concerns
30							40 mph is TOO HIGH for any urban environment! There should be no speed within city limits greater than 35 mph and most streets should optimally be 30 mph. High speed traffic is a major deterrent to usage by other modes like bicyclists and pedestrians.	Vehicle	Consultant	Speeds are set based on functional classification; roadway function (and speed) may be revisited to address safety, connectivity, or operational concerns

Comment card responses from Roseburg TSP Update Open House #1: 12/6/2017

No.	Name	Affiliation	Own Property in Project Area?	Live in Project Area?	Have a Business in Project Area?	If Have a Business Other Than Your Address, Where?	Comment	Mode	Responder	Response
31							Highland/Fairmont streets constitute a de facto bike route that is not designated or promoted - this could be facilitated by installation of an "as needed" flashing light at the crossover at Garden Valley and by erecting a barricade to through traffic and Fairmont and Stewart Parkway to discourage cut through motorists and direct local traffic to Mulholland St.	Vehicle	Consultant	alternatives will consider improvements to address documented concerns
32	Dick Dolgonas		✓	✓			Traffic moves too fast.	Vehicle	Consultant	Speeds are set based on functional classification; roadway function (and speed) may be revisited to address safety, connectivity, or operational concerns
33							We need to spend more to bring bike & ped facilities & landscaping up before spending on more traffic lanes.	Bike/Ped	Consultant	roadway cross sections will be reviewed during alternative development
34							This needs to be consistent with Blue Zone efforts.	Bike/Ped	Consultant	Coordination between the two efforts will happen through City staff
35	Juliete Palenshus	Blue Zones Project	✓	✓	✓	B2P (work here) 566 SE Jackson St	Bike lanes on Harvard Ave to get from West Harvard to downtown via the Oak St Bridge. Bangkok West/ Lookingglass	Bike	Consultant	alternatives will consider improvements to address documented concerns
36							I'd feel more comfortable walking anywhere/everywhere if there was a little buffer between me (on a (wider) sidewalk) and cars in their lanes, such as trees & bike lanes.	Ped	Consultant	roadway cross sections will be reviewed during alternative development
37							Also, slowing traffic down and therapeutic curves can be really nice for all modes of travel :) I NEED to bike to/from work & can't do it safely right now...biking on Harvard right now is terrifying. Please help me get some movement/exercise in my life! :)	Bike	Consultant	Speeds are set based on functional classification; roadway function (and speed) may be revisited to address safety, connectivity, or operational concerns alternatives will consider improvements to address documented concerns
38	Susan Uravich		✓	✓			I am a dedicated walker & Roseburg needs to be a more pleasant place to walk. Aesthetics need to be a consideration in these projects. Thinking of the recent Stewart Parkway changes, it looks like a freeway not a city street. Trees were removed (esp. thinking of in front of the TMCA) and it looks as if no street trees are planned. This makes for a HOT, uninviting place to walk. Any street projects need to have trees incorporated. Supposedly, we are a Tree City, USA, so there should be an increase in the number of trees not a net loss so streets can be wider. Buffers, like planting strips, between streets and sidewalks are needed. Harvard Ave --> too many driveways (like @ Grocery Outlet, every parking aisle has a driveway to the street. More chances to hit pedestrians while making turns.)	Ped	Consultant	Roadway cross sections will be reviewed during alternative development -- landscaping can help improve the pedestrian environment and encourage slower speeds (if designed correctly). There is a cost/coordination associated with landscape maintenance
39	Robert White			✓			Greyhound service returns would be great (Patrick Markham) near Rose apartment/hotel	Transit		Noted - Greyhound operates similar to franchises, meaning each station is independantly/privately operated. The City is interseted in returning the service, but will need an interested party to operate the station
40							Concern about mobility for those who can't/don't drive	Transit	Consultant	alternatives will consider improvements to address documented concerns
41							Thankful for Utrans	Transit	Consultant	noted
42							Visibility concerns for bike/ped by vehicles	Bike/Ped	Consultant	alternatives will consider improvements to address documented concerns
43							Green - video/post office near UPS for greyhound station	Transit		Noted - Greyhound operates similar to franchises, meaning each station is independantly/privately operated. The City is interseted in returning the service, but will need an interested party to operate the station
44							Utrans is nearby, close to freeway	Transit	Consultant	noted

Comment card responses from Roseburg TSP Update Open House #1: 12/6/2017

No.	Name	Affiliation	Own Property in Project Area?	Live in Project Area?	Have a Business in Project Area?	If Have a Business Other Than Your Address, Where?	Comment	Mode	Responder	Response
45	Bob Dannenhoffer	Douglas County Public Health	✓	✓	✓		Really need to make bike "system" more usable.	Bike	Consultant	The Bike/Ped Master Plan looks at the larger system and is the foundation of the enhanced TSP elements for this update
46	Anonymous 1		✓	✓			Residential streets in so many areas have NO sidewalks; some, like along SE Main, have deep ditches along the roadside (jump into the ditch to avoid being sideswiped while walking or biking?)	Ped	Consultant	roadway cross sections, and functional classification, will be reviewed during alternative development
47							I live in SE Roseburg & if I want to walk toward Harvard, I AVOID the Washington St/Pine/Stephens intersection because it is such a large expanse & the ped x-ing signals are poorly timed.	Ped		Noted
48							Diamond Lake & S. Stephens are entries to town & are very unattractive & unwelcoming. If we want to attract businesses, professionals & prosperity to town, the place HAS TO LOOK BETTER. Landscaping plays a big role in that. Nice trees can hide the many ugly buildings we have in this town plus reduce noise levels, heat, etc. Buffers between sidewalks and roads make walking more pleasant. I think we want people out of cars & walking for health (Blue Zones Project) & we need an inviting environment for that.	All		Noted -- Agree that landscaping can be beneficial to the community/pedestrian experience. Landscaping is not exclusively an element of the TSP and requires coordination with other City departments. City code/policy can encourage new development to have landscaping requirements.
49	Anonymous 2						Sidewalks are important! They need to be maintained so they are not slippery, trip hazards fixed, bushes trimmed, etc.	Ped	Consultant	Sidewalks maintenance is included in the City maintenance plan
50	Anonymous 3						I would most like to see the following improvements (choose up to 3): -Safety -New bicycle lanes -Fill in gaps in sidewalk	Bike/Ped	Consultant	noted

Open House

Meeting #2

October 10, 2019

5:30 PM – 7:30 PM

Roseburg Public Safety Center

700 SE Douglas Ave.

Portland, OR 97205

Roseburg TSP

Public Open House

October 10, 2019

900 SE Douglas Avenue – Umpqua Room

SIGN IN SHEET

Name	Contact Info (Phone or Email)
1. Jenny Young Seidemann	jyoungseidemann@gmail.com
2. Steve Kaser	rhs. futbol at gmail.com
3. Jessica Hand	jessica.hand@sharecare.com
4. Kirk Blaine	kirk.blaine@sharecare.com
5. Ryan Finlay	Roseburg@gmail.com
6. John McLean	macj878@icloud.com
7. Mike Baker	ODOT
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Roseburg Transportation System Plan

Public Open House

Thursday, October 10, 2019

What Can You Learn at the Open House?

- Purpose of Transportation System Plan (TSP)
- Project Process and Timeline
- TSP Goals
- Content of the TSP
  - Funding Considerations
  - Project Lists/Modal Plans

What is a TSP? Why do we need one?

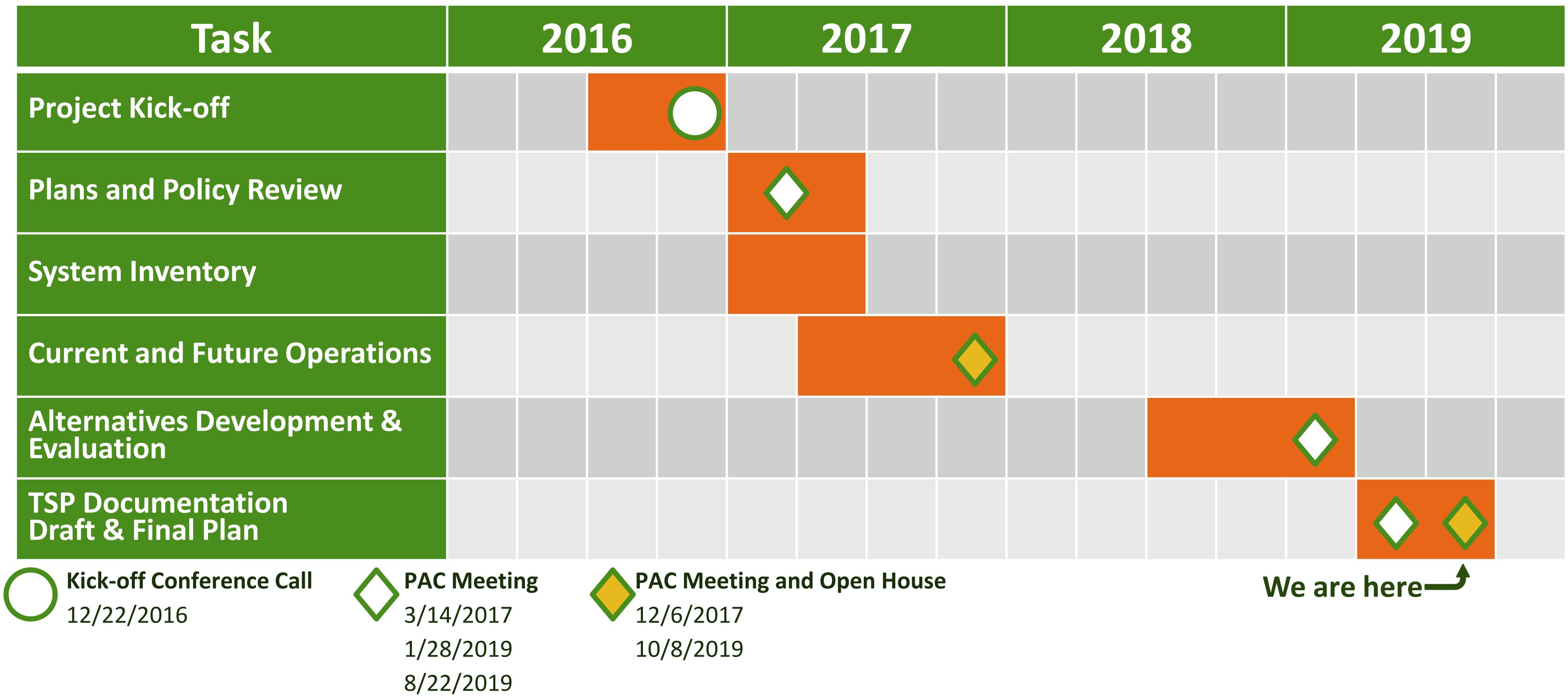
WHAT

- A blueprint for all modes of travel
- Must be consistent with other TSPs and planning documents governing the region it serves and with the Oregon Transportation Plan.
- TSPs are required by the Transportation Planning Rule documented in the Oregon Administrative Rule 660-012-0015.
- Eventually adopted as the transportation element of the City's Comprehensive Plan.

WHY

- Attract and secure funds (Statewide Transportation Improvement Program, grants)
- Plot a course for your community (goals, planned land uses, right-of-way needs, projects and services)
- Work toward goals
- TSP must document the needs, functions, modes, and general location of planned improvements.

Project Timeline



- **Next Steps**
  - Address comments on Draft TSP
  - Finalize Report by Oct 31, 2019
  - Begin City adoption process

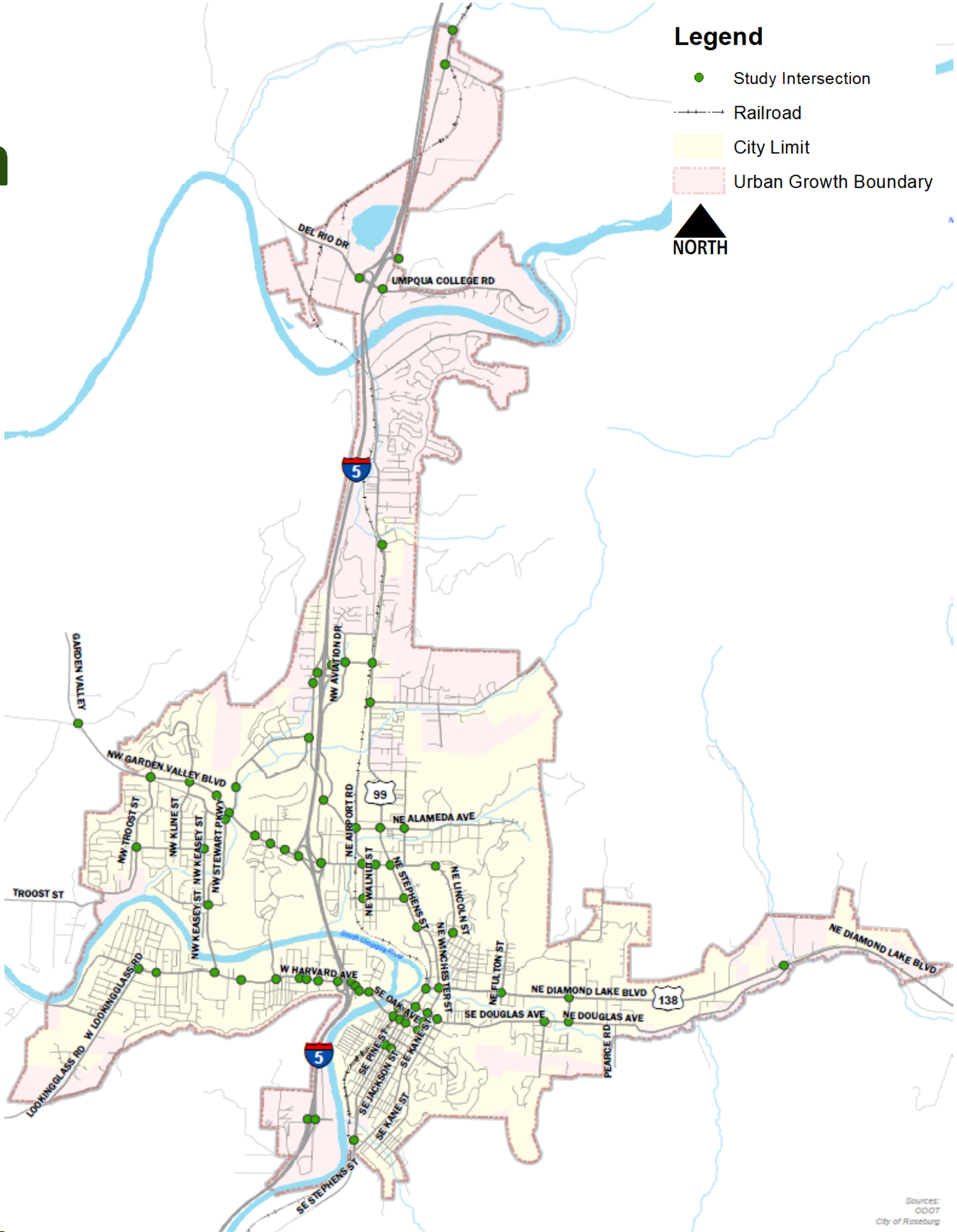
TSP Goals

- **Goal 1. Mobility and Accessibility** Provide a comfortable, reliable, and accessible transportation system that ensures safety and mobility for all members of the community.
- **Goal 2. Vibrant Community** Create an integrated multi-modal transportation system that enhances community livability.
- **Goal 3. Transportation Options** Provide for a multi-modal transportation system that enhances connectivity.
- **Goal 4. Economic Vitality** Advance regional sustainability by providing a transportation system that improves economic vitality and facilitates the local and regional movement of people, goods, and services.
- **Goal 5. Implementation** Provide a sustainable transportation system through responsible stewardship of financial and environmental resources.

TSP Planning Area

Planning Area Includes:

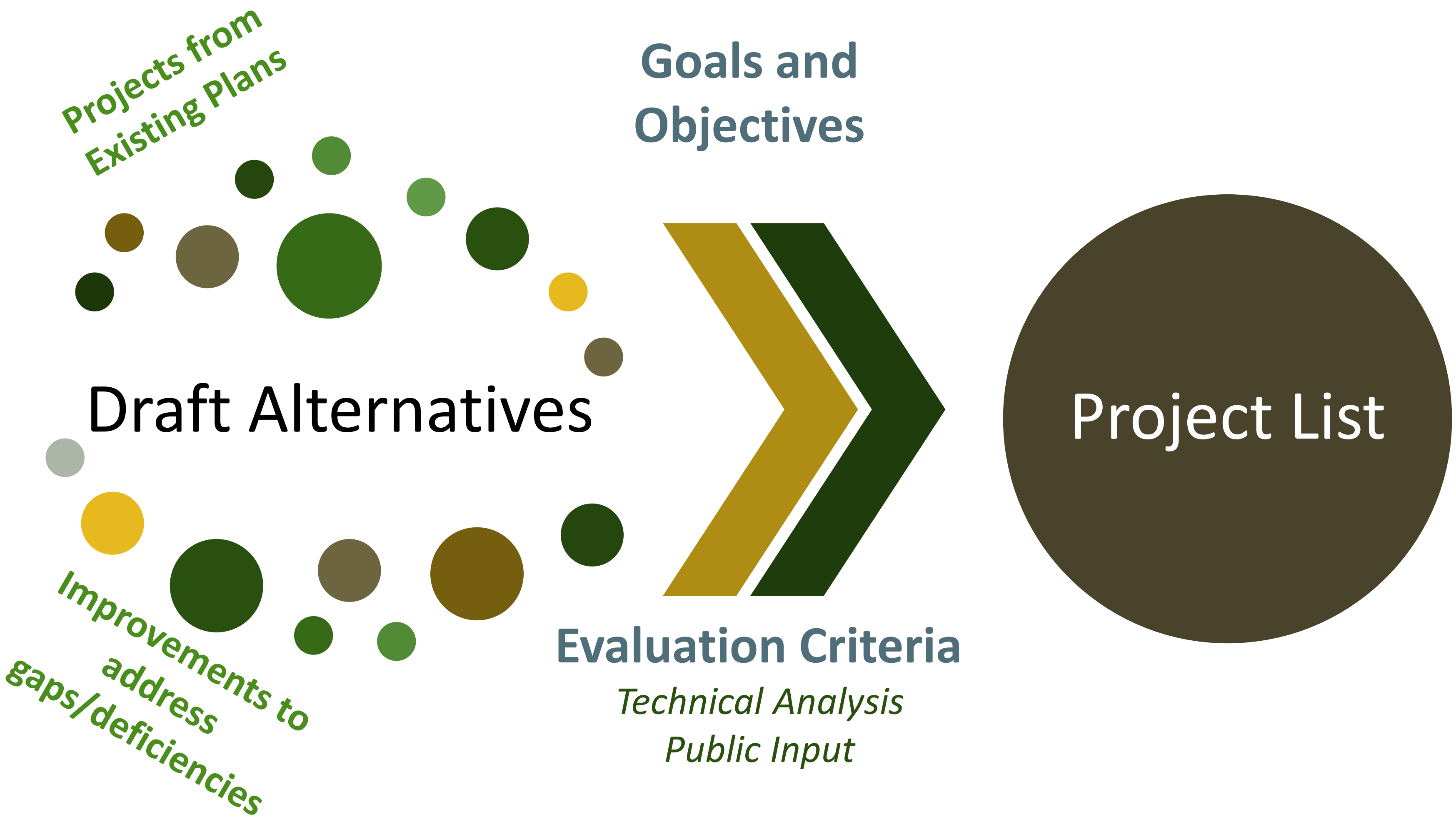
- City Limits – all of the area currently incorporated
- Urban Growth Boundary – Areas currently identified for future growth in the Comprehensive Plan
- 76 study intersections - mostly arterials/collectors



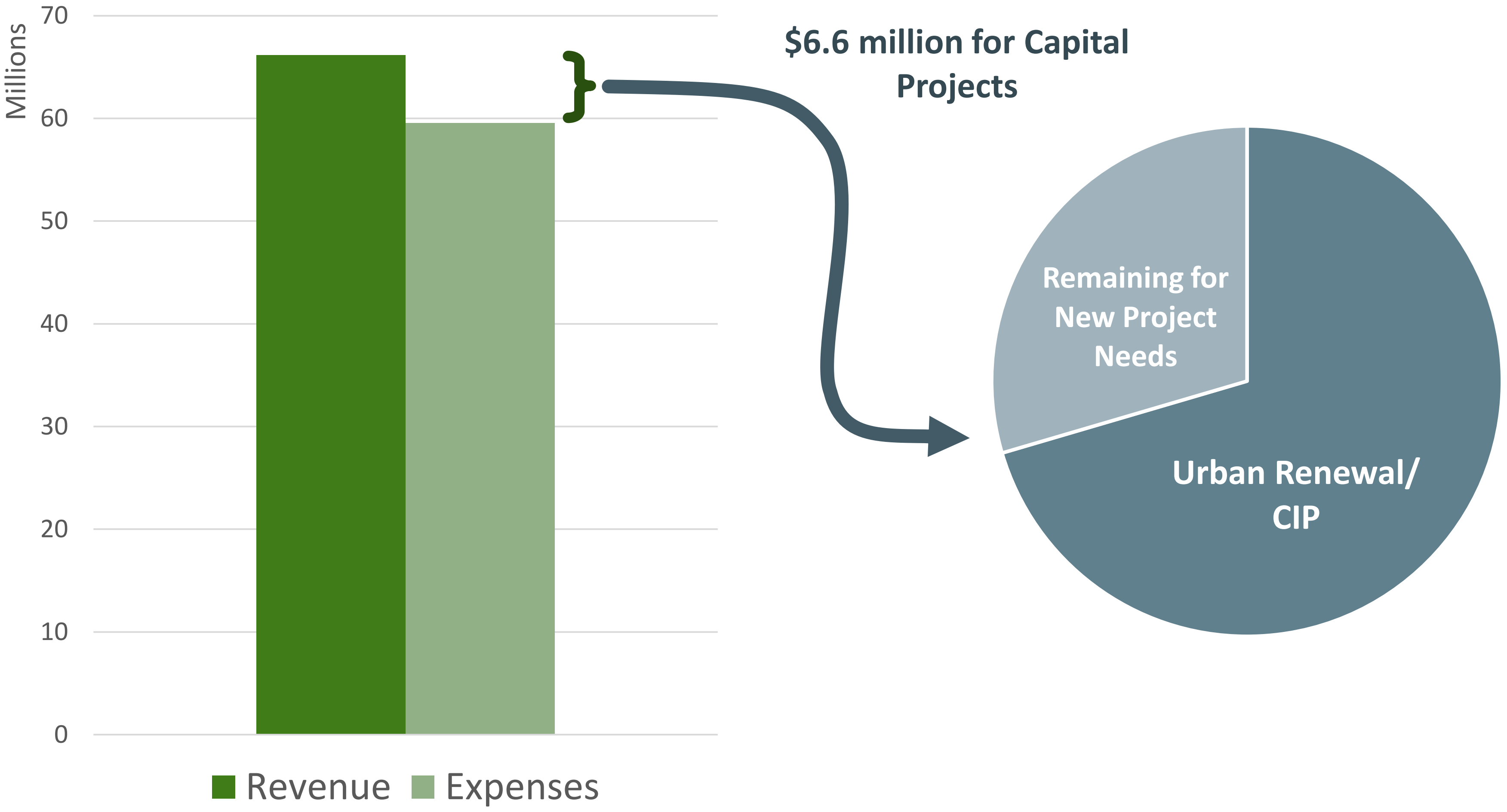
Ongoing Planning Process

- The TSP process avoided duplicating analysis efforts of facilities included in the other studies.
- The full impact of these planning processes is undetermined at this time, as such, there may be projects identified in the future that could influence how Roseburg chooses to fund improvements to its transportation system.
  - The I-5: Roseburg Bottleneck Corridor Segment Plan: Seeks low cost potential improvements to the interstate corridor, including ramps and bridges, to improve safety and congestion.
  - Interchange Area Management Plans (IAMPs) for I-5 Exit 124 and Exit 125: Expected to identify preferred solutions within a 20-year planning horizon in order to maintain the integrity of the interchanges and the roads that serve them.
- The TSP expects the outcome of these other planning studies to identify potential solutions that could benefit city facilities, specifically Garden Valley Boulevard. Although not included in the Tier 1 project list, the Tier 2 list notes the importance of upgrading key transportation corridors such as Garden Valley Boulevard, Harvard Avenue and Diamond Lake Boulevard to improve connectivity and operations for all modes.

Project Development and Evaluation



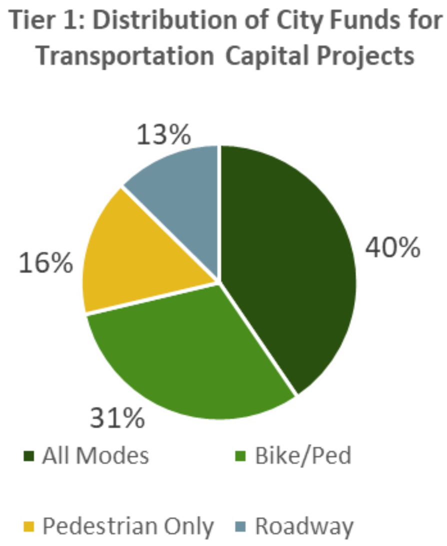
Funding Forecast through 2040



Note: All values are rounded and in 2018 dollars

The Project Lists

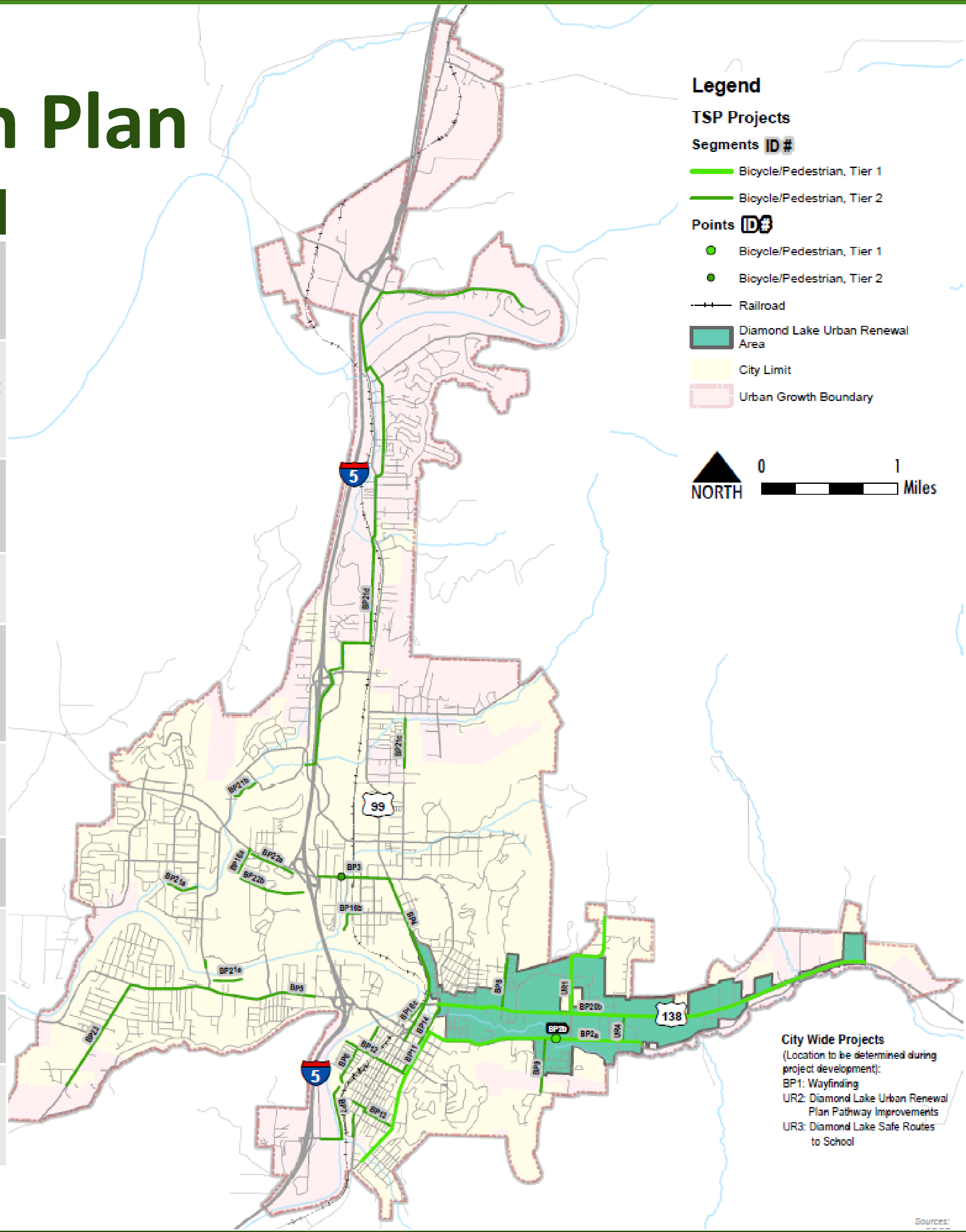
- Tier 1 (Financially Constrained): Projects that have a reasonable likelihood of being funded with existing sources
  - 27 projects identified
  - 16 of the projects were already identified in the Urban Renewal Plan or City Capital Improvement Plan
  - City contribution totals just under $6.6 million – *Transit projects expected to be funded through Transit District*



- Tier 2 (Needed but Unfunded): Projects which would require new funding sources for implementation
  - 58 projects identified
  - All projects without committed funding, could apply for grants or create new revenue sources
  - Range from signal timing modifications to river crossings

Bicycle/Pedestrian Plan

ID	Tier 1 Projects
BP1	**Citywide Bicycle Wayfinding:** Design and implement a wayfinding project to enable visitors to identify their location and destinations in and around the Heart of Roseburg.
BP2a	**Douglas Ave Bike Facilities and Sidewalks:** Add sidewalk on both sides from Deer Creek to city limits and bike facilities from Fowler St to city limits. Given the slopes found along Douglas Ave, a mix of bike facility types may be most appropriate.
BP2b	**ODOT Bridge Replacement Matches: Douglas Ave (Preliminary Engineering)** Provide preliminary engineering to replace/rehab functionally obsolete structure and provide multi-modal facilities.
BP10	**Pine St Sidewalks:** Sidewalks on the east side of Pine St south of existing sidewalks.
BP11	**Main St Sidewalks and Bike Facility:** Sidewalk on the east side of Main St from Rice Ave to Marsters Ave, and on the west side from Hamilton St to Marsters Ave as well as sharrows along Main St from Douglas Ave to Lane St.
BP20b	**Diamond Lake Blvd Sidewalks, power poles, easements:** This concept proposes local participation in the redevelopment of Diamond Lake Blvd multi-modal improvements.
BP21e	**Fir Grove Park Multi-Use Path:** Multi-use path connection paralleling the river between Fir Grove Park and Stewart Pkwy.
UR1	**Rifle Range St north of Diamond Lake Blvd:** Provide full street/multi modal improvements to Rifle Range St from Diamond Lake Blvd to the city limits.
UR2	**DLURP Pathway improvements:** Local participation in pathway improvement in the urban renewal area/district.
UR3	**Safe Routes to School Diamond Lake Blvd to Douglas Ave** Provide local participation in "Safe Routes to Schools" in the Area (pedestrian bridge).



Bicycle/Pedestrian Plan

ID	Tier 2 Projects
BP3	**Garden Valley Blvd Shared Use Sidewalks:** Widen sidewalk to 10' (both sides).
BP4	**Stephens St Bike Facility (Alternate Route):** Provide bicycle facilities on local system as alternate route to Stephens St.
BP5	**West Harvard Ave Shared Use Sidewalk:** Widen sidewalk to 10' on north side.
BP6	**South Umpqua River Sharrow Connections through Downtown:** Sharrows would continue south from the north end of Flint St, where the existing multi-use path terminates, and extend to Micelli Park via Flint St, Mosher Ave, and Fullerton St.
BP7	**South Umpqua River Multi-Use Path and Portland Ave River Crossing:** This concept would build a new multi-use path river crossing at Portland Ave and a new multi-use path connection from this bridge to the new bike facilities in Micelli Park.
BP8	**Fulton St Sidewalks and Bike Facility:** Upgrade the street to minor collector standards with bike/ped facilities.
BP9	**Ramp Road Sidewalk:** Add sidewalks on the west side of Ramp Road.
BP10	**Pine St Sidewalks:** Sidewalks on the east side of Pine St south of existing sidewalks.
BP12	**Mosher Ave Bike Facility and Railroad Crossing Improvements:** Sharrows on Mosher Ave, improved pedestrian facilities at the railroad crossing. Signage would be added to provide guidance to bicyclists and motorists to share the road.
BP13	**Burke St/Roberts Ave Sharrows:** Sharrows on Burke St and Roberts Ave Enhanced wayfinding signage may be necessary to direct travelers to the existing crossings of Pine St and Stephens St.
BP14	**Jackson St Bike Facility:** Sharrows along Jackson St from Diamond Lake Blvd to Douglas Ave as well as along the one-way portion of Jackson St from Douglas Ave to Mosher Ave.
BP16a	**Duck Pond Trail Wayfinding and Connections on Existing Infrastructure:** The path on the west side of the parking would be formalized with signage to establish the area as a multi-use path. The remaining connection to Garden Valley Blvd would be a continuation of the multi-use path on the west side of Duck Pond St.
BP16b	**Gaddis Park Trail Wayfinding and Connections on Existing Infrastructure:** Sharrows connection along Chestnut Ave and Highland St to fill in gap between existing facilities on Cedar St (north of Chestnut Ave) and on Chestnut Ave (east of Cedar St) and the trails in Gaddis Park.
BP16c	**Pine St Trail Wayfinding and Connections on Existing Infrastructure:** Links the trail through Deer Creek Park along Pine St, Douglas Ave, and Spruce St to the existing one-way bike lane along Stephens St The multi-use path would continue on the north side of Pine St, and then a bike lane along Douglas Ave to connect to the existing multi-use path along the South Umpqua River.
BP17	**Garden Valley Blvd and Stephens St Transit Stops:** Require developers to provide transit stop amenities and an update to the include in-lane far-side transit stops at least 30 feet from intersection to avoid bus interference with side street traffic flow.

ID	Tier 2 Projects
BP18	**Calkins Ave Sharrows:** Sharrows on Calkins Ave between Grove Lane and Keasey St with wayfinding to nearby trail system.
BP19	**Garden Valley Blvd Midblock Crossing:** Midblock HAWK crossing near Garden Valley Blvd at Fairmount Ave/Highland St, providing an interconnect with the I-5 Exit 125 ramp signal. Widen the sidewalks on Garden Valley to more comfortably accommodate cyclists and install sharrows on Fairmount Ave and Highland St to formalize a bicycle route.
BP20a	**Garden Valley Blvd Arterial Upgrade:** This concept proposes more detailed study of opportunities to improve traffic flow and provide multimodal accommodations.
BP20c	**Harvard Ave Arterial Upgrade:** This concept proposes more detailed study of opportunities to improve traffic flow and provide multimodal accommodations.
BP21a	**Newton Creek New Multi-Use Paths:** Multi-use path paralleling Newtown Creek between Jefferson St and Keasey St.
BP21b	**Charles Gardiner Park New Multi-Use Paths:** Extend the existing multi-use path that parallels Newton Creek through Charles Gardiner Park. This option would extend this path west of Renann St, paralleling Newton Creek to the Stewart Pkwy access to the Walmart Supercenter.
BP21c	**Vine St to Newton Creek New Multi-Use Paths:** New multi-use path between the north end of Vine St and Newton Creek Road.
BP21d	**I-5 Frontage New Multi-Use Paths:** New multi-use path connections: roughly parallel I-5 and Stephens St and provide connections to existing facilities in the existing bike network where possible, including the existing path paralleling I-5 between Garden Valley Blvd and the river.
BP21e	**Fir Grove Park to Stewart Pkwy New Multi-Use Paths:** Multi-use path connection paralleling the river between Fir Grove Park and Stewart Pkwy.
BP22	**New Bike Connection – Duck Pond St to I-5 Multi-use Path:** This concept would provide a separated bike facility, such as a multi-use path or two-way cycle track, to connect the existing multi-use path facilities found along Duck Pond St and I-5. Option A: Within GVB right of way (cycle track or multi use path); Option B: Through VA campus
BP23	**Lookingglass Rd sidewalks:** Add sidewalks to both sides of the street.
UR6	**MUP north of and parallel to Douglas:** Multi-use path north of and parallel to Douglas Ave.

Traffic Calming/Toolbox

Traffic Calming (encouraged for developing a bicycle boulevard or neighborhood greenway)

Gateway (Curb Bulb-out)

Google, May 2018 image capture

Pinch Point (Curb Extension)

Nacto.org Urban Street Design Guide

Diverters

Nacto.org Urban Bikeway Design Guide

Raised Crosswalk

pedbikeimages.org/PennsylvaniaDOT

Speed Cushions

Nacto.org Urban Street Design Guide

Speed Management Median

Nacto.org Urban Bikeway Design Guide

Pedestrian Median Refuge

pedbikeimages.org/DanBurden

Chicanes

Nacto.org Urban Street Design Guide

Traffic Circle (Mini)

Oregon Bicycle and Pedestrian Design Guide

Signing and Striping

Sharrow

Nacto.org Urban Bikeway Design Guide

Wayfinding

Nacto.org Urban Bikeway Design Guide

Share the Road

Mutcd.fhwa.dot.gov

Bicycle Network Enhancements

Bicycle Lanes

Nacto.org Urban Bikeway Design Guide

Buffered Bicycle Lanes

Nacto.org Urban Bikeway Design Guide

Shared-use Paths

FHWA.dot.gov

Cycle Tracks

Nacto.org Urban Bikeway Design Guide

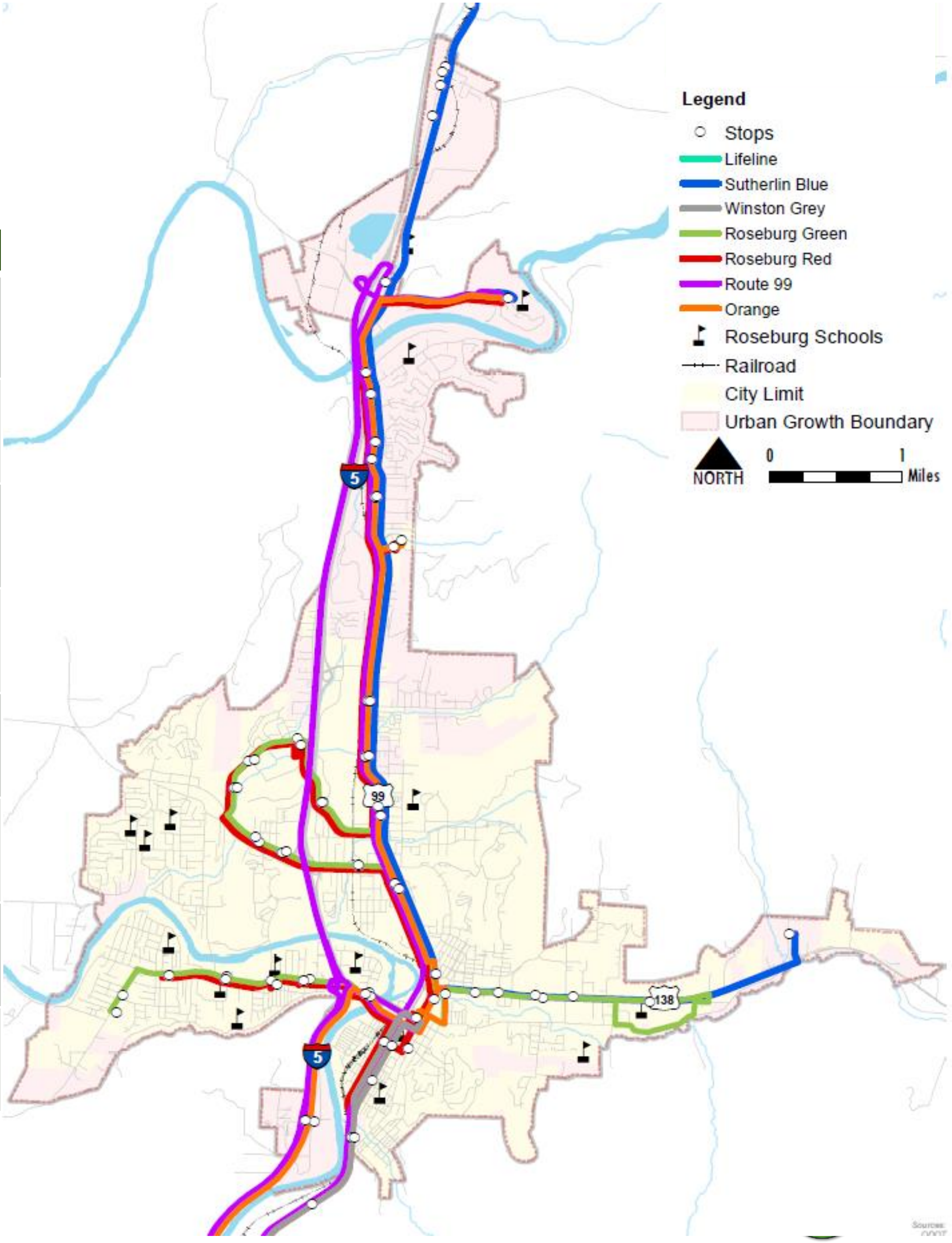
Sharrows

Nacto.org Urban Bikeway Design Guide

Transit Plan

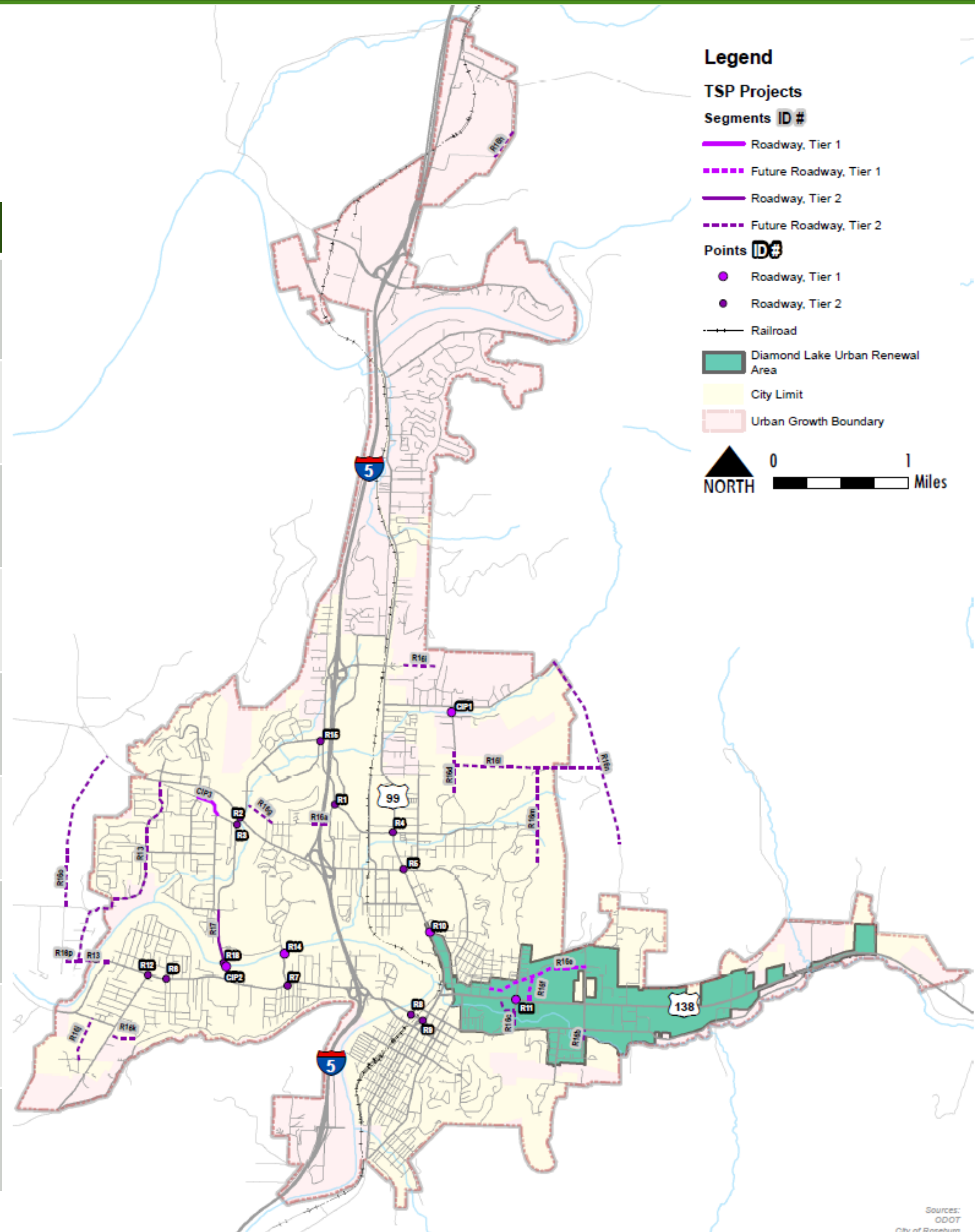
ID	Tier 1 Projects
T1	**Purchase of Additional Buses:** Add buses to existing fleet.
T2	**New Transit Center:** Construct a new transit center in or near the downtown area.
T3	**New Maintenance Facility:** Construct a new maintenance facility.
T4	**Stop Amenities and Accessibility:** Add shelters, seating, lighting, waste bins, and/or traveler information.
T5	**Increased Frequencies:** Increase transit frequency (reduced headways).
T6	**New Routes:** Expand transit service through new routes.
T7	**Transit ITS:** Transit Signal Priority (systems that seek to improve schedule adherence by reducing bus delay at signalized intersections) and communication of real-time bus arrival information to rider.
T8	**Increased Dial-a-Ride Service:** This concept would provide increased Dial-a-Ride service hours and increased coordination with existing and future fixed route services.

Note: Douglas County Transit District will be the primary funding source for the transit projects identified in the TSP, with City support.



Roadway Plan

ID	Tier 1 Projects
R10	**Winchester St/Stephens St Intersection:** Option A: Realign intersection to a T-intersection (stop-control) Option B: Signalize, realign and provide dual westbound right turns.
R11	**Fulton St or Lake St Traffic Control:** Install a traffic signal to provide a protected pedestrian crossing of Diamond Lake Blvd.
R14	**ODOT Bridge Replacement Matches, Stewart Park Dr:** Replace/rehab functionally obsolete structure.
R16e	**Commercial Ave Extension:** Extend Commercial Ave between Fulton St and Rifle Range St.
R16f	**Champion Site Connection to Diamond Lake (Klamath Ave Extension:** Extend Klamath Ave between Fulton St and Rifle Range St.
R17	**Stewart Pkwy - Harvey South Design:** This project would design the final phase of the Stewart Pkwy Improvements (multi-modal facilities and new structure).
CIP1	**ODOT Bridge Replacement Matches, Parker Rd:** Replace/rehab functionally obsolete structure.
CIP2	**Stewart Pkwy Bridge Approaches:** This project will address the issues with the bridge approaches.
CIP3	**Valley View Dr Improvements:** This project would improve Valley View Dr between Keasey St and Kline St.



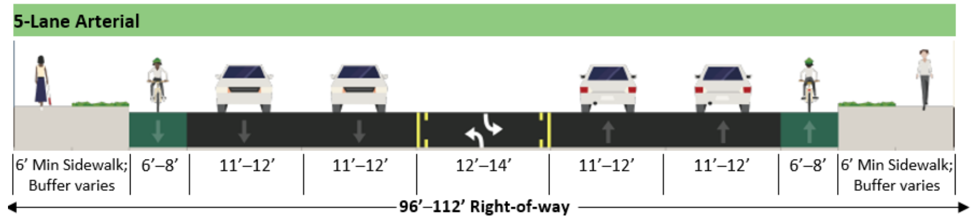
Roadway Plan

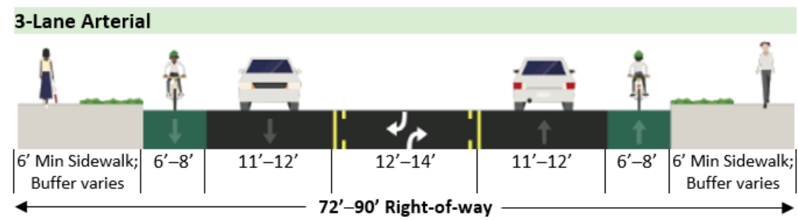
ID	Tier 2 Projects
R1	**Stewart Pkwy at Aviation Dr/Mulholland Dr Operations and Safety:** Add a dedicated southeast right-turn lane from Stewart Pkwy to Mulholland Dr.
R2	**Garden Valley Blvd at Stewart Pkwy Dual Turn Lanes:** Add eastbound and westbound dual left-turns from Garden Valley Blvd to Stewart Pkwy and dual southbound right-turn lanes from Stewart Pkwy to Garden Valley Blvd.
R3	**Stewart Pkwy at Valley View Dr Access Management:** Restrict the eastbound left-turns from Valley View Dr to Stewart Pkwy (Right-in/Right-out/Left-in)
R4	**Stewart Pkwy at Stephens St turn lanes:** Option A: Add dual northbound left-turn lanes; Option B: Dedicated westbound and southbound right-turn lanes
R5	**Garden Valley Blvd at Stephens St Turn Lanes:** Dual eastbound left-turns on Garden Valley Blvd and dedicated southbound and northbound right-turn on Stephens St Project would provide an opportunity for access management of impacted driveways.
R6	**Harvard Ave at Broccoli St traffic control:** Install either traffic signal or roundabout if side street delays become a concern in the future.
R7	**Harvard Ave at Centennial Dr/Stewart Park Dr Restriping:** Restripe the north leg of the intersection to allow for dual southbound left-turns. Centennial Dr/Stewart Park would be striped as a southbound left and southbound left/right-turn lane
R8	**Washington Ave at Spruce St Access Management:** Eliminate northbound movements by creating a curb extension or bulb-out to prevent the movements and adding "No outlet" signage at the intersection of Oak Ave and Spruce St Another variation of this option may be to prohibit vehicles from turning left from Oak St onto Spruce St, which would dramatically reduce the number of northbound vehicles at the Washington Ave intersection
R9	**Stephens St at Washington Ave Pedestrian Timing:** This concept extends the pedestrian time from 23 to 30 seconds for pedestrians traveling east-west.
R12	**Harvard Ave at Lookingglass Road Traffic Control:** Install a roundabout with a westbound bypass lane
R13	**Harvard Ave Bridge:** Construct a new bridge to carry Harvard Ave across the South Umpqua River, forming a new connection with Charter Oaks Dr With this new bridge connection, improvements to Charter Oaks Dr and Troost St would formalize this route
R15	**Northbound Receiving Lanes Extension at Stewart Pkwy and Edenbower Blvd:** Extend the northbound receiving lanes at the intersection of Stewart Pkwy and Edenbower Blvd.
R16a	**NW Hill extension:** Extend NW Hill between Stewart Pkwy and Mulholland Dr.
R16b	**Rifle Range St connection:** Construct a new bridge to carry Rifle Range St over Deer Creek

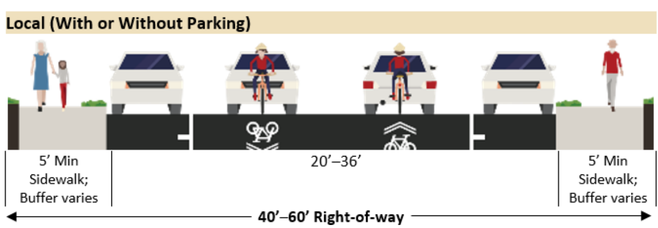
ID	Tier 2 Projects
R16c	**Fulton St Connection:** Construct a new bridge to carry Fulton St over Deer Creek
R16d	**Full Connection between Sunset St and Parker Rd:** Construct a new full street connection between the current north end of Sunset St and the current south end of Parker Road
R16e	**Commercial Ave Extension (Phase 2):** Extend Commercial Ave between Fulton St and Rifle Range St.
R16f	**Champion Site Connection to Diamond Lake (Klamath Ave Extension) (Phase 2):** New street connection from Lake St north of Diamond Lake Blvd to Champion Site and Klamath Ave.
R16h	**Forest Glen Ln extension:** Extend Forest Glen Lane between N Bank Road and Weyerhaeuser Dr.
R16i	**Roadway Connections and Extensions:** Extend Edenbower Blvd between Stephens St and Hughes St.
R16j	**Basil St Extension:** Extend Basil St from Rosemary Ave to Goedeck Ave.
R16k	**Harris Hills Dr Extension:** Extend Harris Hills Dr to Lookingglass Road
R16l	**East Roseburg Connectivity:** New east/west connection east of Parker Rd, similar to alignment of Clover Ave or Meadow Ave.
R16m	**Rocky Ridge Dr north Extension:** Extend Rocky Ridge Dr north
R16n	**Rifle Range Rd north extension:** Extend Rifle Range Road north
R16o	**West Roseburg Connectivity:** Provide a new north/south connection between Troost St and Garden Valley Blvd.
R16p	**Cloake St to Charter Oaks Dr:** Connect Cloake St to Charter Oaks Dr (after Charter Oaks/Harvard Ave bridge).
R17	**Stewart Pkwy Phase 2:** This project would construct the final phase of the Stewart Pkwy Improvements (multimodal facilities and new structure).
UR4	**Patterson Street:** Provide multi-modal improvements that will provide an enhanced travel connection between Diamond Lake Blvd and Douglas Ave.
UR5	**Fleser Connection:** Provide local participation in a project to provide a connection between Diamond Lake Blvd and Fleser St as outlined in the Diamond Lake Access Management Plan.
UR7	**Fulton to Rocky Participation:** To participate in widening and multi-modal improvements to connect Rocky Dr and Fulton St in conjunction with developers/property owners.

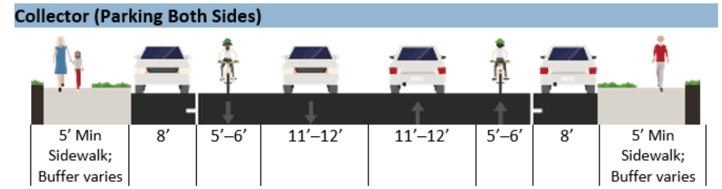
Typical Roadway Cross-Section Guidelines

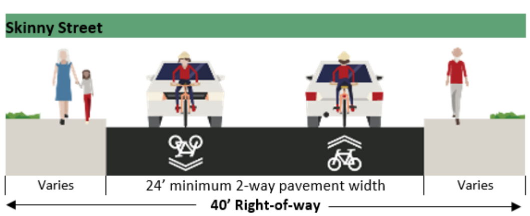
- Apply to new and reconstructed roadways
- Cross-sections provide flexibility within the right-of-way
- Provides minimum requirements (widths) in order to serve a multi-modal system
- Arterial and collectors must provide sidewalk and bicycle lanes

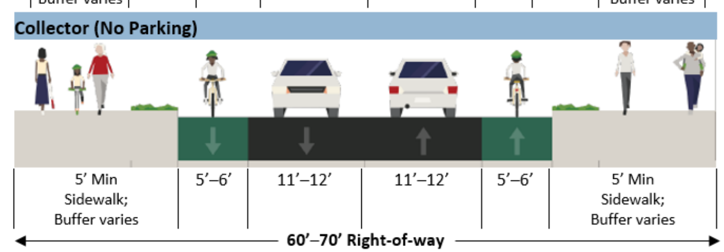












Other Travel Modes

- **Air Transportation**
  - The Roseburg Regional Airport (designated airport code of RBG) is owned and operated by the City of Roseburg (no commercial flights)
  - Nearest commercial service airports to RBG are the Eugene Airport and the Rogue Valley International – Medford Airport
  - 2018 Airport Master Plan outlines details of the airport conditions and future goals
- **Rail Transportation**
  - One railroad line passes through Roseburg: The Central Oregon and Pacific Railroad (CORP) is a short line railroad.
  - Currently, the railroad line is exclusively for freight, with 90% percent of its delivery consisting of forest products.
  - Projects identified in the TSP that may require coordination with Rail:
    - Mosher Ave Bicycle Improvements (Project BP 12)
- **Pipeline Transportation**
  - No changes planned
- **Water Transportation**
  - No changes planned

Next Steps

- Consider comments and public input
- Revise Draft TSP as needed
- Finalize TSP
- City adoption of TSP into Roseburg Comprehensive Plan

Project Management Team

Bi-Monthly Meetings

ROSEBURG TSP

PROJECT MANAGEMENT TEAM

MEETING #1 – APRIL 5, 2017

DRAFT MEETING AGENDA

1. Roll Call
   a. John Lazur, City of Roseburg
   b. Nikki Messenger, City of Roseburg
   c. Thomas Guevara, ODOT
   d. Shelly Alexander, DEA
   e. Angela Rogge, DEA

2. Debrief Goals/Objectives meeting (March 14)
   - No further conversations have been had, initial feedback was positive
   - Doug (Feldcamp?) - Freight representative was very quiet, need to look for opportunities to engage/hear from him
3. Submitted Deliverables (Draft TM 1, Final TM 1 Appendix A, TM 1 Appendix A comment log)
   - City met to discuss Draft TM 1 internal, decided not to send to PAC
   - Discussed City concerns for revised Draft TM 1 to send to PAC
     - DEA documented city comments and made edits
     - Summary of comments/Edits in email from Angela (also attached)
     - Revised Draft TM 1 sent to City, 4/7/17 for distribution to PAC
   - Tom has comments and will send to John (not necessary for PAC revision, but need to be incorporated into final)
   - Draft TM 1 sent to PAC 4/10
   - **Action item: John to send consolidated, non-conflicting comments (City, ODOT, PAC) to DEA by 4/17**
4. Upcoming Deliverables (Final TM 1, TM 1 comment log, Draft TM 2)
   - Draft TM 2 data needs
     - DEA sent Nikki a list of prioritized data formats in-lieu of GIS data (Nikki is out, returning 4/17)
     - **Action item: DEA to send Tom a list of data needs from ODOT**
     - Nikki noted the ADA Transition plan work currently underway and Airport Master Plan work on the horizon
5. Schedule
   - DEA sent current schedule to City for review

- Summary – we are ~4month behind where we thought we'd be at this time when the schedule was prepared

6. Other (area project coordination: City meetings, ODOT meetings, planning studies, design work)

7. Adjourn

ROSEBURG TSP

PROJECT MANAGEMENT TEAM

MEETING #2 – JUNE 7, 2017

DRAFT MEETING AGENDA

1. Roll Call
   - John Lazur
   - Thomas Guevara
   - Angela Rogge
   - Shelly Alexander

2. Submitted Deliverables (Draft TM 2 for PAC: Existing Inventory)

   a. Draft TM 2: City status of additional figure updates (AARO-end of June)

   -Noriko is on-track to get the figure updates; **John will double check on status and get back to us**. Bike/Ped top priority, others will be best available

   -PAC-Dick Dolgonas (excited about Blue Zones presentation), Denny Austin (will submit comments)

   a. Comment log format (TM 2 and remainder of project)

      ODOT- 2 types: 1. text edits to City, 2. research(significant changes) to City maybe in excel

      John - more familiar with Word (track changes); excel provides transparency for public; will transpose PAC comments into excel

3. Upcoming Deliverables (Draft TM 3, Appendix A: Current Transportation System Operation Analysis)

   -Review of volume development and operational analysis (V/C, LOS)

   -Douglas County contact for TM3, Appendix A: use PAC member contact Josh Heacock (sp?); DougCo Planning Dept-Josh Shackly (sp?) (manager)---John Lazur to forward both emails to DEA

4. Schedule (amendment for time extension, schedule update)

   Tom: timeline extension - 1 year + schedule update; funding memo

   DEA prep a draft SOW amendment (time extension, sample language to modify Task 7 for funding forecast, supporting BOC)

   DEA to do schedule update assuming time extension (simultaneous with amendment and send to Tom)

   DEA to draft amendment and send to Tom

5. Funding Forecast memo needed by Task 7: Concept Evaluation (not currently in scope, who prepares?)
   John to talk to Nikki to assess capacity to do the Funding Forecast and get back to PMT - within week (~6/14)
   *Ex. - SDCs, Urban Renewal, LIDs, developer exactions
   *Tier 1 funding: address deficiencies, if out of money look at Alt Mobility stds; Tier 2 (not deficiency, only desire)
   *Options: New Urban Renewal district in different part of City
   ***If DEA does work, just a summary of existing TSP info from City (1-2 pages), no identification of new sources or substantial work

6. Other (area project coordination: City meetings, ODOT meetings, planning studies, design work)
   1. Code assistance grant (TGM) development overlay Pine Street - City
   2. I-5 Corridor Plan (still in negotiations) - ODOT
   3. Stevens/Diamond Lake intersection operations; Stewart Parkway/Edenbower intersection (Construction now/soon-may need to consider for future no-build) --- Council presentation re: business impacts to road improvements

      Planning Commissioner resigned (*new person will be on PAC*); Marisa to replace Jeff was suggested-but Dick notified that he'll need to step up

7. Adjourn

ROSEBURG TSP

PROJECT MANAGEMENT TEAM

MEETING #3 – JULY 27, 2017

DRAFT MEETING AGENDA

1. Roll Call

    a. John Lazur
    b. Nicki Messenger
    c. Stu Cowie
    d. Thomas Guevara
    e. Angela Rogge
    f. Shelly Alexander

2. Amendment and Schedule
    a. Amendment:
        i. Time extension: June 28, 2018

Tom mentioned that ODOT could extend to 24-months total (2 months beyond the June 28, 2018 date originally discussed) – City is reviewing the remaining tasks to look for consolidation opportunities and assess comfort. City will get back to DEA next week (by 8/2/17)

Amendment needs to be in to ODOT by end of August 2017 for processing to minimize impacts to schedule.

        ii. Task 6 (per June call): Added Funding Forecast memo (prepared by City), provided to DEA for inclusion in TM #4 Future Baseline Conditions

Noted. No further discussion.

    b. Schedule:
        i. Currently 6 months behind, only extended 4 months (June 28, 2018) - will require prompt responses by PMT and PAC to hit this date

See summary above (2a)

        ii. Future conditions travel demand model is critical path (~ETA August 2017)

- Note from TPAU that the model request is being processed now. Hope to have output for post-processing by mid-August.

    iii. Do we need Contingency tasks? If so, we need to expedite TSP project to aim for a March 2018 completion date to allow time for contingency task work before June 28, 2018

3. See summary above (2a)
4. Adjourn

ROSEBURG TSP

PROJECT MANAGEMENT TEAM

MEETING #4 – OCTOBER 4, 2017

DRAFT MEETING AGENDA

1) Roll Call

   a) John Lazur
   b) Thomas Guevara
   c) Angela Rogge
   d) Shelly Alexander

2) Quick Updates
   a) Contract amendment was submitted to ODOT – Status update from Tom

Currently in process

   b) TM 3 PMT Comment log:
      i) Potential countermeasures will now be introduced in TM 5 (Concept Evaluation)
      ii) Operations table added to memo per TPAU request – can remove if PAC wants

Noted.

3) Schedule
   a) Please refer to revised schedule sent (8/29, also attached)
   b) Submitted for PAC review
      i) TM 3 (Current Transportation System Operations, all modes) and
      ii) TM 3, Appendix A (Current Transportation System Operations, vehicular operations)

Schedule is critical moving forward: PAC comments due to John Monday 10/9, please have comments back to DEA by 10/13 (end of week).

   c) In progress
      i) TM 4, Appendix A (Future Baseline - No Build, vehicular operations) – received supplemental model information from TPAU late last week
      ii) TM 4 (Future Baseline - No Build, all modes) – need to confirm projects from CIP that should be included

Schedule is critical moving forward:

- DEA is working with additional information provided by TPAU (last week) for the 2040 volume forecasts.
- TM 4 and TM 4, Appendix A should still be out to PAC well in advance of the 11/28-12/7 PAC/Open House meeting date (not much flex time)
- DEA to talk to Nikki regarding roadway improvements to include in the traffic analysis (e.g., Stewart Parkway/Edenbower (revised project description, restricted access an issue-City redesigning to add a U-turn); DEA to talk to Nikki

d. **Confirm and schedule meeting dates**:

-John to send a doodle to Thomas and PAC to establish meeting date (same day for both meetings)

-DEA to send out conf call invite to discuss concepts ~3 weeks prior to meeting date

iii) **PAC** (2 hrs + 1/2 hr feedback on concepts not supported)

(1) Agenda (due 2 weeks prior to PAC meeting)

(2) Project Materials (**schedule conference call** with PMT ~3 weeks prior to PAC meeting to review high-level concepts to become part of the agenda)

iv) **Open House** (3 hrs)

(1) Agenda (due 2 weeks prior to PAC meeting)

(2) Project Materials (same as PAC)

4) List of 2006 projects to carry forward and concept discussion

-John to talk to Nikki and send 2006 projects to DEA

5) Other business/project coordination

(Tom) Diamond Lake Blvd development new article: does this change the volume forecasting assumptions? If not included in current TSP, then City may need to do an amendment to the TSP is LU is significantly different from what is assumed.

1. City gives sample scenario for future forecast scenario (worst-case assumption).

2. Identify how much more development can occur before exceeding operational standards

3. (outside the box) ITE by parcel/trip cap approach

---John to discuss internally with City staff

---Shelly and Angela to discuss how DEA can support City and discuss options with John; DEA will continue with the TM 4 work for Future Baseline - No Build, all modes

6) Adjourn

ROSEBURG TSP

PROJECT MANAGEMENT TEAM

MEETING #5 – DECEMBER 11, 2017

DRAFT MEETING AGENDA

1. Roll Call

2. Updates
    a. Contract amendment was submitted to ODOT – Status update from Tom
    b. Additional comments regarding PAC #2 and/or Open House - All

3. Schedule
    a. Submitted for PAC review
        i. TM 4 (Future Transportation System Operations, all modes) and
        ii. TM 4, Appendix A (Future Transportation System Operations, vehicular operations)
        iii. Comments? (PAC, PMT follow up)
    b. In progress
        i. TM 5 and TM 5, Appendix A (Concept Evaluation)
            1. Project ideas that we'd like to consider for the concept evaluation task
            2. City to provide DEA with Bike/Ped project list and CIP project list in strikeout form (from TM1, Appendix A – started 12/7 in City office)
            3. Analysis (locations, timeline discussion)
    c. Confirm and schedule meeting dates:
        i. PMT availability in December/first week of January
4. Adjourn

ROSEBURG TSP

PROJECT MANAGEMENT TEAM

MEETING #6 – FEBRUARY 7, 2018

DRAFT MEETING AGENDA

1. Roll Call

2. Updates
   a. 2nd Contract amendment underway for updated/additional traffic counts and schedule update
   b. Concept development task on hold while drafting 2nd amendment

3. Schedule
   a. Currently paused at beginning of Concept Evaluation (TM 5)
4. Adjourn

ROSEBURG TSP

PROJECT MANAGEMENT TEAM

MEETING #7 – JULY 3, 2018

DRAFT MEETING MINUTES

1. Roll Call

   a. John Lazur
   b. Nikki Messenger
   c. Thomas Guevara
   d. Angela Rogge
   e. Shelly Alexander

2. Updates
   a. We have NTP on the amendment to update/add 5 intersections
   b. Counts collected May 31, 2018, data summarized, drafting methodology memo

3. Schedule
   a. Aggressive, to get back on track
   b. Reviews are isolated to City/ODOT (PAC potentially engaged in Task C.6 – Prepare Redline Package for PAC Review)
      i. (Tom) PAC – no budget to address comments
      ii. Vacations (conflicts for review): lots of people in-out, can we consolidate TMs for a single review time?
      iii. Consolidate some of the TMs? (John)
         1. (Tom) submit all "track changes" in one package
         2. (DEA) to get volumes to TPAU for review, and run analysis, then send updated draft memos to PMT (7/30)
         3. (DEA) push final deliverables out 2-3 weeks (~late August)
         4. Give City and ODOT more review time (~2-3 weeks?), provide opportunity for City to review with the PAC
      iv. Update schedule (also review lines 67 and 69)
      v. URD approved at first reading
      vi. ODOT/City/County responsible for review/comment; PAC is for FYI (DEA provide a bullet summary)
   c. Main contract currently paused at beginning of Concept Evaluation (TM 5)
   d. Coordination with the I-5 Bottleneck Plan
      i. (Tom) – KO. Consultant finish future conditions in late Nov 2018

1. Can alternatives been presented to counsel jointly (TSP and Bottleneck)?
    a. Carry forward with 2/16/19 contract end date (no coordination time available with current contract end date)

ii. Add section to TSP talking about I-5 Bottleneck overlap projects

iii. Adopt I-5 Bottleneck “by reference”

4. Adjourn

ROSEBURG TSP

PROJECT MANAGEMENT TEAM

MEETING #8 –AUGUGST 6, 2018

DRAFT MEETING MINUTES

1. Roll Call

   a. John Lazur
   b. Stu Cowie
   c. Nikki Messenger
   d. Thomas Guevara
   e. Angela Rogge
   f. Shelly Alexander

2. Updates
   a. City/ODOT reconvened the PAC in late August (28), will give PAC opportunity to provide comments on the draft concepts during review of Draft TM 5A and Draft TM 5 (no additional email to solicit early ideas for inclusion prior to the reviews)

3. Schedule
   a. Spoke multiple times this week (intersection operations, corridor opportunities, multimodal and safety
      i. Reviewed intersection list, DEA prepared more detailed project descriptions and sent on to IE for cost opinions
      ii. City reviewing multimodal and safety list (removing, consolidating) and will send back to DEA by 9/7
      iii. DEA started defining the B/P Plan "Refinement Plan" projects (3) and is looking for additional training connection opportunities
      iv. DEA coordinated with Cheryl at UTrans and received her draft project list for review/inclusion in the TSP
   b. DEA drafting TM 5A, waiting on City comments for Draft TM 5

4. Adjourn

ROSEBURG TSP

PROJECT MANAGEMENT TEAM

MEETING #9 – NOVEMBER 6, 2018

DRAFT MEETING AGENDA

1. Roll Call
   John Lazur, Stu, Nikki, Tom, Angela, Shelly
2. Updates
   a. PAC meeting status (schedule line 62)
      i. Haven't scheduled yet. May want some removed before PAC presentation. May want to add concepts. Will know more after the internal City meeting.
   b. Draft TM 5/5A comments to DEA (see schedule below, will need to discuss update options)
      i. City to put comments together and send, then assess a duration for a follow up call
      ii. City getting together to discuss internally 11/7. Comments to DEA 11/9.
      iii. Can't eliminate, but can explain why we are dismissing them from TM5 and justify with a sentence or two. City has flexibility with new concepts (not from existing plan)
   c. Other coordination/area projects or work?
      i. Code/Ordinance – will need to postpone
      ii. Change line 72 to draft TM 6 (with final TM5)
      iii. Final TM 5 to Draft TM 6
      iv. Draft TM 6 to Final TM 6 (~Jan 2019), prior to Draft TSP
      v. <u>Area projects:</u> new bridge for Stewart Park Drive by Fir Oak (?) school, is this included in the TSP to improve/fix
      vi. <u>Can DEA include bridge projects? Corridors? Aspirational?</u> Yes, if City sends list DEA can add; Stewart Pkwy corridor (systemic) projects are missing (?) DEA should capture widening/where does that come in? Aspirational list?
      vii. <u>HB 2017 bridge reporting for consideration…</u>
         1. Nikki pointed out gap in approach documentation (bridge/corridor): These extra projects are included in the original project list that was narrowed down/prioritized by City to 30 MM, 15 operational based on? Projects that were "not a priority" should still be captured as Aspirational/listed (no cost, operational analysis, in-depth assessment). No Preferred Alt memo

3. Schedule (please have a copy for our discussion)

15	**Project Advisory Committee Meeting #1**	Wed 12/6/17	Wed 12/6/17	1 day	
16	**Project Advisory Committee Meeting #2**	Wed 11/28/18	Wed 11/28/18	1 day	70
17	**Project Advisory Committee Meeting #3**	Wed 1/30/19	Wed 1/30/19	1 day	77
18	Public Meeting #1	Wed 12/6/17	Wed 12/6/17	1 day	
19	Public Meeting #2	Wed 1/30/19	Wed 1/30/19	1 day	77
20	Draft Policy Review -TM #1	Fri 10/21/16	Fri 10/21/16	1 day?	

55	6.13 Amended Final TM#4 (Future)	Tue 7/31/18	Mon 8/20/18	15 days	53
56	City/ODOT PAC Meeting - solicit feedback for Draft TM5	Wed 8/22/18	Tue 8/28/18	5 days	
57	**Draft TM #5**	**Tue 8/21/18**	**Tue 10/23/18**	**46 days**	
58	Prepare Draft TM #5, Appendix A	Tue 8/21/18	Tue 9/18/18	21 days	55
59	Review Draft TM #5, Appendix A (ODOT/CITY/PAC)	Wed 9/19/18	Tue 10/9/18	15 days	58
60	Prepare Draft TM #5	Tue 8/21/18	Tue 9/25/18	26 days	55
61	Review Draft TM #5 (ODOT/CITY/PAC)	Wed 9/26/18	Tue 10/16/18	15 days	60
62	City/ODOT PAC meeting - feedback for alternatives to feed into Final TM5	Wed 10/17/18	Tue 10/23/18	5 days	61
63	**Final TM #5**	**Wed 10/10/18**	**Tue 11/6/18**	**20 days**	
64	Prepare Final #5, Appendix A	Wed 10/10/18	Tue 11/6/18	20 days	59
65	TM #5, Appendix A Comment Log	Wed 10/10/18	Tue 11/6/18	20 days	59
66	Prepare Final #5	Wed 10/17/18	Tue 11/6/18	15 days	61
67	TM #5 Comment Log	Wed 10/17/18	Tue 11/6/18	15 days	61
68	**Draft TM #6**	**Wed 10/10/18**	**Tue 12/4/18**	**40 days**	
69	Draft Implementing Ordinances and Code Changes	Wed 10/10/18	Tue 11/6/18	20 days	59
70	Review Draft TM #6 (ODOT/CITY/PAC)	Wed 11/7/18	Tue 11/27/18	15 days	69
71	Respond to PMT Comments	Wed 11/28/18	Tue 12/4/18	5 days	70
72	**Final TM #6**	**Wed 12/5/18**	**Tue 12/18/18**	**10 days**	
73	Comment Log for Draft Ordinances and Code Changes Memorandum	Wed 12/5/18	Tue 12/18/18	10 days	71
74	Final Implementing Ordinances and Code Changes	Wed 12/5/18	Tue 12/18/18	10 days	71
75	**Draft TSP**	**Wed 11/7/18**	**Thu 2/7/19**	**67 days**	
76	Draft TSP	Wed 11/7/18	Tue 1/8/19	45 days	65
77	Review Draft TSP (ODOT/CITY/PAC)	Wed 1/9/19	Tue 1/29/19	15 days	76
78	Respond to PMT Comments	Wed 1/30/19	Thu 2/7/19	7 days	77
79	City/ODOT worksession with Planning Commission and Council	Wed 1/9/19	Mon 1/14/19	4 days	76

4. Adjourn

ROSEBURG TSP

PROJECT MANAGEMENT TEAM

MEETING #10 – FEBRUARY 14, 2019

DRAFT MEETING AGENDA

1. Roll Call

   Tom Guevara, Angela, Shelly, Darci, John, Stu, and Niki

2. PAC meeting –general impressions/take-aways
   a. Stu: City pleased with meeting progress (questions and presentation)
   b. John: 7 or 8 PAC members have already commented (types of comments: ranking projects, commenting on project definitions (add cross walk here), throughout measurements (ADT, speed, V/C).
   c. Niki: not much to add at this time
   d. Tom: submitted comments to City, ODOT/City will discuss prior to submitting to DEA
      i. Traffic, Access Management, TPAU, Bridge, Planning, traffic manager, transit, Project leader, environmental
   e. Angela: quiet PAC group, good questions, PAC education is needed (e.g., Sharrows description-what, when used), aspirational list will be included in TSP – e.g. bridge across the Umpqua, not a lot of detail
   f. **Remove or add concepts:**
   g. How to respond to comments -
   h. General comments:
      i. Projects may be too specific – but solution isn't really acceptable (don't know what other option may be, e.g. BP projects Diamond Lake bike lane / Garden Valley (don't want to remove center turn lane for bike lane space, sharrows, Douglas)
      ii. Garden Valley/Stewart – no strong support (dual left turns)
      iii. Tom –Stewart Parkway (alternative mobility standards?); max out at-grade or go grade separated (or parallel routes with funding issues too)
         1. **Contract** – Operational analysis for # of intersections (new or reanalyze existing measures)
         2. **Bike/Ped** - don't require model updates, City can recommend for inclusion
         3. Make current system bigger or distribute to parallel routes (TSM/TDM)

   Timeline 2/15 PAC comments due, City/ODOT consolidate and discuss 2/22, City will respond to ODOT comments -> ODOT revises and send back City, then City to DEA, reconvene to talk about comments

3. ~~Preferred Concept status~~

4. ~~APG questions to dive into policy/code work~~

5. Schedule

   a. Contract until 10/31/19

b. Comments to DEA late February, update schedule once received (propose updating dates from when PAC comments were anticipated in Nov/Dec to Feb/Mar, once DEA has received them
c. Darci – TPR audit of code, schedule wise mid-March will work well
d. Requests next bi-monthly meeting includes discuss code/policy work, deliverable format, etc.

6. Updates

7. Adjourn

City of Roseburg
Transportation System Plan Update

Technical Memorandum #2
(Task 4.2 – Transportation System Inventory)

Prepared for

City of Roseburg
900 SE Douglas Avenue
Roseburg, Oregon

Prepared by

David Evans and Associates, Inc.
2100 SW River Parkway
Portland, Oregon

July 2017

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Table of Contents

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Appendices

Overview

This memorandum updates the existing transportation system inventory provided in the City of Roseburg's current *2006 Transportation System Plan* (TSP). This memorandum provides an inventory. The information summarized in this memorandum is intended to provide a basis for informing and identifying opportunities and constraints of the current transportation system.

This inventory includes the following sections:

Existing Land Use and Population Inventory	Existing Transportation System	Natural Resources
• Land Use • Demographics	• Roadway Network • Bicycle and Pedestrian • Transit • Air, Water, Rail and Pipeline	• Environmental Resources • Hazards • Historic Resources

Existing Land Use and Population Inventory

This section provides a description of the existing land use patterns and zoning regulations that currently exist within the Urban Growth Boundary (UGB). Land use is a key factor in developing a functional transportation system; the amount of land planned for development, the types of land uses, and how they relate to each other have a direct relationship to the anticipated demands on the transportation system. Similarly, the makeup of the population influences the types of facilities and programs needed to move the residents and visitors within the community.

Existing Land Use

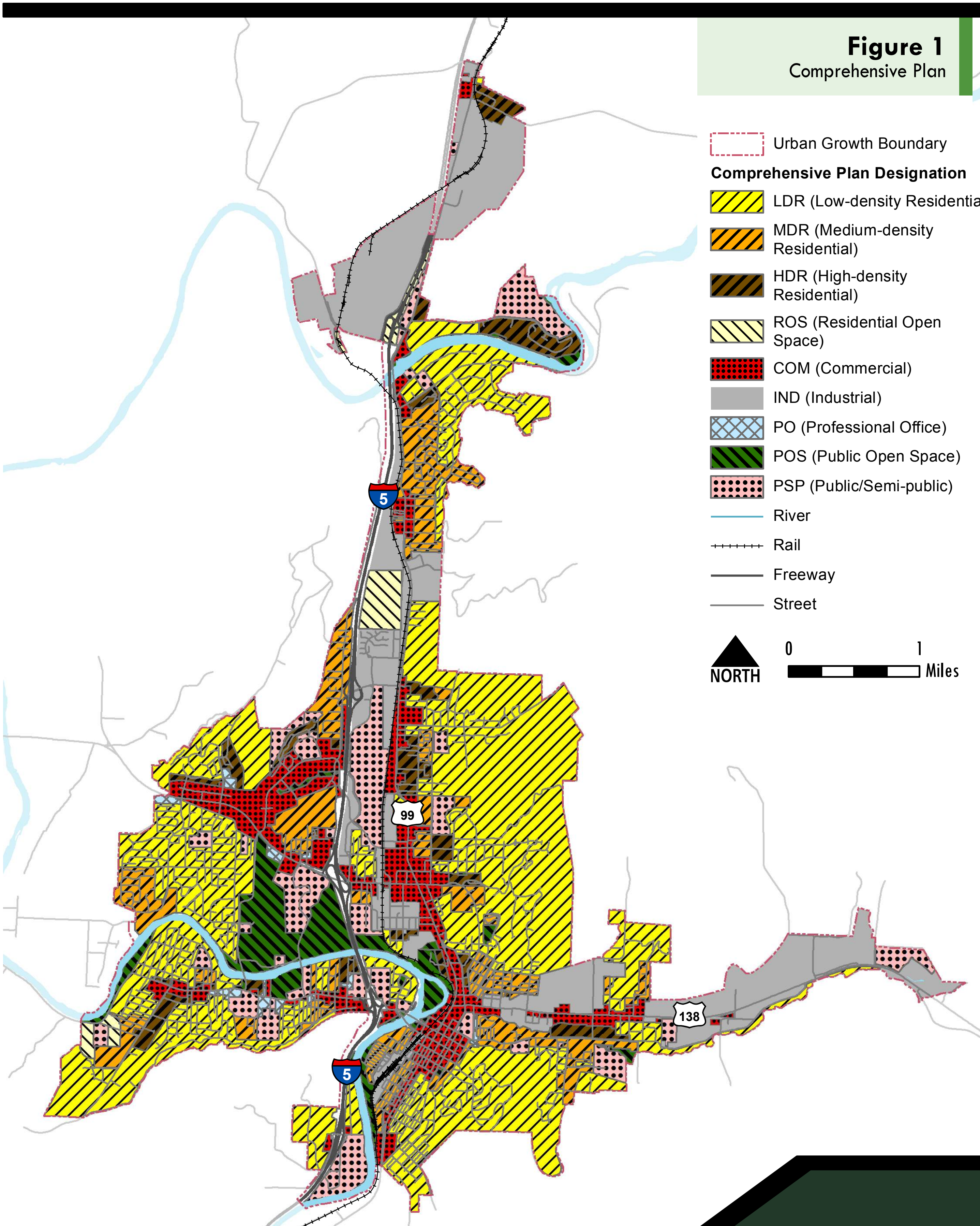
Land use regulations are implemented through the City's Land Use and Development Ordinance (LUDO). The following is a summary of the existing land uses in the city and the associated requirements that govern development and redevelopment. This overview is intended to provide an indication of the type and intensity of land uses that can be expected within the planning horizon in order to determine future traffic generation.

Comprehensive Plan and Zoning Designations

The Comprehensive Plan provides a long-term guide for where and how future development will occur. Figure 1 shows the Comprehensive Plan land use designations. There are nine designations, including residential, industrial, commercial, and public and park space designations (see Figure 2).

Segregated, low-density land uses tend to limit transportation choices by separating trip origins and destinations and increasing average trip lengths. This makes walking and bicycling less convenient, which could in turn result in more single occupancy vehicles traveling the system and inefficiencies in freight movement. Alternatively, mixed-land uses at higher densities tend to bring a larger number of origins and destinations close together, thereby shortening average trip lengths and making walking, biking, and transit feasible for a larger number of trips.

Figure 1
Comprehensive Plan



Within the city limits, land uses adjacent to Arterials and Collectors are generally automobile-oriented in nature, and include mostly industrial and commercial uses. Beyond the commercial areas, the designated land uses change to residential. Since the residential areas are segregated from the commercial areas, walking and bicycling to these locations becomes less convenient. Encouraging a diversified and connected transportation system allows for more efficient travel through the system for all modes. If travelers do not have to use their personal vehicle to reach their destination, then the roadway network can more efficiently serve those that must use it.

FIGURE 2. COMPREHENSIVE PLAN DESIGNATION BREAKDOWN

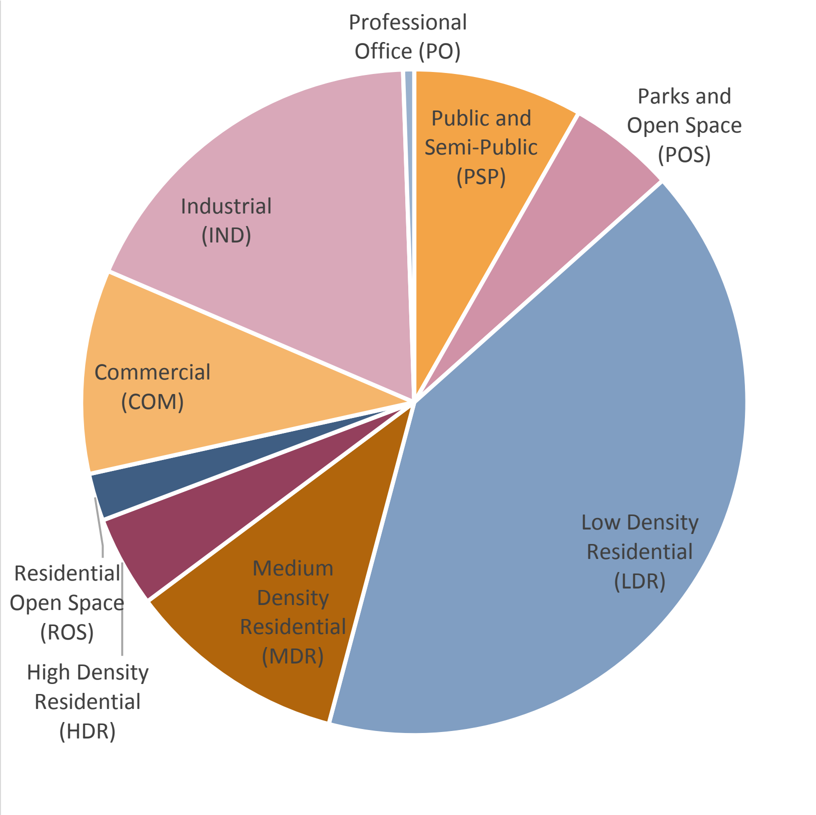


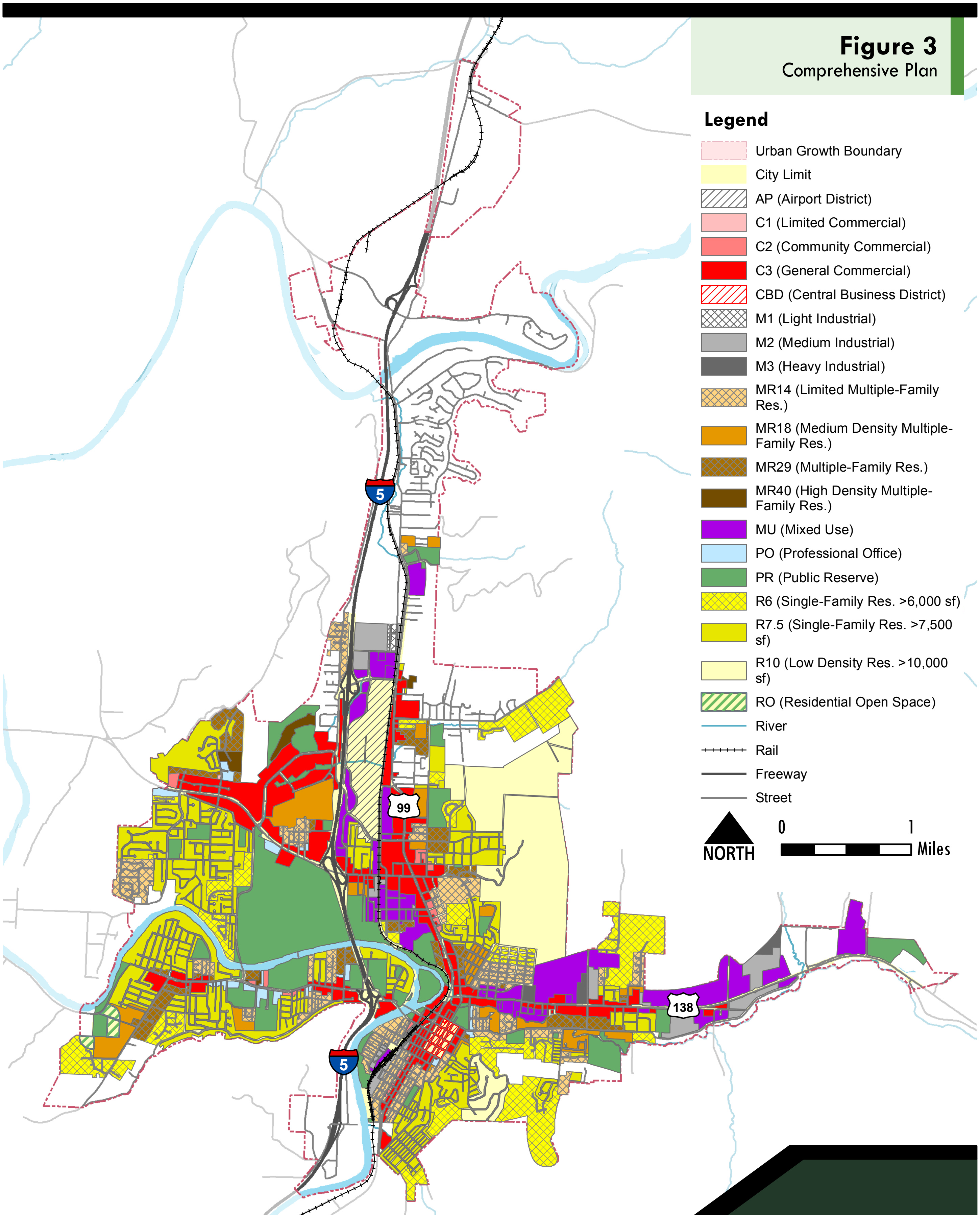
Figure 3 provides the location of zoning districts within the city limits. The City has 19 zones, including several commercial, industrial, and residential zoning districts. The City's UGB is larger than the city limits; there are large areas on the periphery of the current city limits that have Comprehensive Plan land use designations but that will not be zoned for urban uses until they are annexed.[1] The City's zoning is informed by the Comprehensive Plan designations and provides the allowed uses and associated development regulations consistent with the Comprehensive Plan. Zoning designations typically reflect existing land uses, but also reflect the types of uses the City would like to encourage in the future. Allowed uses and development regulations for each of the City's zones are provided for in the LUDO.

Connecting residents and workers to services they use on a daily basis can be accomplished by well-considered land use planning. Listed below are activity centers where the transportation network should support multi-modal and accessible public transportation. Key community features, activity centers and destinations within the City include:

- Schools (Elementary, Junior and Senior)
- Umpqua Community College
- Public Parks (e.g. Sunshine, Stewart Park and Fir Grove Park)
- Mercy Medical Center
- USFS Office
- BLM Office
- VA Medical Center
- Douglas County Fairgrounds
- Douglas County Library *(closed June 1, 2017)*
- Roseburg Airport
- Courthouse
- City Hall
- Historic Downtown Roseburg
- Garden Valley Shopping Center
- Roseburg Valley Mall
- UCAN
- State DHS
- YMCA

[1] Land inside the UGB, but outside city limits, will be considered to be developable to the greatest extent allowed, pursuant to the LUDO zoning district that could be applied to the unincorporated area once annexed.

Figure 3
Comprehensive Plan



Overlays

Roseburg includes six different overlay districts that may apply to any portion of an existing zoning district. Overlay districts provide regulations that are in addition to, or that modify, the base zone. Similar to how the zoning districts are organized, development regulations for each of the City's overlay districts are provided in the LUDO. A general description of Roseburg's overlay districts are presented in Table 1.

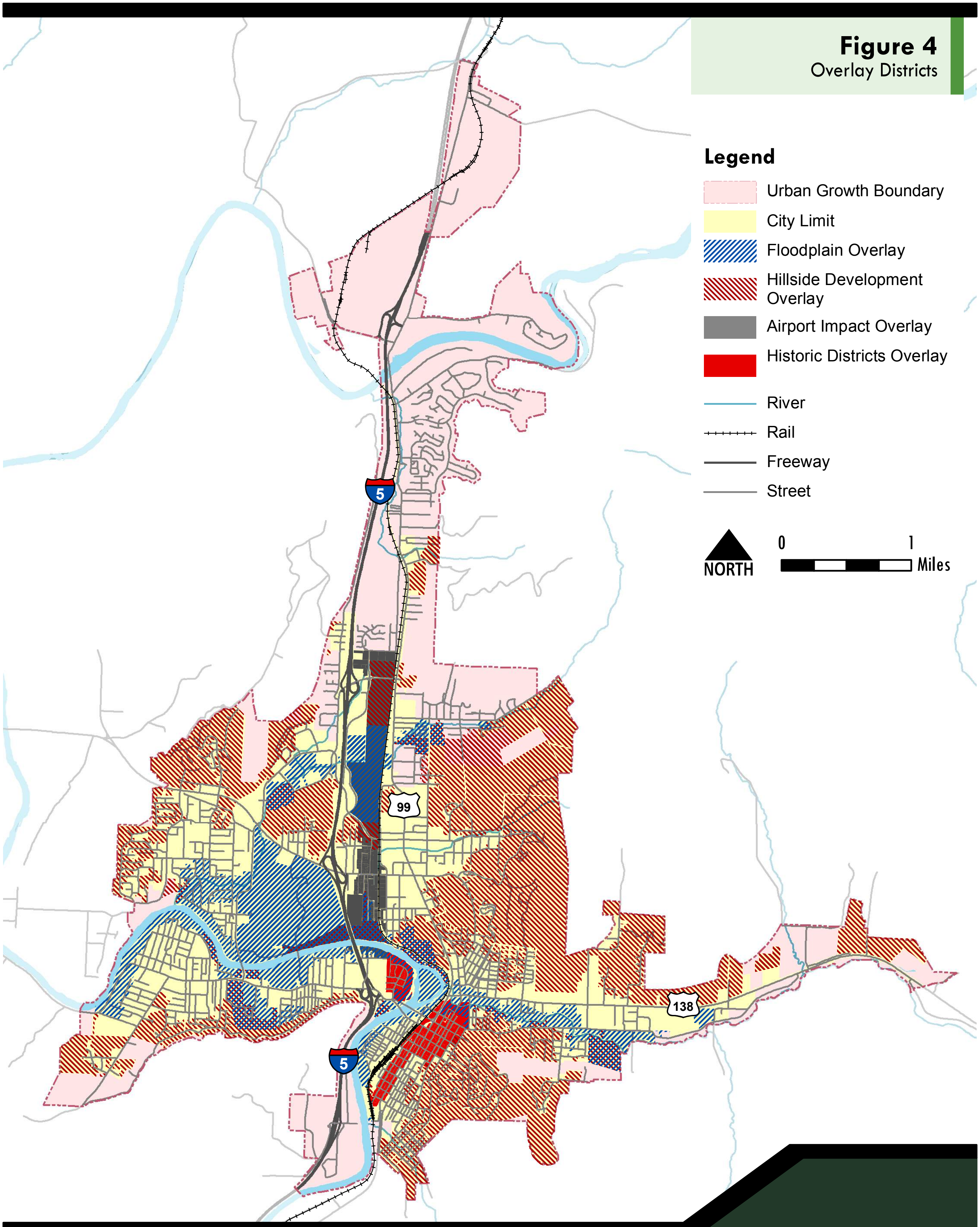
TABLE 1: OVERLAY DISTRICTS

Overlay District	Summary
Airport Impact Overlay	Protects the public health, safety, and welfare by assuring the development within areas impacted by airport operations is appropriately planned to mitigate the impact of such operations.
Floodplain Overlay	Assures that development in areas subject to periodic inundations as identified by FEMA is appropriately planned for and impacts are mitigated.
Hillside Development Overlay	Assures that development in areas susceptible to landslides and areas with slopes greater than 12% are planned for and impacts are mitigated.
Historic Districts Overlay	Provides standards designed to preserve, protect, maintain, and enhance historic resources.
West Avenue Residential Overlay	Implements the West Avenue Redevelopment Plan.
Riparian Habitat Overlay	Provides riparian habitat setbacks to provide riparian habitat protection to lands adjacent to the South and North Umpqua Rivers, Newton Creek and Deer Creek.

Figure 4 shows the locations of the mapped overlays in the city. Most of the city is subject to either Floodplain Overlay or Hillside Development Overlay regulations on a case-by-case basis. If appropriate, overlays will be applied upon annexation.[2] Transportation requirements are covered by the base zone regulations; specific transportation requirements within the Floodplain Overlay are limited to road elevation (in relation to mean sea level) and proper drainage for subdivisions, while the Hillside Development Overlay contains specific street design alternatives.[3]

[2] There are, for example, areas within the UGB but currently outside city limits that will be subject to either Floodplain Overlay or Hillside Development Overlay due to environmental conditions. See Figure 21: FEMA Flood Zone, Figure 18: Wetlands, and Figure 22: Environmental Hazards.

[3] Transportation-related regulations are found in the respective chapters of the LUDO; Floodplain Overlay (Section 2, Article 9) and Hillside Development Overlay (Section 2, Article 10).



City of Roseburg

Transportation System Plan

Development Potential

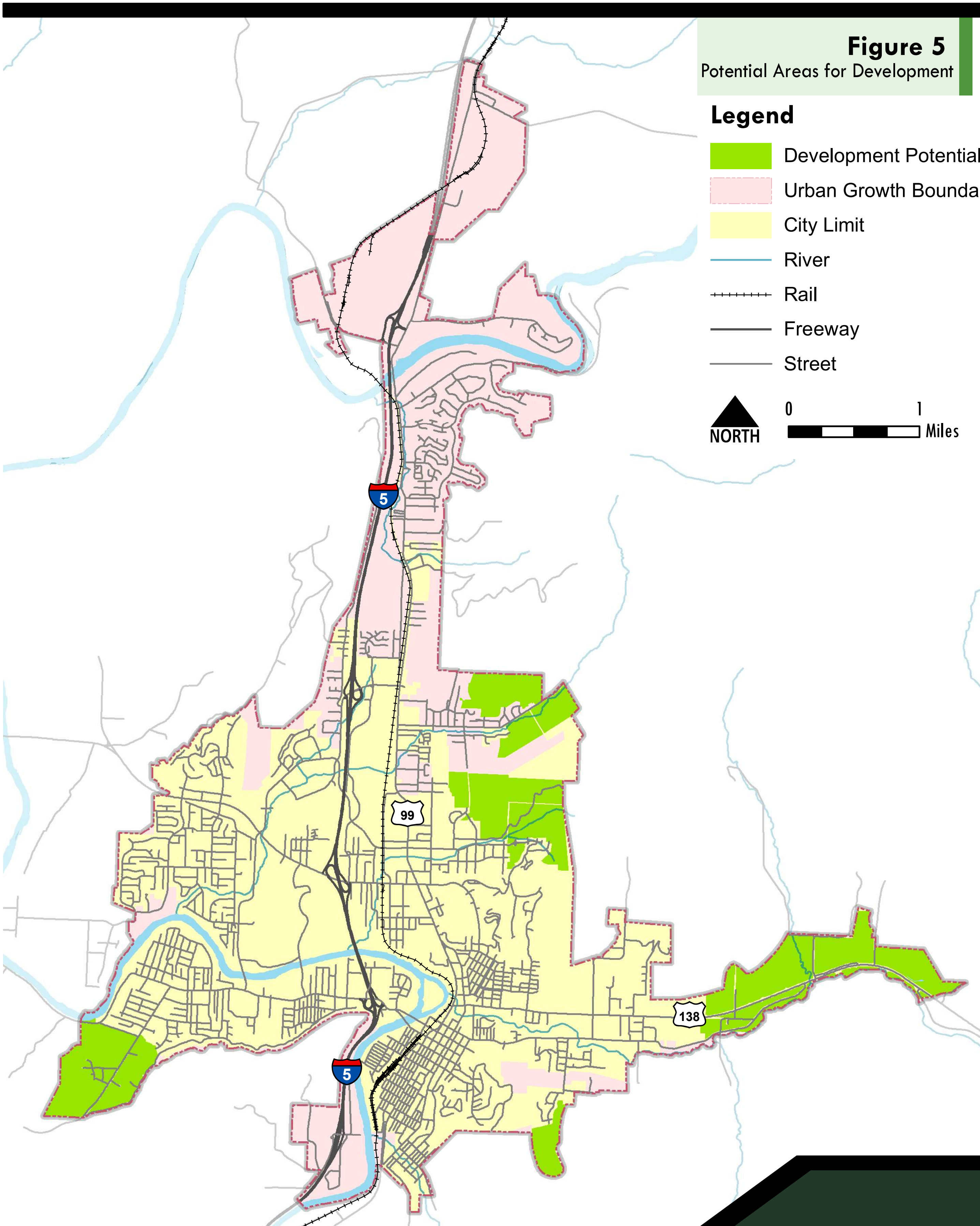
As part of the TSP process, it is important to identify "buildable lands", or areas for potential redevelopment. "Buildable lands" includes both vacant land and developed land likely to be redeveloped (ORS 197.295). A well-connected transportation network is integrated with surrounding land uses and provides safe, multimodal facilities between and within neighborhoods. Knowing where development is likely to occur can aide in planning a transportation network that adequately and efficiently serves the community.

Figure 5 shows areas within or near the Roseburg UGB that have development potential. There are no large concentrations of vacant parcels within city limits. There may be opportunities for potential for redevelopment in the central city, however there is most potential for development on both the east and western edges of the UGB. Most of the southern area of Roseburg is developed and is unlikely to see appreciable redevelopment within the TSP planning horizon.[4]

The *Heart of Roseburg Marketing Plan 2015* reviewed marketing strategies for the Historic Downtown, the Mill Pine District, the Stephen's Street Business Corridor, and the adjoining commercial and residential neighborhoods. The plan mentions the potential for second floor housing in Historic Downtown, but that the cost of redevelopment of some of the historic properties exceeded the potential returns.

[4] Interchange Area Management Plan, I-5 Exit 127, 2014.

Figure 5
Potential Areas for Development



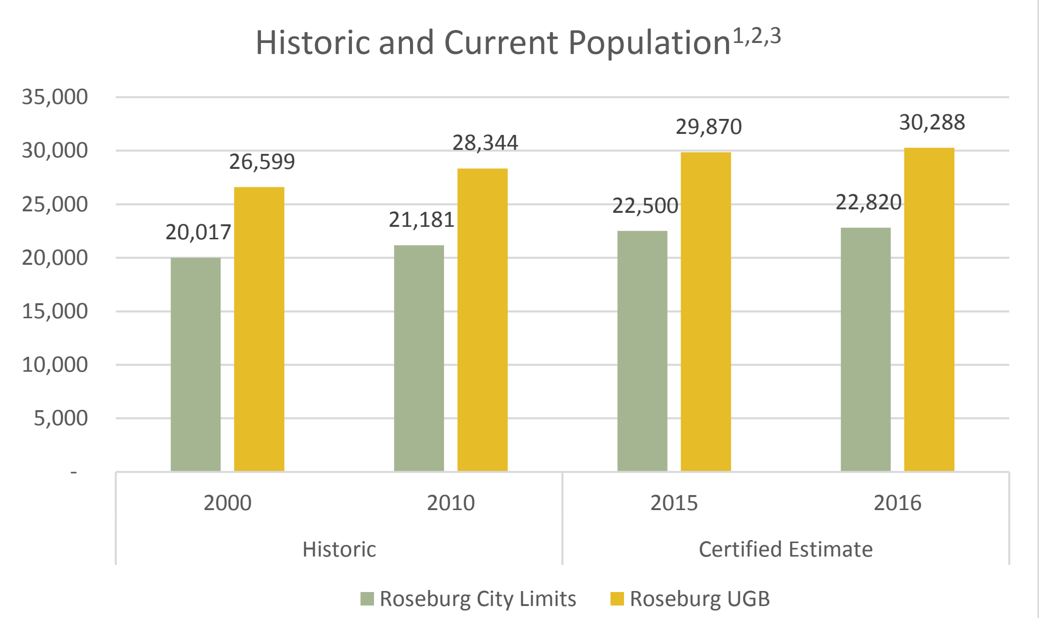
City of Roseburg
Transportation System Plan

Demographics

Knowing where Roseburg's population resides will help inform the projects and policies proposed in the TSP. Mapping the overall population density helps identify areas where targeted transportation system improvements would be most beneficial. For example, higher density areas would be desirable for transit, and areas with a high population of seniors and youth would benefit from improved multi-modal connectivity.

Population and Employment

The planning area includes all of the transportation facilities within the City's UGB. As seen in Exhibit 1, the most recent (2016) population estimate for Roseburg within the City limits was 22,820. Within the larger UGB area, the 2015 population estimate was 29,870. This represents a modest increase from the 2010 census data for the population in both the city limits and UGB.



1. U.S. Census Bureau, 2000 and 2010 Censuses
2. Roseburg Certified Population Estimates 2016, Portland State University Population Research Center, April 2017
3. Coordinated Population Forecast for Douglas County, its Urban Growth Boundaries (UGB), and Area Outside UGBs 2015-2065, Portland State University Population Research Center, June 2015

EXHIBIT 1. HISTORIC AND FORECAST POPULATION COMPARISON

According to Portland State University's population forecast for the area, Roseburg's population is expected to grow to 39,239 by the year 2035, and to 46,805 by the year 2065. This represents an average annual growth rate 1.4% over the next 20 years, and an average annual growth rate of 0.6% over the following 30 years. By comparison, the average annual growth rate for Douglas County is expected to be 0.9% (20-year rate) and 0.5% (30-year rate). Roseburg encompasses the County's largest urban area and is expected to capture the largest share of total countywide population growth during the 20-year forecast period.[5]

[5] Coordinated Population Forecast for Douglas County, its Urban Growth Boundaries (UGB), and Area Outside UGBs 2015-2065, Portland State University Population Research Center, June 2015

Employment

The Great Recession officially began in December of 2007, the year after the last TSP update. Douglas County's employment peaked in 2006 and hit bottom in 2012. Since then, businesses started adding jobs (2011-2016) but Douglas County has experienced a more subdued recovery than the rest of the state.[6]

See Exhibit 2 below for a summary of year 2016 employment estimates for Douglas County as determined by The State of Oregon Office of Economic Analysis.

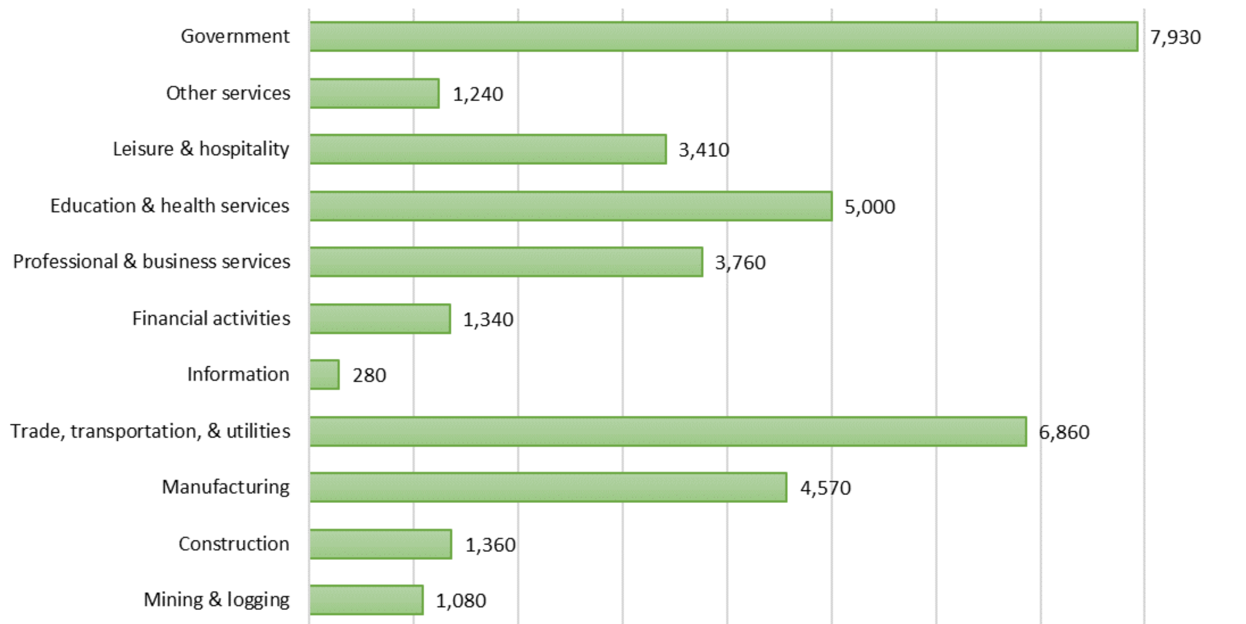


EXHIBIT 2. DOUGLAS COUNTY 2016 EMPLOYMENT ESTIMATES

Commute Patterns

Roseburg has its own unique transportation identity, although it is important to recognize its connection to the region; many people live in one community and work in another. Table 2 summarizes the year 2014 employment destinations for people who lived within the City Limits of Roseburg; 2014 is the most recent year of available data. The majority of Roseburg workers actually live outside of the city, further emphasizing the dependence on the transportation network to get from home to work.

TABLE 2. INFLOW/OUTFLOW JOB COUNTS, 2014

Condition	Count	Share
Living and employed in Roseburg UGB	4,706	28.5%
Commuting to Roseburg UGB from elsewhere	11,831	71.5%

Source: U.S. Census Bureau. 2016. OnTheMap Application. Longitudinal-Employer Household Dynamics Program. http://onthemap.ces.census.gov/

[6] https://www.qualityinfo.org/-/douglas-county-s-economy-the-last-10-years-2006-2016

Transportation-Disadvantaged Population

A community's transportation system should provide efficient and accessible transportation that serves the daily transportation needs of all its citizens. To achieve this goal, it is important to know where the transportation-disadvantaged communities are, and to accommodate these populations through improved multi-modal connectivity to community activity centers and key destinations.

Elderly and Youth Population

Age is a key factor in determining mode choice decisions. Roseburg's oldest residents are less likely to drive. Similarly, most of Roseburg's youngest population, those under 18 years old, are heavily dependent on active transportation modes such as walking, biking, and transit.

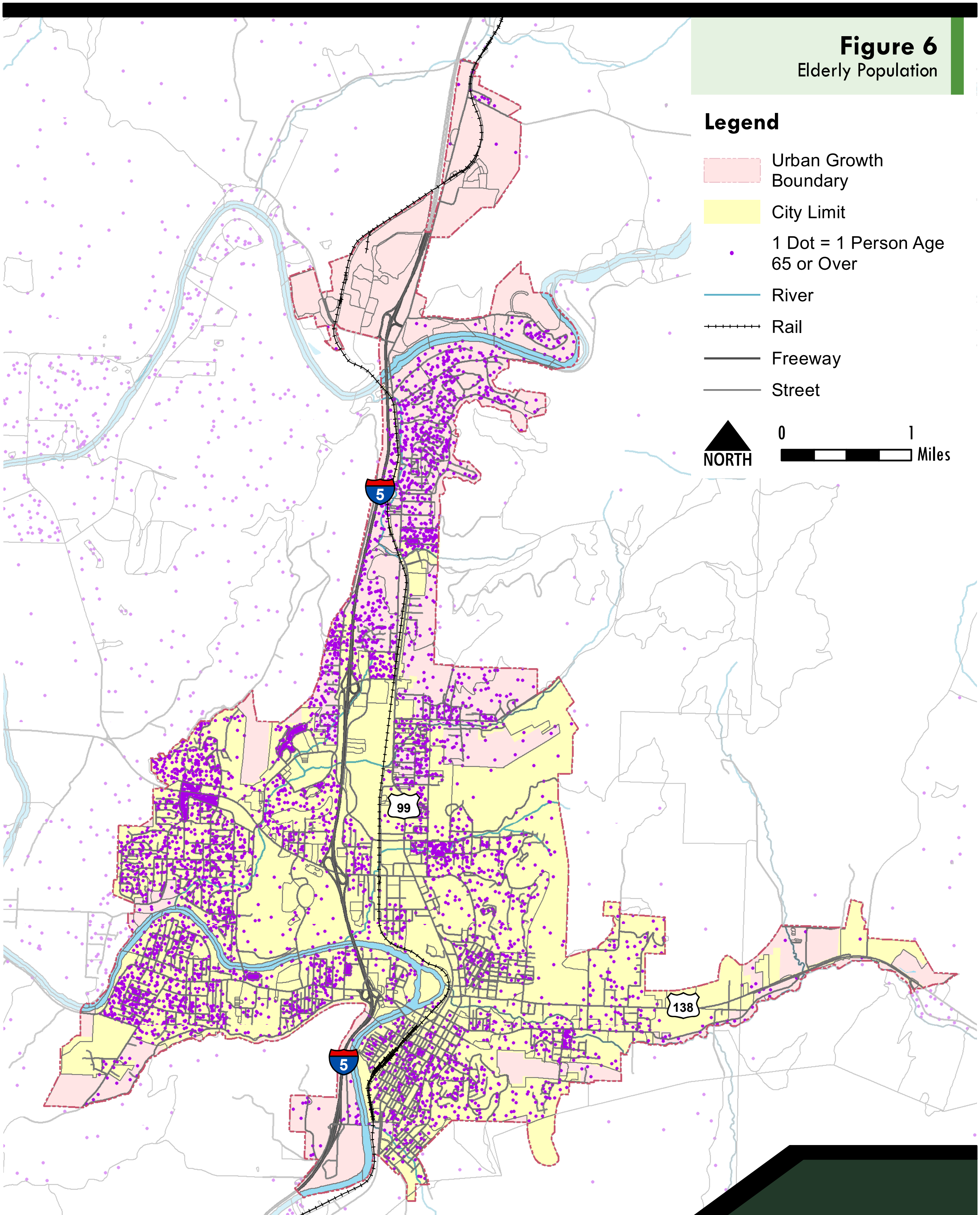
Like most areas in the state, Roseburg's population is aging. Table 3 compares Roseburg's age groups to Douglas County and Oregon. Approximately 19.1% of the City's population is 65 years or older, which is similar to the County as a whole (21.0%).[7] Roseburg has a relatively high proportion of people aged 65 and over compared to the rest of the state (13.9%). As shown in Figure 6, this population is generally dispersed throughout the City, with a few notable exceptions in western Roseburg near NW Garden Valley Boulevard, where a concentration is shown due to retirement and care facilities.

Approximately 21.7% of the City's population is under the age of 18.[8] The percent of population under the age of 18 is close to that of Douglas County (20.5%) and the state as a whole (22.6%). As shown in Figure 7, concentrations of areas with a high percentage of youth are spread throughout residential areas in the city.

TABLE 3: SUMMARY OF AGE GROUPS[9]

Age	Roseburg		Douglas County		Oregon	
Total Population	21,181		107,6678		3,831,074	
Under 18 Years	4,591	21.7%	22,094	20.5%	866,453	22.6%
18 to 64 Years	12,541	59.2%	63,003	58.5%	2,431,088	63.5%
65 Years and Over	4,049	19.1%	22,570	21.0%	533,533	13.9%
Median Age (Years)	41.1		46.1		38.4	

[7] Source: U.S. Census Bureau, 2010, 2010 Census Summary File 1, Tables P12, P13, and PCT12: Age Groups
[8] Ibid.
[9] Ibid.



City of Roseburg

Transportation System Plan

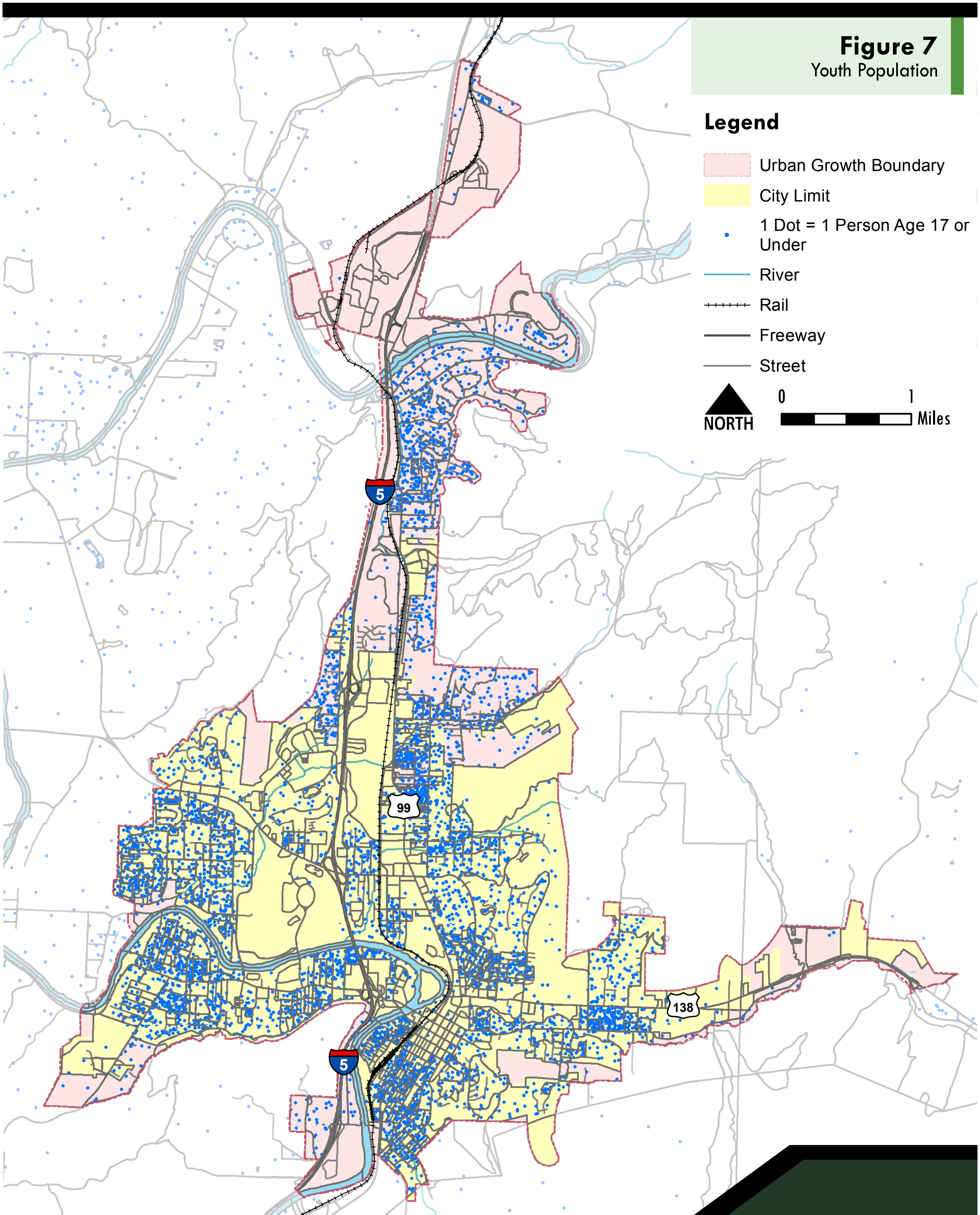


Figure 7
Youth Population
Legend
Urban Growth Boundary
City Limit
1 Dot = 1 Person Age 17 or Under
River
Rail
Freeway
Street
NORTH
0
1
Miles
5
99
138
5

Minority Population

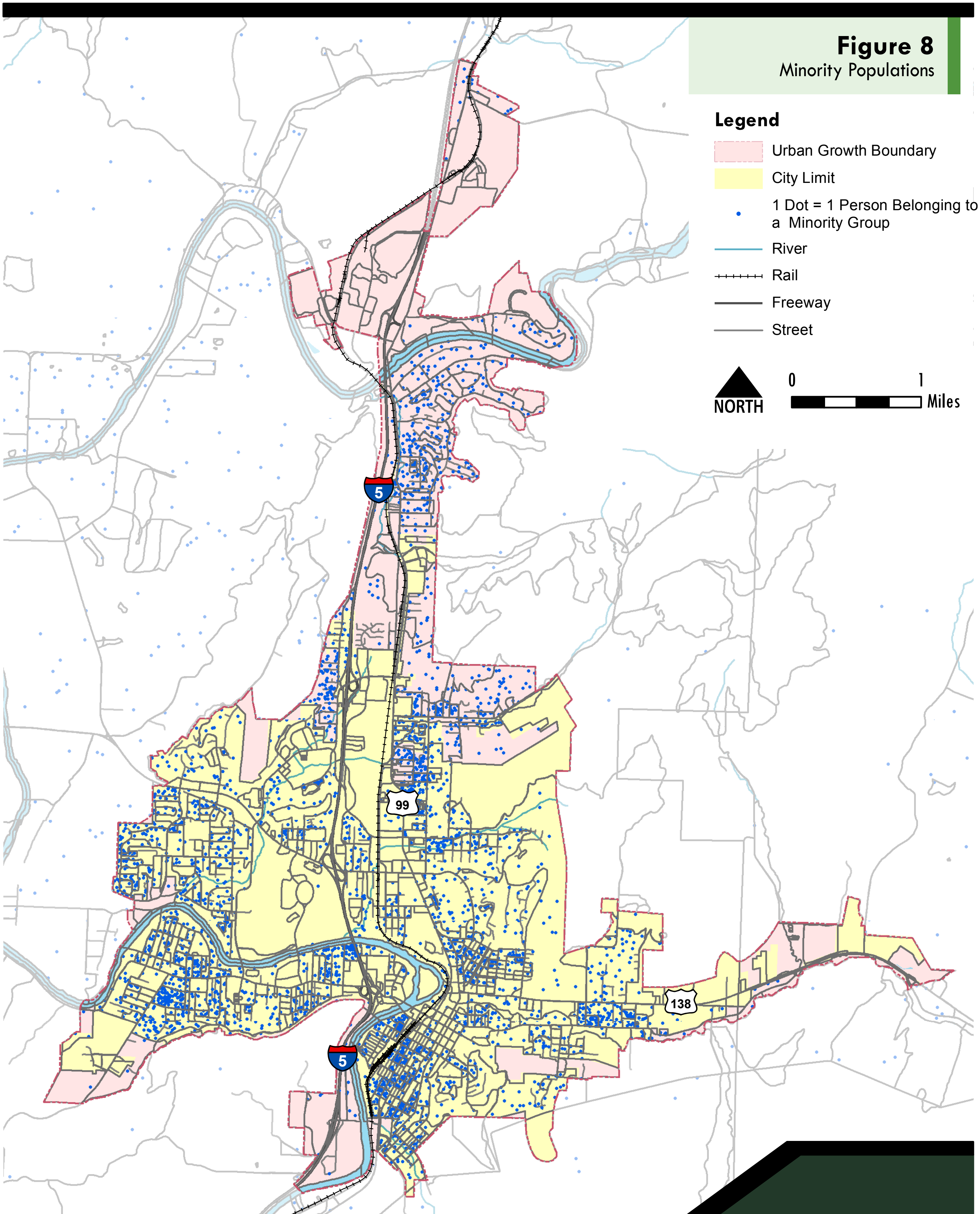
Roseburg is slightly more diverse than the County, but less so compared to the state. Approximately 22.3% of the City's population is either non-white and non-Hispanic/Latino or Hispanic/Latino of any race.[10] As shown in Table 4, the Hispanic/Latino population comprises the largest minority group, with approximately 5.5% of the population. The second largest minority population group, at 2.9% of the population, identifies as two or more races. Compared to the state, all minority groups are underrepresented in Roseburg, with the exception of American Indian and Alaskan Natives, which are slightly more represented as compared with the state as a whole.

TABLE 4: RACE AND ETHNICITY POPULATION[11]

Race and Ethnicity	Roseburg		Douglas County		Oregon	
Total:	**21,181**		**107,667**		**3,831,074**	
Hispanic or Latino	1,155	5.5%	5,055	4.7%	450,062	11.7%
Not Hispanic or Latino:	20,026	94.5%	102,612	95.3%	3,381,012	88.3%
White alone	18,578	87.7%	96,343	89.5%	3,005,848	78.5%
Black or African American alone	86	0.4%	279	0.3%	64,984	1.7%
American Indian and Alaska Native alone	341	1.6%	1,799	1.7%	42,706	1.1%
Asian alone	334	1.6%	1,008	0.9%	139,436	3.6%
Native Hawaiian and Other Pacific Islander alone	46	0.2%	110	0.1%	12,697	0.3%
Some Other Race alone	27	0.1%	154	0.1%	5,502	0.1%
Two or More Races:	614	2.9%	2,919	2.7%	109,839	2.9%

[10] Source: U.S. Census Bureau, 2010, 2010 Census Summary File 1, P9: Hispanic or Latino, and Not Hispanic or Latino by Race
[11] Ibid.

Figure 8
Minority Populations



City of Roseburg

Transportation System Plan

Low-income Population

Vehicle ownership has a strong impact on mode choice, and lower income residents are less likely to own one or more vehicles. A larger population of low-income residents is more likely to be reliant on non-automotive forms of transportation.

The Census Bureau uses a set of money income thresholds that vary by family size and composition to determine who is in poverty. If a family's total income is less than the family's threshold, then that family and every individual in it is considered in poverty. The official poverty thresholds do not vary geographically, but they are updated for inflation using the Consumer Price Index. According to the Census Bureau, an average family of four has a threshold of approximately $25,000.

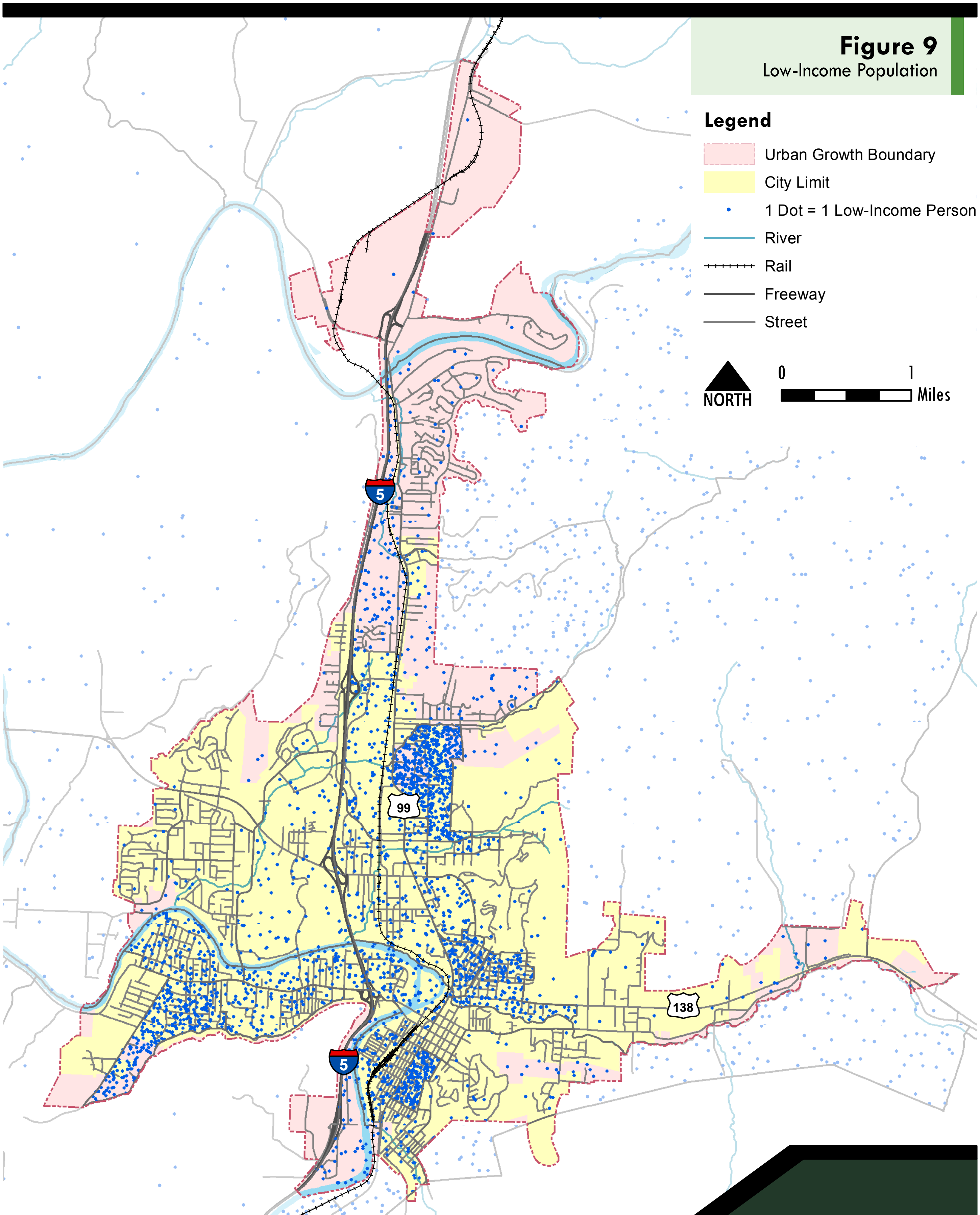
Table 5 provides a comparison of low-income population within Roseburg. Approximately 21% of the City's population is below the poverty level.[12] Roseburg's poverty rate is similar to Douglas County (20%), but has a higher rate of poverty compared to the state (17%). As shown in Figure 9, people below the poverty line are generally concentrated in two areas: one south of downtown and the other east of Stephens Street and between Joseph Lane Middle School and NE Newton Creek Road. Improved non-motorized connections, facilities and transit service may be more important to and within these areas.

TABLE 5: LOW-INCOME POPULATION

Roseburg		**Douglas County**		**Oregon**	
Estimate	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
21,149	+/-230	105,767	+/-260	3,823,874	+/-1,167

Source: Low-income population data: U.S. Census Bureau, 2010-2014 American Community Survey 5-Year Estimates, C17002: Ratio of Income to Poverty Level in the Past 12 Months

[12] Low-income population data: U.S. Census Bureau, 2010-2014 American Community Survey 5-Year Estimates, C17002: Ratio of Income to Poverty Level in the Past 12 Months



City of Roseburg
Transportation System Plan

Existing Transportation System Inventory

The City maintains an inventory of the existing transportation system in Roseburg. This section documents the inventory of facilities and services that comprise the Roseburg transportation system, and summarizes their current use. This inventory includes the street, pedestrian, bikeway, public transportation, rail, air, water, and pipeline systems within the Roseburg City Limits and Urban Growth Boundary (UGB)

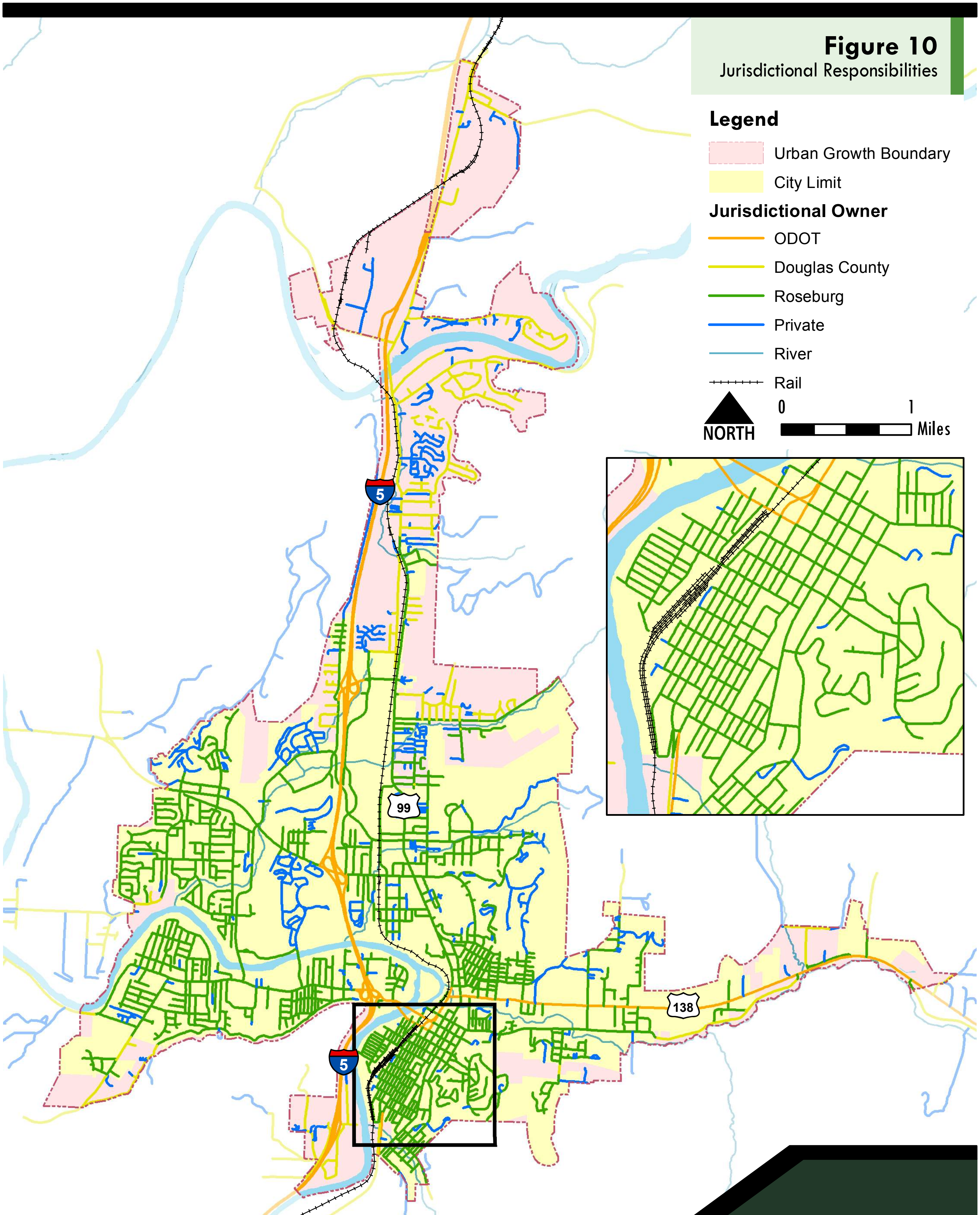
Existing Street and Highway System

There are two state highways (I-5 and OR 138) serving the City of Roseburg as well as a network of arterial and collector streets maintained by the City and/or Douglas County. This section describes the current system for vehicular travel within the project area. The inventory includes a summary of the available facilities, as well as jurisdiction, roadway characteristics, and important uses.

Street Jurisdiction

The street system within the Roseburg UGB includes roadways under three jurisdictions: State, County, and City. There are also numerous private streets within the city. A list of roadways and the corresponding jurisdiction is provided in Table 9 (page 27). A number of privately maintained roads can be found within the UGB as well. Figure 10 shows the location of roads by jurisdictional responsibility within the Roseburg UGB.

Figure 10
Jurisdictional Responsibilities



Functional Classification

Streets and highways are assigned a classification to indicate their purpose, design, and function. Functional classification describes how adjacent properties are accessed and how much mobility the street provides, as illustrated below in Exhibit 3. A combination of arterials, collectors, and minor collectors, along with local streets, can help a community create a balanced transportation system, one that facilitates mobility for all modes at acceptable levels of service, while providing sufficient access to adjacent land uses.

The functional classification system for the Roseburg street network is illustrated in Figure 11 (page 22).

The most recent TSP (year 2006) applies a Street Functional Classification system to reserve future rights of way, determine street design, and develop future street improvement projects. As described in the City of Roseburg's Comprehensive Plan, this system is comprised of five specific designations: freeway, arterial street, collector street, local street, and cul-de-sac street.

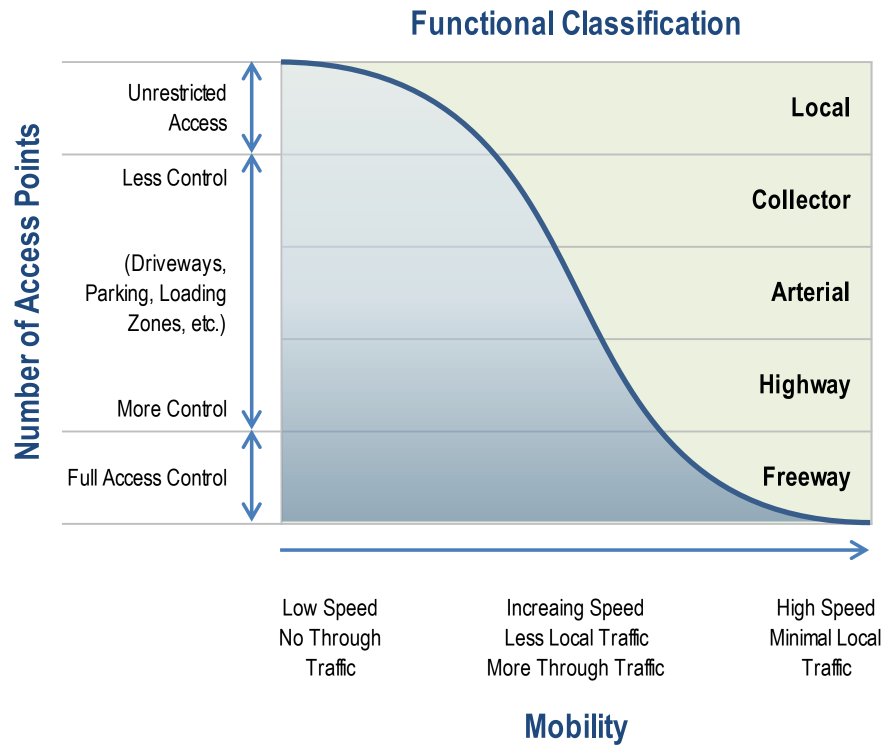


Exhibit 3. Functional Classification

Freeway – The highest form of roadway design. This type of facility is intended to provide for the expeditious movement of large volumes of traffic between, across, around, or through a city, region, or state. The freeway is a divided highway with full control of access. It is not intended to provide access to abutting land. Complete separation of conflicting traffic movements is provided.

Arterial Street – The primary function of an arterial street is to provide for the traffic movement between areas and across portions of a city or region, direct service to principal generators, and connect to the freeway-expressway system. A subordinate function is the provision of access to abutting land. Since the primary function of this type of street is movement of vehicles, people, and goods rather than access to abutting land or temporary storage of vehicles, arterial streets are subject to regulation and control of parking, turning movements, entrances, exits, and curb uses. Control of access is highly recommended and may be required.

Collector Street – A street that provides for traffic movement within neighborhoods and between activity centers, between arterial streets and local streets, and for direct access to abutting land. The City of Roseburg identifies Collectors and Minor Collectors but currently does not provide clear language to distinguish the two. Clarifying the functional classification descriptions will be an element of the TSP update.

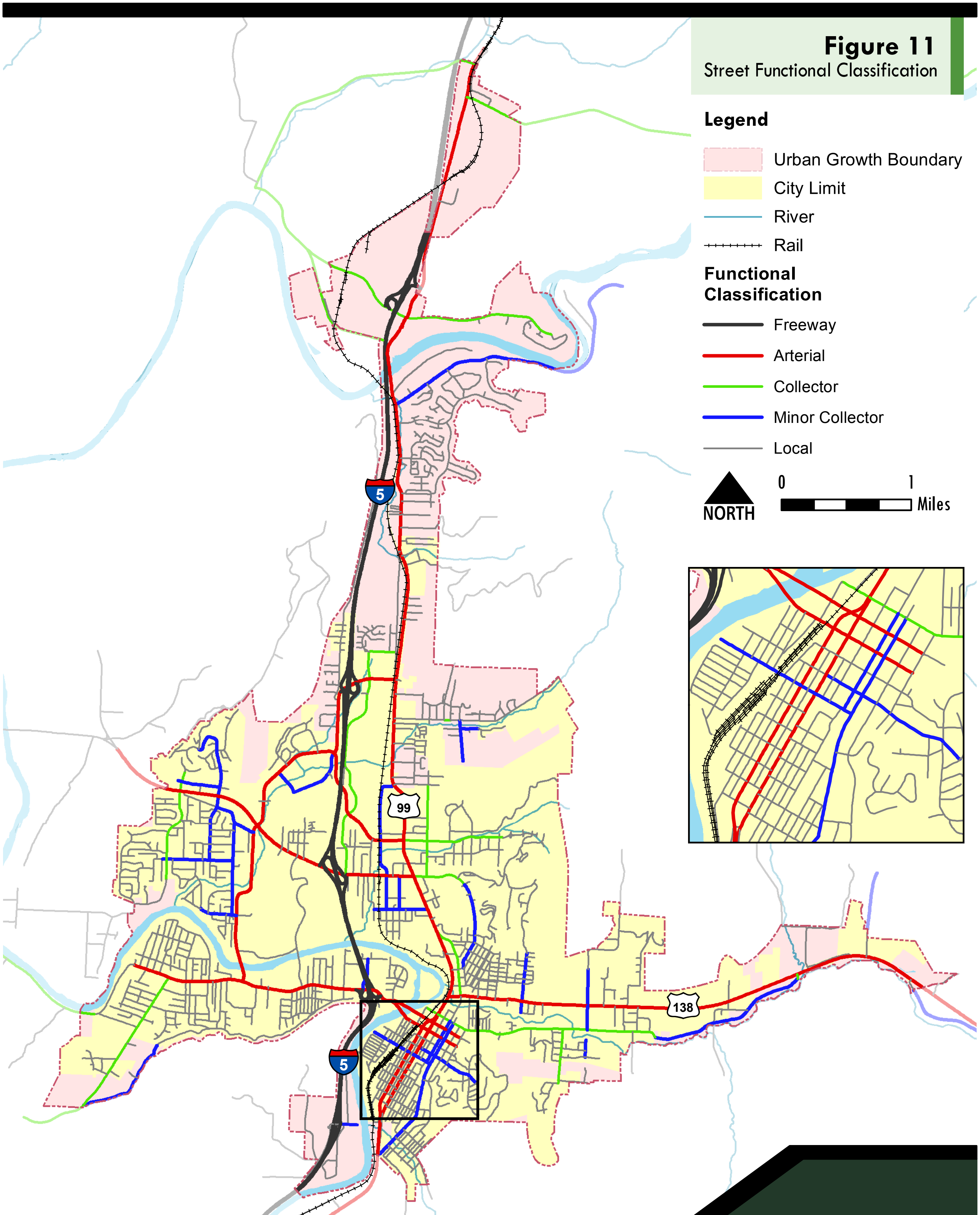
Local Street – Provides access to abutting land and the collector and arterial network. These streets serve local traffic movements and are not intended to accommodate through traffic. Any street not designated as a freeway, arterial, or collector is considered a local street.

Cul-de-sac Street – Functions as a local street providing access to abutting land. A cul de sac is not a through street and contains a turnaround.

Pathways – Functions for use by non-motorized vehicles.

Different transportation authorities in Oregon have different functional classification systems. There is not necessarily a correlation between functional classifications among jurisdictions. It is important that City-designated arterials and collectors are consistent with the designations assigned by the Oregon Department of Transportation (ODOT), due to their regional significance. All of the local transportation system planning efforts are required to be consistent with federal guidelines regarding functional classification. Table 9 (page 27) summarizes the functional classifications assigned by the various jurisdictions.

Figure 11
Street Functional Classification



Access Management

Access management can be an important tool for protecting the function of roadway. As part of a TSP, access management describes property access conditions that may influence travel along major local transportation corridors. The TSP must also be consistent with designated access management categories in the Oregon Highway Plan (OHP).

There is a common understanding for the need of property owners to maintain roadway access to their businesses and residences. However, a proliferation of driveways and minor street intersections multiplies the number of conflicts along a roadway segment, thus reducing the capacity of intersections, increasing the probability of crashes, and generally degrading service for all system users. Hence, access management must balance the competing needs of compatible land uses, private access, and the function of the transportation system.

Both ODOT and the City of Roseburg have access management standards that apply within Roseburg city limits. Douglas County access spacing standards were not available at the time of publication. The access management standards applicable to this project are summarized Table 6 and Table 7.

TABLE 6. EXISTING ROSEBURG ACCESS SPACING GUIDELINES

Functional Classification	Access Spacing Standard[1]
Arterial	500 feet
Collector	200 feet

1. City of Roseburg Land Use and Development Ordinance.

TABLE 7. EXISTING ODOT ACCESS SPACING STANDARDS

Functional Classification	Posted Speed	Access Spacing Standard (feet)
Regional Highway (Applicable to OR 138)	25 mph & lower	250[1]
	30 mph & 35 mph	350[1]
	40 mph & 45 mph	500 feet[1]
	50 mph	830 feet[1]
	55 mph or higher	990 feet[1]
ODOT – Interchange Ramp Terminals - Fully Developed Urban[2] (Applicable to interchanges in Roseburg UGB)		
Distance from off-ramp to first approach on the right, right-turn movements only		750 feet[3,4]
		990 ft[4]
Distance from off-ramp to first intersection where left turns are allowed		1320 feet[3,4]
Distance from last approach road to the start of the taper for the on-ramp		1320 feet[3,4]
Distance from last right in/right out approach road to the start of the taper for the on-ramp		990 feet[3,4]

Notes:

1. Table 15 in the revised OHP-Effective January 1, 2012 Amended May 3, 2012 : Access Management Spacing Standards for Regional Highways with Annual Average Daily Traffic (AADT) of More Than 5,000 Vehicles
2. Fully Developed Urban Interchange Management Area: Occurs when 85% or more of the parcels along the developable frontage area are developed at urban densities and many have driveways connecting to the crossroad. See definition in the Oregon Highway Plan.
3. Table 17 in the revised OHP: Access Management Spacing Standards for Freeway Interchanges with Two-Lane Crossroads
4. Table 18 in the revised OHP: Minimum Spacing Standards Applicable to Freeway Interchanges with Multi-Lane Crossroads

An access inventory for roadways within the UGB was not available for inclusion in the report; however, Harvard Avenue, Stewart Parkway, Garden Valley, Diamond Lake Boulevard and Stephens Street all serve commercial businesses and have sections with closely spaced accesses or driveways.

Roadway Characteristics

State Facilities

Roseburg is bisected by **Interstate 5 (I-5)**, which runs in a north-south direction through the city. Five I-5 interchanges serve Roseburg UGB:

- Exit 123 – Portland Avenue
- Exit 124 – Harvard Avenue
- Exit 125 – Garden Valley Boulevard
- Exit 127 – Edenbower Boulevard
- Exit 129 – Winchester/Wilbur

OR 138 is classified as a regional highway by the OHP. It runs from Exit 124 – Harvard Avenue to Oak Avenue/Washington Avenue, Stephens Street, where it then runs east through town as Diamond Lake Boulevard and exits the UGB in the east.

National Highway System Facilities

The National Highway System (NHS) is a network of nationally significant roads. There are a few NHS routes in the study area:

- I-5 Mainline and Ramp Terminals
- OR 138
- Garden Valley Boulevard from I-5 to Stephens Street
- Stephens Street (south of Hooker Road)
- Pine Street (south of SE Washington)

Freight Routes

I-5 is designated as a Freight Route in the Oregon Highway Plan (OHP). Consistent with the State designation, Roseburg's TSP classifies I-5 as a freight route, along with other State and local roads within the UGB. The major freight routes designated by Roseburg's TSP within the UGB are shown in Figure 12 and include:

- I-5
- OR 138 (Diamond Lake Boulevard)
- OR 99 (Stephens Street/Old Highway 99)
- Garden Valley Boulevard
- Edenbower Boulevard (between I-5 and OR 99)[13]

[13] 2006 Roseburg TSP

Design and Geometric Roadway Data

There are various inventories that describe the design and various features along the street system in Roseburg. A description and accompanying table or figure are provided in this section.

***Speed Limits* –** Table 9 provides a listing of speed limits for Arterials and Collectors in the City of Roseburg. In Roseburg, speeds on Local Streets generally range from 15 to 25 mph, although a few exceptions of 35 mph are found. Minor Collector and Collector streets can range from 15 to 45 mph and Arterial streets can range from 25 to 55 mph.

***Stop Controls Devices* –** Stop control devices in Roseburg include signalized intersections and stop signs. Their use is intended to increase safety for all users by regulating the flow of traffic. There are numerous signalized and stop controlled intersections in Roseburg. Figure 13 shows the locations of control devices within city limits.[14]

***Bridges, Culverts and Rail Crossings* –** An important aspect of a community's transportation system is recognizing the critical role that some transportation facilities, particularly bridges, play in emergency response and evacuation. Figure 14 (page 32) summarizes the locations of bridges and culverts in the study area, as well as public and private rail crossings of railroad facilities. There are 45 bridges identified within the Roseburg UGB. Though none of the bridges have been identified as structurally deficient, seven bridges are listed as functionally obsolete:[15]

1. North Umpqua River, Hwy 234 (Old Winchester) – Bridge ID 00839: Serves Highway 234/Old Highway 99; Constructed in 1923
2. Garden Valley Road over Hwy 1 [I-5] – Bridge ID 07667: Serves Garden Valley Road; Constructed 1955
3. Highway 1 [I-5] & Conn over Harvard Ave – Bridge ID 07669A: Serves I-5; Constructed in 1976
4. Stewart Parkway (Airport Rd) over Hwy 1 – Bridge ID 18990: Serves Stewart Parkway; Constructed in 2002
5. Highway 1 [I-5] over Portland Ave (Fairgrounds Interchange) – Bridge ID 07670A: Serves I-5; Constructed in 1954
6. South Umpqua River, Stewart Park Rd – Bridge ID 26T05: Serves Stewart Park Road; Constructed in 1946
7. Deer Creek, Douglas Ave – Bridge ID 26T03: Serves Douglas Avenue; Constructed in 1950

***Pavement Condition* –** The City prepared the *Five Year Pavement Maintenance Plan* (2016) to determine street pavement conditions and create a refined project list for addressing paving needs. The plan uses the following rating system for Pavement Condition Index (PCI):

- 70-100 PCI: Very Good
- 50-70 PCI: Good
- 25-20 PCI: Poor
- 0-25 PCI: Very Poor

[14] Data for signalized intersections from 2006 Roseburg TSP
[15] ODOT Bridge Management System, 2016.

A summary of the City's pavement conditions are listed in Table 8 below. A full list is provided in Appendix A.

TABLE 8. CITY OF ROSEBURG PAVEMENT RATING SUMMARY

Functional Classification	Total Center Lane Miles	Total Lane Miles	PCI[1]
Arterial	14.55	56.06	73
Collector	16.99	35.89	76
Residential/Local	79.07	155.01	71
Gravel	0.06	0.06	N/A
Total	**110.67**	**247.02**	**Overall Network: 72[2]**

Notes:
1. Pavement Condition Index (PCI) is measured as a rating between 0 and 100
2. Overall Network PCI as of 9/2/2015

***Medians/Islands/Curb* –** There are roadways within the UGB that have center islands, medians or curb within the right-of-way for various purposes. Appendix B summarizes the locations of these roadway features on City facilities.

***On Street Parking* –** On street parking is available at various locations within the City of Roseburg and is generally concentrated near commercial areas and on residential streets. A complete inventory of on street parking locations on City roadways was not conducted as part of this memorandum. There is no on street parking allowed on ODOT roadways within the Roseburg UGB.

Table 9. Inventory of Arterial and Collector Roadways

Roadway/ Highway Name	Jurisdiction	Federal Functional Classification	ODOT Functional Classification	City Functional Classification	Posted Speed (mph)	No. of Lanes	Pavement Width	Lane Width	Shoulder Width	Medians?	On-Street Parking?
I-5 (Pacific Highway No. 1)	ODOT	Urban Interstate	Interstate Hwy, NHS, FR, TR[1]	-	65	4	76 ft.	12-15 ft.	6-10 ft.	Yes	No
I-5 Northbound & Southbound Ramps	ODOT	Urban Interstate	Interstate Hwy, NHS, FR, TR[1]	-	-	1-2	26-40 ft.	12-16 ft.	6-10 ft.	No	No
Diamond Lake Boulevard[1]	ODOT	Urban Principal Arterial	Principal Arterial, NHS	Arterial	35/45/ 55	4	26-82 ft.	12-13 ft.	10 ft.	No	No
Edenbower Blvd[2]	ODOT/City	Urban Minor Arterial	Minor Arterial	Arterial[2]	40[3]	2-3	42-50 ft.	12-14 ft.	2-6 ft.	No	No
Garden Valley Blvd (West of Stephens St)[2]	ODOT/City	Urban Principal Arterial/ Urban Minor Arterial	Principal Arterial/ Minor Arterial	Arterial	25/30/ 35/45	4	60-80 ft.	10-12 ft.	-	No	No
Harvard Ave[1]	ODOT/City	Principal Arterial/ Urban Minor Arterial	Principal Arterial/ Minor Arterial/ Major Collector	Arterial	30/35	2-4	60-72 ft.	10-12 ft.	0-4 ft.	No	No
Oak Ave[1]	ODOT/City	Principal Arterial	Principal Arterial/ Local	Arterial	25/30	2-3	36-40 ft.	10-12 ft.	-	No	No
Pine St	City	Urban Principal Arterial	Principal Arterial	Arterial	25/35	2	*Data not for City Facilities not collected as part of this inventory*				
Stephens St (Old Highway 99)	City	Urban Principal Arterial	Principal Arterial	Arterial	25/30/ 35/45	2-4					
Stewart Pkwy	City	Urban Minor Arterial	Principal Arterial/ Minor Arterial	Arterial	35/40	2-4					
Washington Ave	City	Principal Arterial	Principal Arterial/ Local	Arterial	25/30	2-3					
Alameda Ave		Urban Collector	Major Collector	Collector	25	1-2					
Aviation Dr	City	Urban Collector	Minor Arterial	Collector	25	2					
Douglas Ave	City/County	Urban Collector	Major Collector	Collector	20/25/ 35	2					
Garden Valley Blvd (east of Stephens St)	City	Urban Collector	Major Collector	Collector	25	2					
Kane St	City	Unclassified	Unclassified	Collector	--	--					
Lookingglass Road	City/County	Urban Minor Arterial	Minor Arterial	Collector	25/40	2					
Pearce St	Private	Unclassified	Unclassified	Collector	--	--					
Ramp St	City/County	--	Local	Collector	25	2					

Table 9. Inventory of Arterial and Collector Roadways

Roadway/ Highway Name	Jurisdiction	Federal Functional Classification	ODOT Functional Classification	City Functional Classification	Posted Speed (mph)	No. of Lanes	Pavement Width	Lane Width	Shoulder Width	Medians?	On-Street Parking?
Troost St	City	Urban Collector	Major Collector	Collector	25	2	*Data not for City Facilities not collected as part of this inventory*				
Vine St	City	Urban Collector	Major Collector	Collector	25	2					
Winchester St	City	Urban Collector	Major Collector	Collector	35	2-3					
Airport Rd	City	Urban Collector	Major Collector	Minor Collector	25	2					
Bellows St	City	Unclassified	Local	Minor Collector	25	2					
Calkins Rd	City	Urban Collector	Major Collector	Minor Collector	25	2					
Cedar St (north of Chestnut Ave)	City	Urban Collector	Major Collector	Minor Collector	20	2					
Chestnut Ave	City	Urban Collector	Major Collector	Minor Collector	20	2					
Douglas Ave (east of Lombardy Dr)	City/County	Urban Collector	Major Collector	Minor Collector	--	2					
Edenbower Blvd (between Renann St and Stewart Pkwy)	City	Urban Collector	Major Collector	Minor Collector	25	2					
Fulton St	City	Urban Collector	Major Collector	Minor Collector	25	2					
Harvey Ave	City	Urban Collector	Local	Minor Collector	25	2					
Hughwood Dr	City	Unclassified	Local	Minor Collector	25	2					
Jackson St (between Mosher Ave and Douglas Ave)	City	Unclassified	Local	Minor Collector	20	2					
Keasey St	City	Urban Collector	Major Collector	Minor Collector	25	2					
Kline St	City	Urban Collector	Major Collector	Minor Collector	25	2					

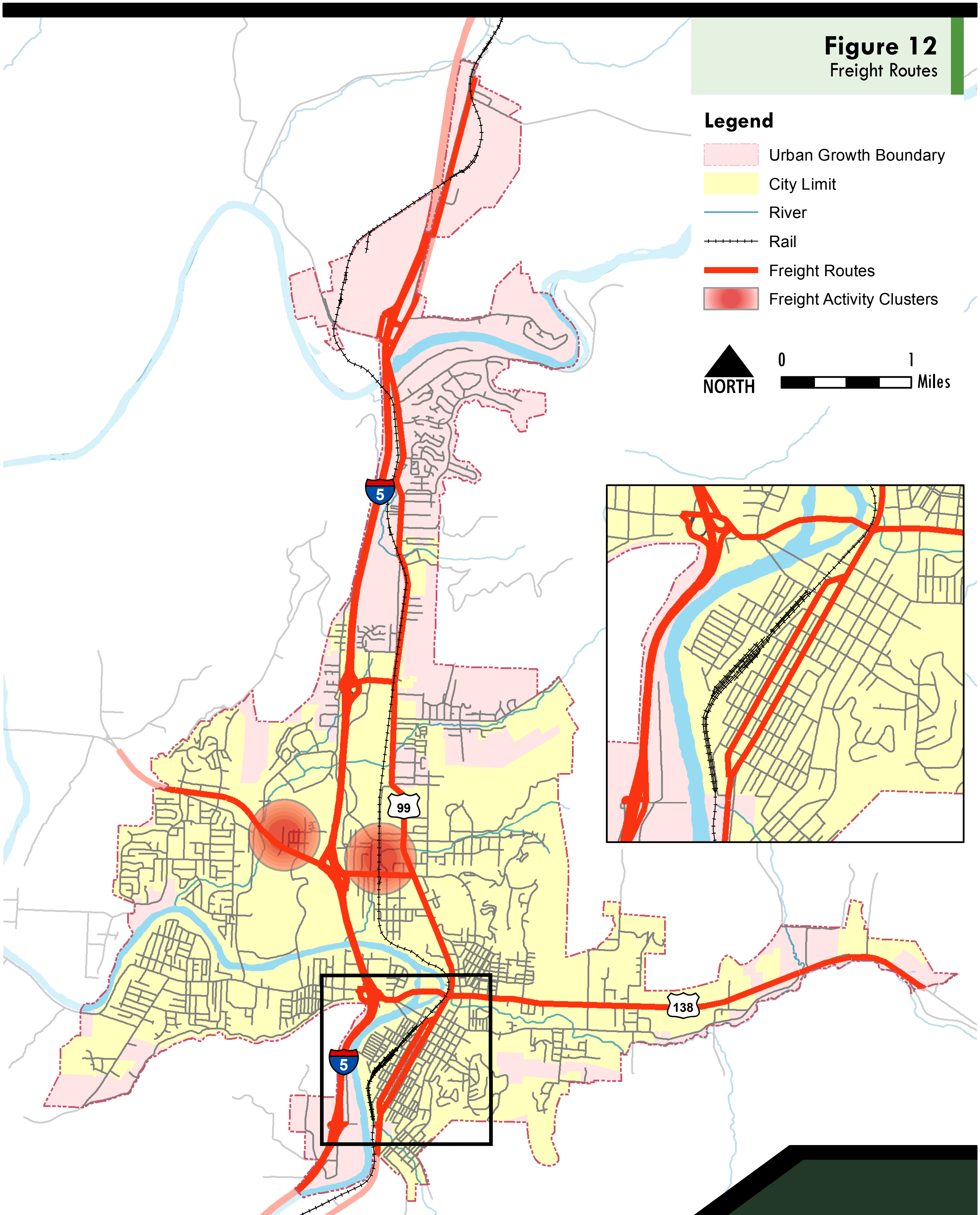
Table 9. Inventory of Arterial and Collector Roadways

Roadway/ Highway Name	Jurisdiction	Federal Functional Classification	ODOT Functional Classification	City Functional Classification	Posted Speed (mph)	No. of Lanes	Pavement Width	Lane Width	Shoulder Width	Medians?	On-Street Parking?
Lane Ave (east of Stephens St)	City	Urban Collector	Major Collector	Minor Collector	25	2	*Data not for City Facilities not collected as part of this inventory*				
Lincoln St	City	Urban Collector	Major Collector	Minor Collector	25	2					
Main St (between Lane Ave and Douglas Ave)	City	Urban Collector	Major Collector/ Local	Minor Collector	20	2					
Mosher Ave	City	Urban Collector	Major Collector	Minor Collector	25	2					
Renann St	City	Urban Collector	Major Collector	Minor Collector	25	2					
Rifle Range St	City	Urban Collector	Major Collector/ Local	Minor Collector	25	2					
Valley View Dr (between Kline St and Stewart Pkwy)	City	Urban Collector	Major Collector	Minor Collector	25	2					
Walnut St (north of Chestnut Ave)	City	Urban Collector	Major Collector	Minor Collector	25	2					

Source: City of Roseburg COR_Centerline.shp

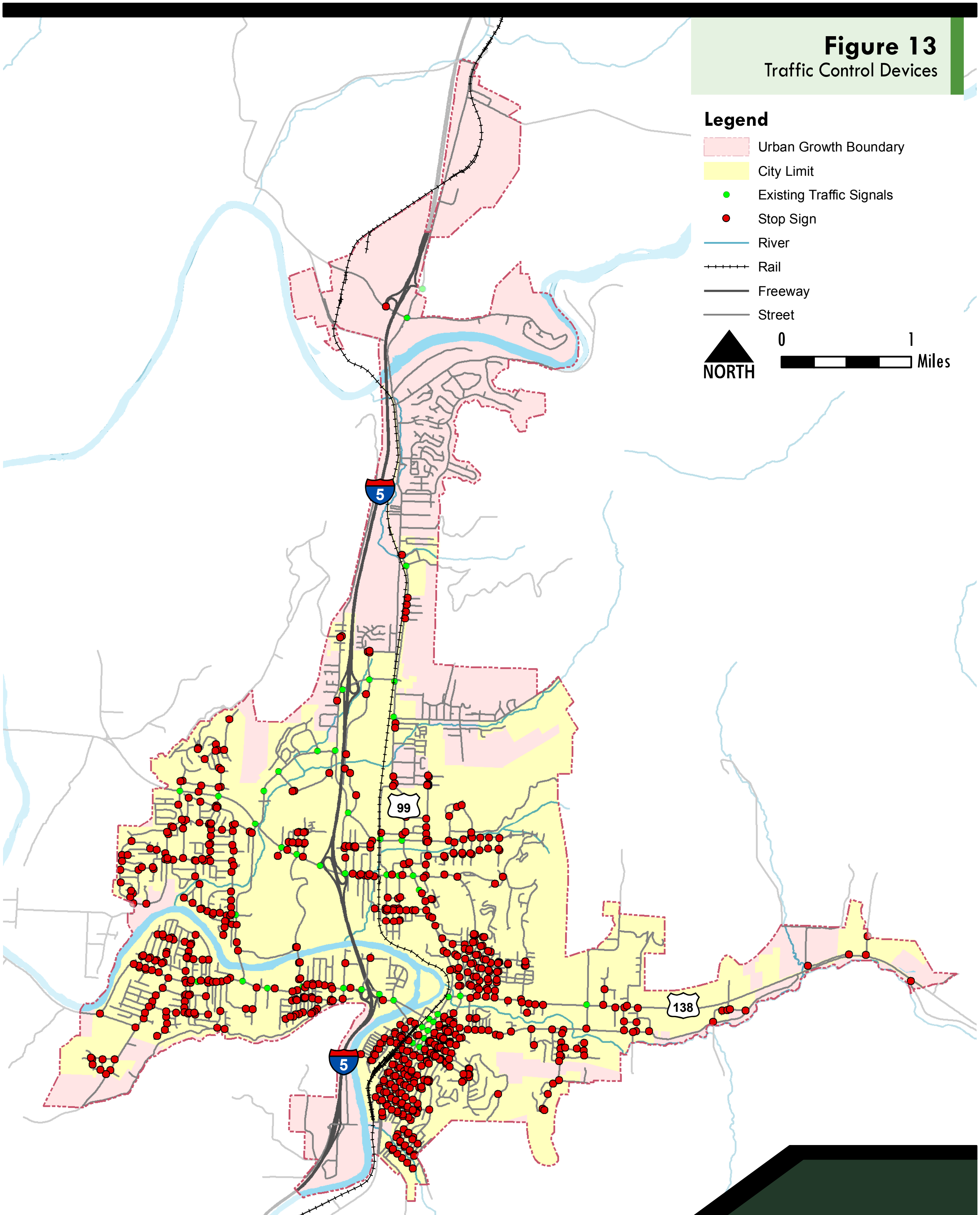
1. Inventory was collected as part of the OR 138E study.
2. Roadways are ODOT jurisdiction within the interchange influence area but are built to City standards.

Figure 12
Freight Routes



City of Roseburg
Transportation System Plan

Figure 13
Traffic Control Devices



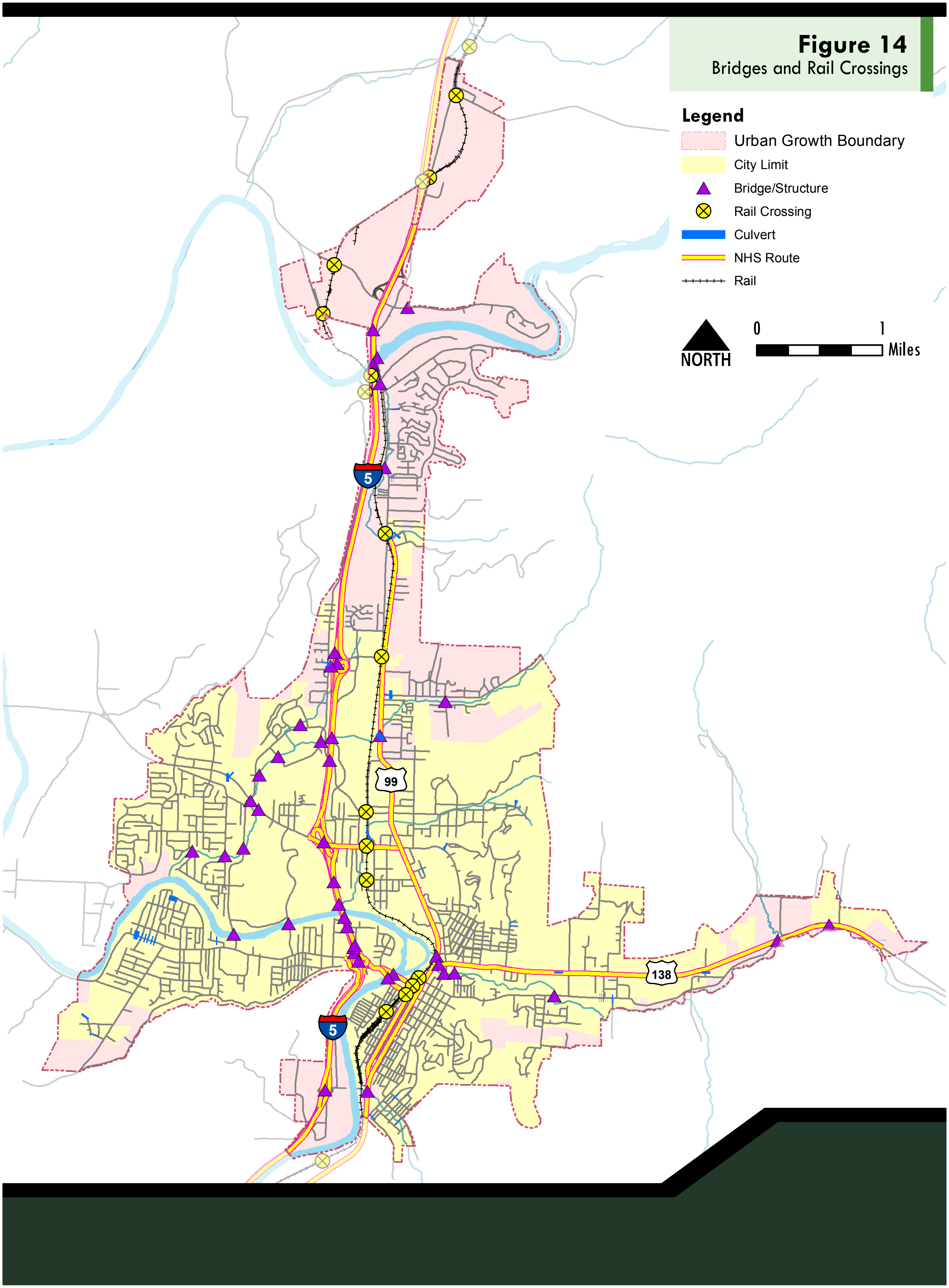


Figure 14
Bridges and Rail Crossings
Legend
Urban Growth Boundary
City Limit
Bridge/Structure
Rail Crossing
Culvert
NHS Route
Rail
NORTH
0
1
Miles
5
99
138
5

Existing Pedestrian and Bicycle Network

Provisions of a comprehensive pedestrian and bicycle facilities can enable people to walk and bike safely and efficiently between land uses. In addition, bicycling and walking are more environmentally friendly alternatives to driving. Improving the non-motorized elements of the transportation system can provide more choices for the traveling public and can have the added benefit of reducing vehicle congestion, carbon emissions and improving health through physical activity.

This section provides a basic inventory of the current pedestrian and bicycle network within the Roseburg UGB. For additional details, see Roseburg's *Bicycle and Pedestrian Plan* (2009); the plan provides background and definitions of typical facilities, types of users, and barriers to travel.

Critical Routes

The *Bicycle and Pedestrian Plan* (2009) identified critical routes for bicycle and pedestrians that connect important and desirable destinations. The list below summarizes the known routes; in some cases, the route is not formalized.

Critical Route	Route Limits
NW Calkins Avenue	Troost Street to NW Keasey Street
W Harvard Avenue	I-5 to Lookinglass Road
NW Garden Valley Boulevard	Entire length
NW Highland Street/NW Fairmount Street	Stewart Parkway to Gaddis Park
Washington/Oak Bridges	Washington and Oak Avenue
NE Douglas Avenue	Spruce Street to Hwy 138 to Sunshine Park
Duck Pond Path	I-5 to the Duck Pond
Hwy 99 Trail	Edenbower to North Umpqua River
NE Vine Street	Alameda Avenue to Meadows Avenue
NE Stephens Street/ NE Winchester Street	Garden Valley Boulevard to Diamond Lake Blvd

Pedestrian Network

Walking is the most affordable and accessible of all transportation modes. It is also clean, low-impact on the City's infrastructure, healthy for the individual, and integral to community livability. A walkable environment integrated with other modes of transportation is essential to creating a multi-modal transportation system. It is also a key component to reducing reliance on automobiles. Whether an entire trip is on foot or with a mobility device, people must walk for at least part of every trip, even when the trip takes place on transit, in an automobile, or on a bicycle.

Based on a pedestrian facility inventory, Figure 15 shows locations within the city where sidewalks are missing on one or both sides of the street.[16] Streets for which sidewalks are shown as missing are primarily limited to Arterials and Collectors, not Local Streets. However, several Local Streets within the city currently lack sidewalks. In addition, the figure shows the location of existing multi-use paths. These multi-use paths are shared with bicyclists and are concentrated in the parks and golf course near the South Umpqua River. The

[16] Source: 2006 Roseburg TSP

figure also shows current locations of pedestrian push buttons and locations of missing pedestrian ramps. A summary of sidewalks along ODOT facilities is summarized in the Appendix.

ADA Transition Plan

The City is currently updating its American Disabilities Act (ADA) Transition Plan for improvement needs within the public rights-of-way (ROW). Figure 15 reflects the most recent inventory update of missing pedestrian ramps at intersections (with marked and unmarked crosswalks).

Bicycle Network

Bicycling is a low-cost and effective means of transportation that is non-polluting, energy efficient, versatile, and promotes good health. Cycling offers low-cost mobility to the non-driving public, including the youth population.

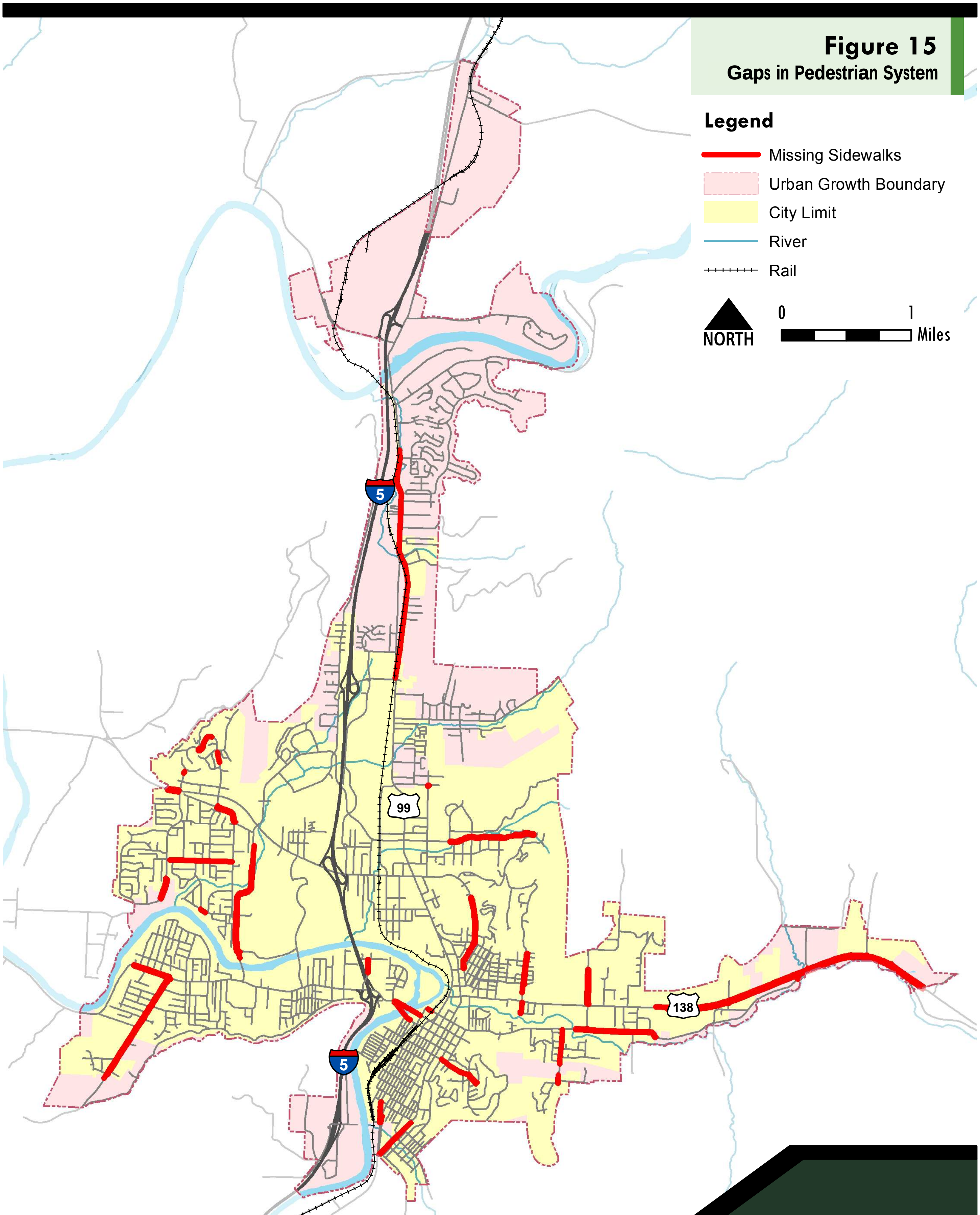
Currently, the City has roadway bicycle facilities. Improvements have been made since the adoption of the previous TSP, but there are opportunities to create continuous north-south and east-west connections across the City. Figure 16 shows existing bike lanes within the UGB.[17] As seen in the figure, many bicycle facilities share the roadway with motor vehicles. These routes are designated by signing, striping, and other visual markings. Roseburg also includes several separated bicycles facilities for joint use of bicyclists and pedestrians. These facilities are concentrated in the parks and near the South Umpqua River.

Multi-Use Paths

The City of Roseburg offers several multi-use paths throughout its jurisdiction, though they are generally concentrated in parks and near the river. One multi-use path follows the northern edge of the South Umpqua River through Stewart Park, passing under I-5 and then following the river around Elk Island. This multi-use path terminates at Douglas Avenue. The Freeway Bike Trail runs along the eastern side of I-5 from the bridge at the South Umpqua River, then south to the Fairgrounds. There is also a multi-use path through Gaddis Park. In addition, one off-street bicycle path exists along Newton Creek between Rennan Street and Stewart Parkway.[18] A detailed inventory of multi-use paths along ODOT facilities is located in the Appendix.

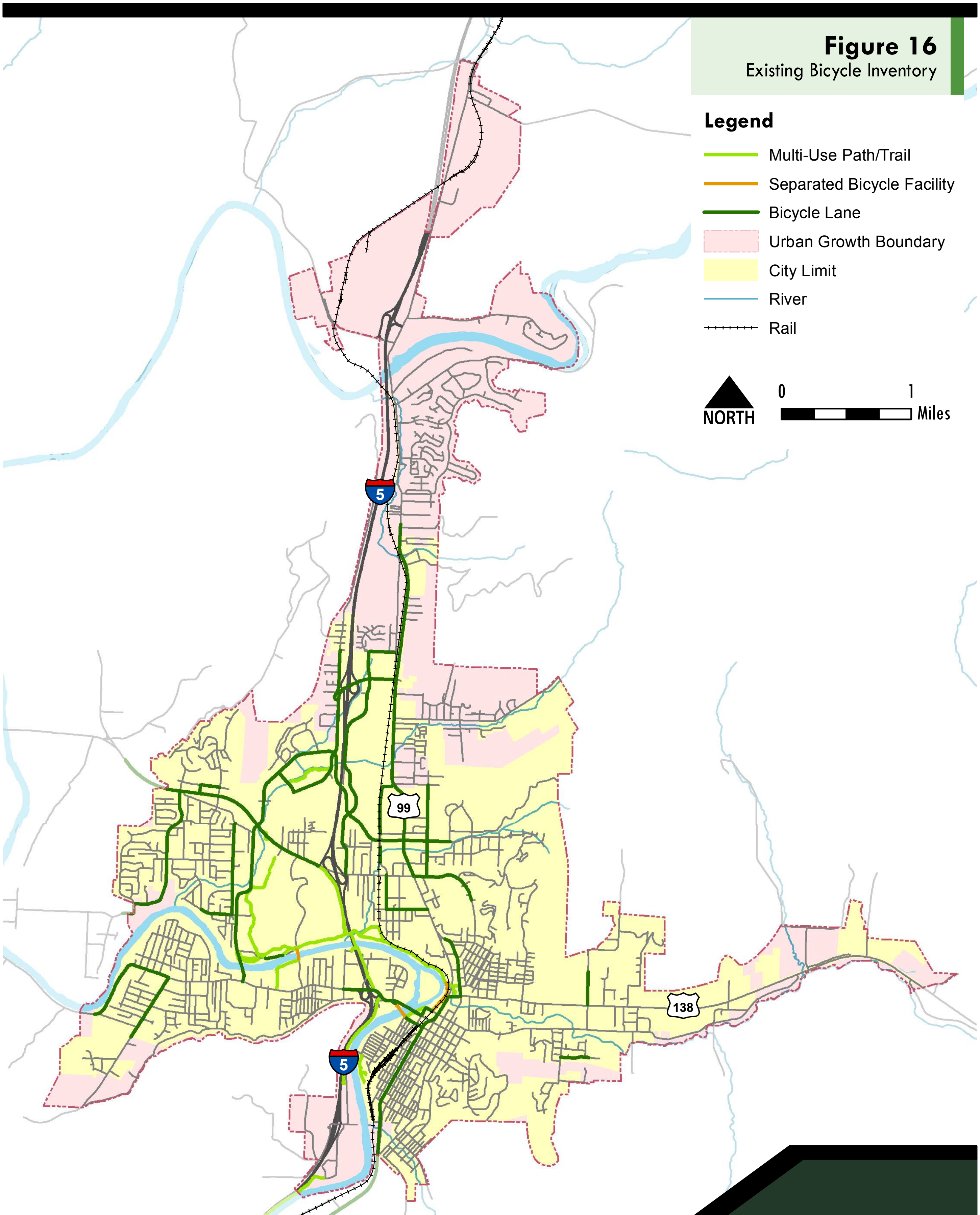
[17] Source: City of Roseburg
[18] Source: City of Roseburg TSP, 2006.

Figure 15
Gaps in Pedestrian System



City of Roseburg
Transportation System Plan

Figure 16
Existing Bicycle Inventory



City of Roseburg
Transportation System Plan

Existing Public Transit Services

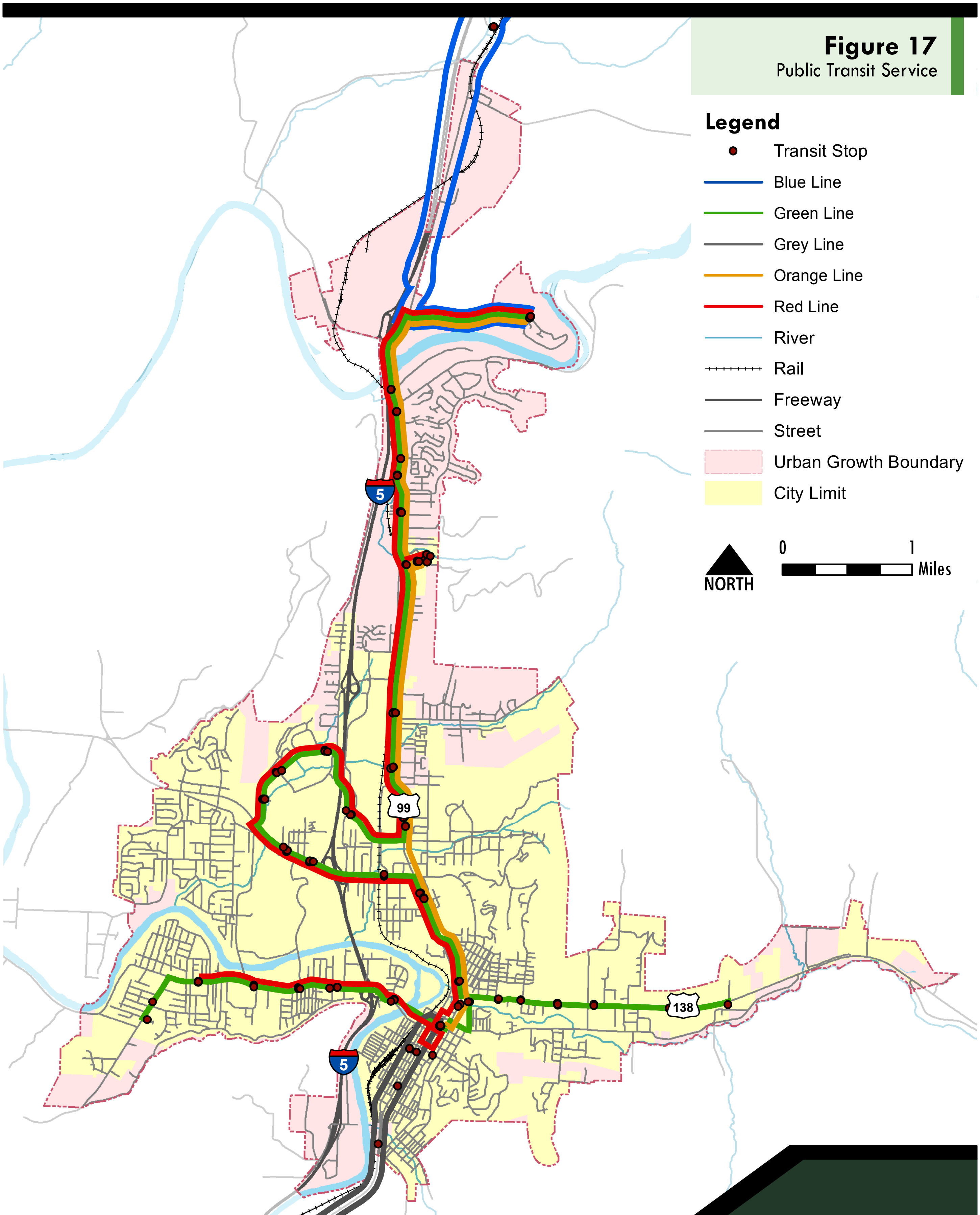
Public transit can provide intra- and inter-city transportation alternatives for those who cannot or choose not to drive motor vehicles. Public transportation in Roseburg is provided by UTrans, operated by United Community Action Network (UCAN) through a contract with Douglas County. UTrans provides fixed-route and paratransit for the greater Roseburg area, with commuter services to nearby cities. Six transit lines provide service in Roseburg. The route names and description are included in Table 10. Figure 17 shows the routes for five of the six routes.[19] Potential planned public transportation facilities and service were not available.

TABLE 10: TRANSIT SERVICE SUMMARY

Route Name	Service Frequency	Service Times	Route	Key Stops
UTrans Greenline	Hourly service	6:35 am – 6:36 pm	Provides service along W. Harvard Ave., OR 138, Stephens St. and portions of Steward Pkwy.	• Umpqua Community College • Mercy Hospital • Roseburg Municipal Airport • Downtown
UTrans Orangeline (Northbound & Southbound)	Peak service (AM, midday, and PM)	7:47 am – 7:28 pm	Service between downtown and Umpqua Community College	• Umpqua Community College • Downtown
UTrans Redline	Hourly service	6:60 am – 6:40 pm	Service along W. Harvard Ave., through downtown, Stephens St. and NW Steward Pkwy.	• Umpqua Community College • Roseburg Valley Mall • Roseburg Municipal Airport • Downtown
UTrans Route 99 (Northbound & Southbound)	Peak service (AM, midday, and PM)	4:50 am – 8:00 pm	Service along OR 99 between Seven Feathers Casino, Winston, and Roseburg	• Seven Feathers Casino • Winston • Downtown
UTrans Sutherlin Blueline (Northbound & Southbound)	Peak service (AM, midday, and PM)	6:20 am – 6:52 pm	Sutherlin commuter route	• Sutherlin • Umpqua Community College
UTrans Winston Greyline	Peak service (AM, midday, and PM)	5:45 am – 6:34 pm	Winston commuter route	• Winston • Greyhound Bus Station

[19] The sixth route, Route 99, is not shown on the UTrans website, but has bus stops in downtown Roseburg and at Umpqua Community College.

Figure 17
Public Transit Service



Legend

- Transit Stop
- Blue Line
- Green Line
- Grey Line
- Orange Line
- Red Line
- River
- Rail
- Freeway
- Street
- Urban Growth Boundary
- City Limit

NORTH

0 1 Miles

City of Roseburg
Transportation System Plan

Existing Air, Water, Rail, and Pipeline Inventories

While the movement of goods and commodities into, out of, and through the Roseburg area is heavily dependent on the highway system (see the discussion of the Freight Routes in the Existing Street Network section above), freight movement also occurs via rail and pipeline modes. This section describes air, water, rail, and pipeline facilities in Roseburg.

Air Facilities

The Roseburg Regional Airport is located on the north side of Roseburg near I-5. Owned and operated by the City of Roseburg, the Roseburg Regional Airport does not have commercial flights. The nearest airports for commercial flight are North Bend, Eugene, or Medford. A transient-parking fee is charged per day and can be paid on-site.

There are regular freight flights into and out of Roseburg Regional Airport. Generally, three departing flights leave Roseburg, one for Medford in the morning, and two for Portland scheduled during the evening. Approximately seven flights arrive from Portland in a typical morning. Flight lessons are offered to pilots of all ages and experience levels.

Classified by the Oregon Aviation Plan (OAP 2007) as a Category III airport, Roseburg is a “Regional General Aviation Airport” and supports most twin and single engine aircraft. It may accommodate occasional business jets, and supports regional transportation needs. As a Category III, the site is designed to handle less than 30,000 yearly operations, and is more than 90 minutes from a commercial airfield. Especially during the summer months, Roseburg Regional Airport accommodates seasonal fire response activity for surrounding areas.

The airport is set to update their Master Plan this year (2017).

Water Facilities

The South Umpqua River meets the North Umpqua River approximately eight miles northwest of downtown Roseburg. This confluence becomes the Umpqua River. The South Umpqua River is used primarily for fishing and recreational boating; north of the Stewart Parkway Bridge the river is considered non-navigable. The North Umpqua River is considered non-navigable above the Winchester Dam. Only the Umpqua River near Reedsport, Oregon, is used for limited shipments of raw timber.[20]

Rail Facilities

One railroad line passes through Roseburg. The Central Oregon and Pacific (CORP) Railroad is a short line railroad. Currently, the railroad line is exclusively for freight, with 90 percent of their delivery consisting of forest products.

CORP, headquartered in Roseburg, Oregon, has 389 miles of track between Eugene, Oregon and Black Butte, California. CORP tracks are maintained to Federal Railroad Administration (FRA) Class 1 (47 miles) and Class 2 (200 miles) conditions, which limits maximum speeds to 10 mph for Class 1 or 25 mph for Class 2. Current service includes one northbound and one southbound train five days a week on eight routes:

[20] Source: 2006 Roseburg TSP

- Eugene and Roseburg
- Glendale and Medford
- Roseburg and Dillard
- Dillard and Riddle
- Dillard and Glendale
- Springfield and Cottage Grove
- Sutherlin and Roseburg
- White City and Medford

No passenger rail service is available in the study area; the closest available is AMTRAK located in Eugene, Oregon.

Pipeline Facilities

There is one major natural gas pipeline transportation system in the Roseburg UGB and numerous secondary natural gas distribution lines that spur off the mainline to provide gas to residences and businesses. The major pipeline is part of a system operated by Northwest Pipeline LLC and traveles north-south along the western edge of Roseburg.[21]

[21] *National Pipeline Mapping System Public Map Viewer*, Pipeline and Hazardous Materials Safety Administration. 2017

Natural Resources and Environmental Barriers

The following summarizes the existing natural resources and environmental features found in Roseburg. The following sections illustrate and describe areas that may pose barriers to providing transportation access or improvements. The inventory is based on available Geographic Information System (GIS) maps, previous reports, and known resource sites. Further resources may exist in the study area that are not yet documented or are not visually apparent.

Natural Resources

Statewide Planning Goal 5 requires local jurisdictions to inventory natural resources such as riparian corridors, wetlands, wildlife habitat, and recreation trails.

Wetlands

Wetlands, including swamps, bogs, fens, marshes, and estuaries, perform important natural functions, such as controlling floodwater and cleaning and storing water. Wetlands also play a crucial role in a healthy ecosystem by providing essential habitat for waterfowl, fish, amphibians, and many other animal and plant species. The State defines a wetland as an area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions (Oregon Administrative Rule (OAR) 660-023-0100).

The City of Roseburg has not conducted a Local Wetlands Inventory (LWI). As such, wetland information for the TSP was gathered from the National Wetland Inventory (NWI) developed by the U.S. Fish and Wildlife Service. The NWI relies on high-altitude aerial photos, supplemented with limited field work.

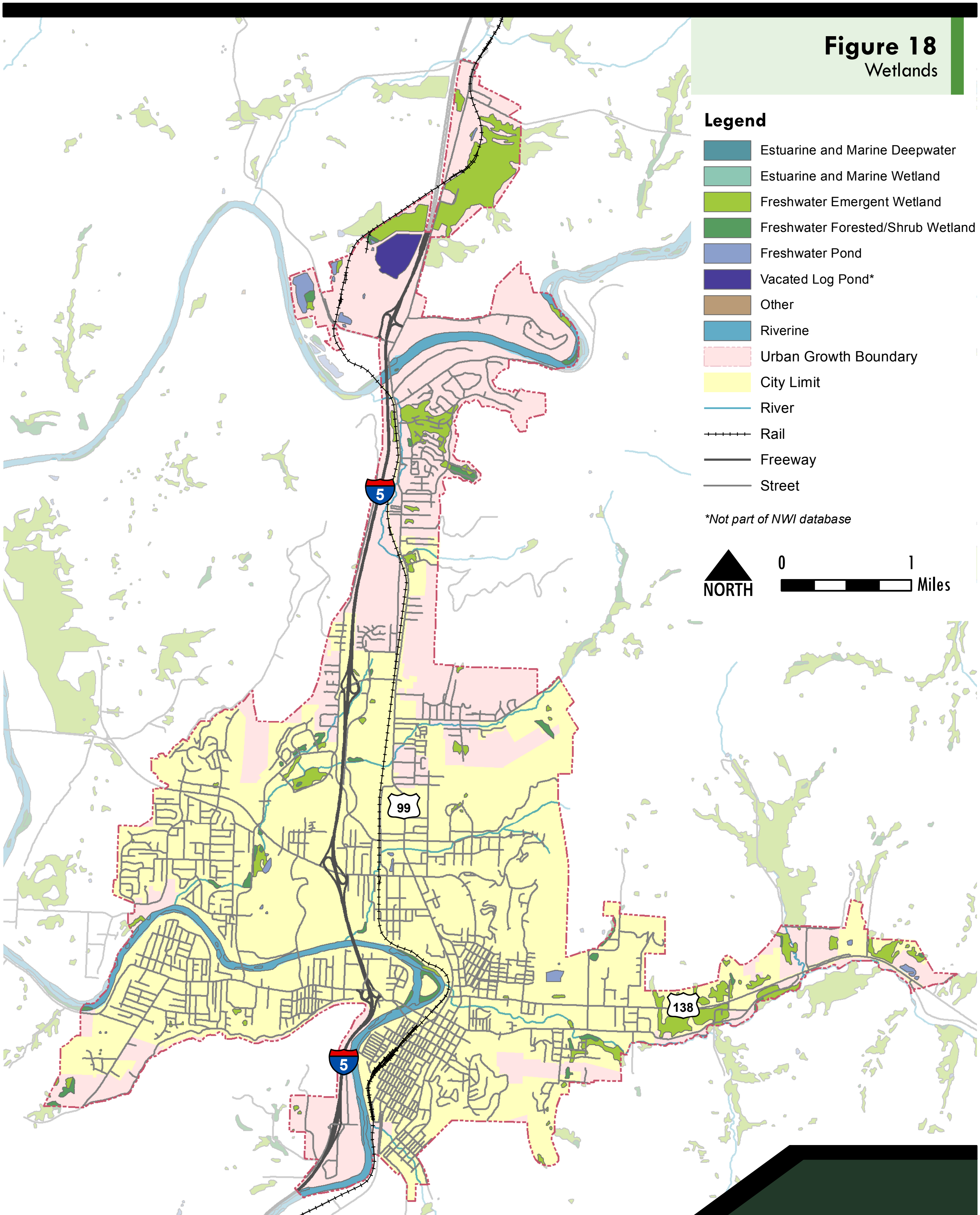
There are several types of wetlands found in Roseburg; these are listed in Table 11. Most wetland areas in Roseburg are classified as freshwater emergent wetlands. Emergent wetland vegetation is described as being present for most of the growing season in most years and are wetlands usually dominated by perennial plants. Figure 18 illustrates the extent, approximate location, and type wetlands and deepwater habitats in the Roseburg area.[22] As shown in the figure, there are several wetland areas of various sizes spread throughout the Roseburg UGB.

TABLE 11: SUMMARY OF WETLANDS TYPES IN ROSEBURG

Wetland Type	Acres
Freshwater Emergent Wetland	477
Freshwater Forested/Shrub Wetland	74
Freshwater Pond	43
Lake	51
Riverine	279
Total	**923**

[22] Source: U.S. Fish and Wildlife Service (FWS) National Wetlands Inventory (NWI) (2016)

Figure 18
Wetlands



City of Roseburg
Transportation System Plan

USFWS National Wetlands Inventory, 2017 (mapped using 1982 imagery)

Wildlife Habitats

Wildlife habitats are areas that wild animals depend on to meet their requirements for food, water, shelter, and reproduction. Roseburg is in a unique geographic location where parts of the City and the surrounding areas can accommodate a wide range of wildlife. Parts of the City, such as Stewart Park and portions of the South Umpqua River incorporate wildlife habitat.

Roseburg completed an inventory of wildlife as part of their 1984 Comprehensive Plan. However, wildlife habitats were not mapped at that time.

Fish Habitat – Fish habitat constitutes an important part of Roseburg's wildlife population. Two major rivers, the North Umpqua River and the South Umpqua River, contain migration, rearing, and spawning habitat to a variety of native fish species.

Figure 19 illustrates the known or probable presence of all wild, natural, and/or hatchery fish populations within rivers where fish, such as salmon may migrate to.[23] Areas labeled Fish Habitat (ODFW and StreamNet) have been identified by the State of Oregon and other sources as fish-bearing rivers and streams. The maps show the approximate location of the inventoried streams. However, they do not necessarily denote the size of geographic boundaries of the resources. Fish species include Summer Steelhead, Pacific Lamprey, Coho, and Spring and Fall Chinook.

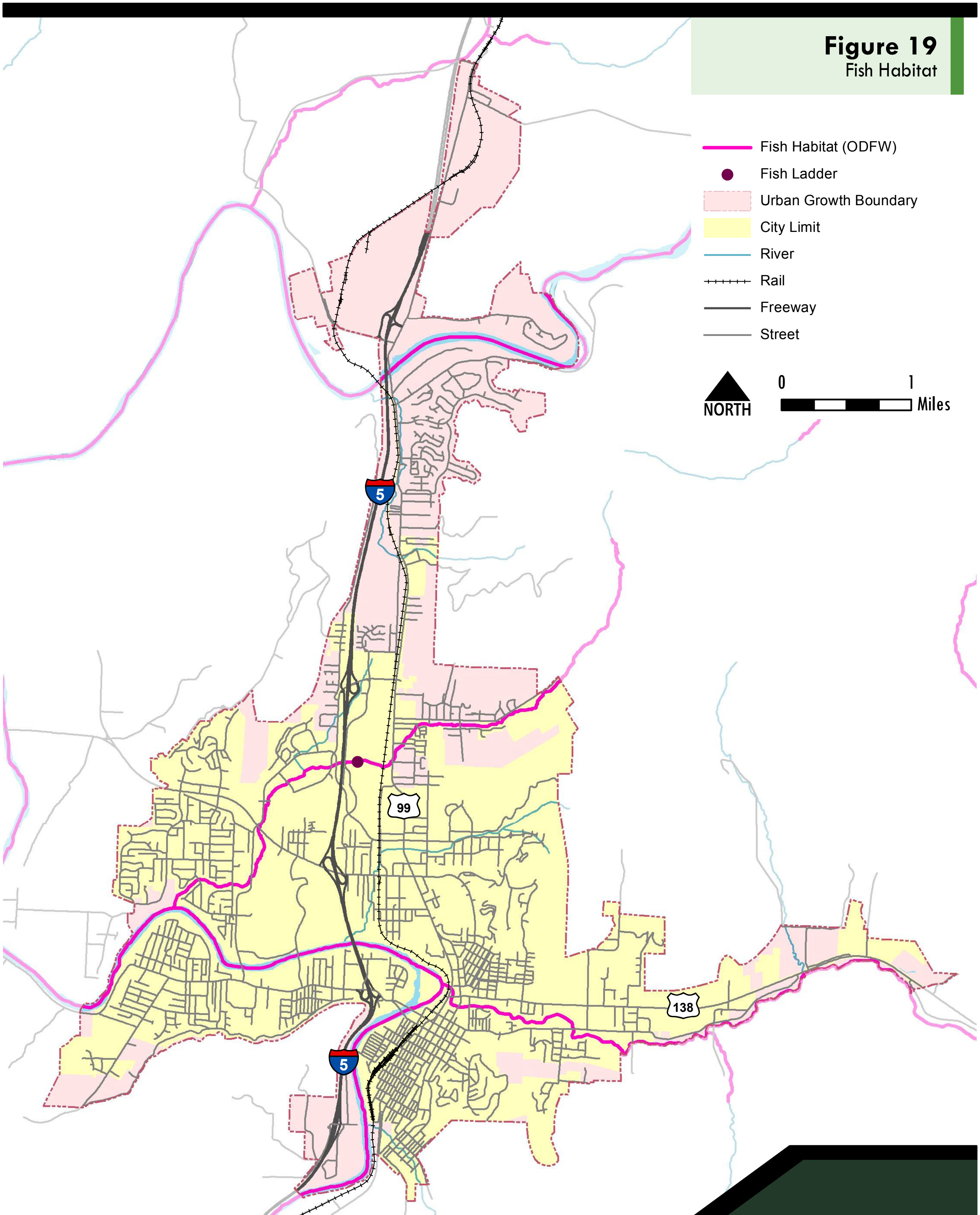
Wildlife Linkages – Wildlife linkages are key movement areas for wildlife, with an emphasis on areas that cross paved roads. Linkage areas are inclusive of a variety of species, including big game mammals, small mammals, amphibians, and reptiles. Areas within Roseburg will need additional surveys or on-site assessment to assess the appropriate level of remedial action needed to improve habitat connectivity and wildlife passages across State highways.

Figure 20 shows areas that are prioritized, based on a combination of various data and qualities, including ODOT's Wildlife Collision Hotspots, areas in close proximity to public lands; areas with the several species present; and more.[24] A higher priority indicates that the area is critical for providing safe wildlife crossings. I-5 in Southern Oregon experiences more deer/vehicle collisions than anywhere else in Oregon. In Roseburg, this generally coincides with high priority areas where I-5 and major rivers cross. The area with highest priority also overlaps, to some extent, with River Front Park. Improvements to transportation facilities in these areas should consider, and mitigate to the extent feasible, impacts to nearby wildlife.

Threatened and Endangered listed species – A detailed list of the Threatened and Endangered (T&E) species within the UGB was not available. A comprehensive list of T&E species for the state of Oregon is available through ODFW.[25]

[23] Source: Oregon Department of Fish and Wildlife (ODFW) Fish Habitat Distribution Data and StreamNet Generalized Fish Distribution, All Species Combined. StreamNet is a cooperative information management project focuses on fisheries and aquatic related data for the Pacific Northwest.
[24] Source: Oregon Department of Fish and Wildlife (ODFW) Wildlife Linkages Datasets
[25] Source: http://www.dfw.state.or.us/wildlife/diversity/species/threatened_endangered_candidate_list.asp

Figure 19
Fish Habitat



City of Roseburg
Transportation System Plan

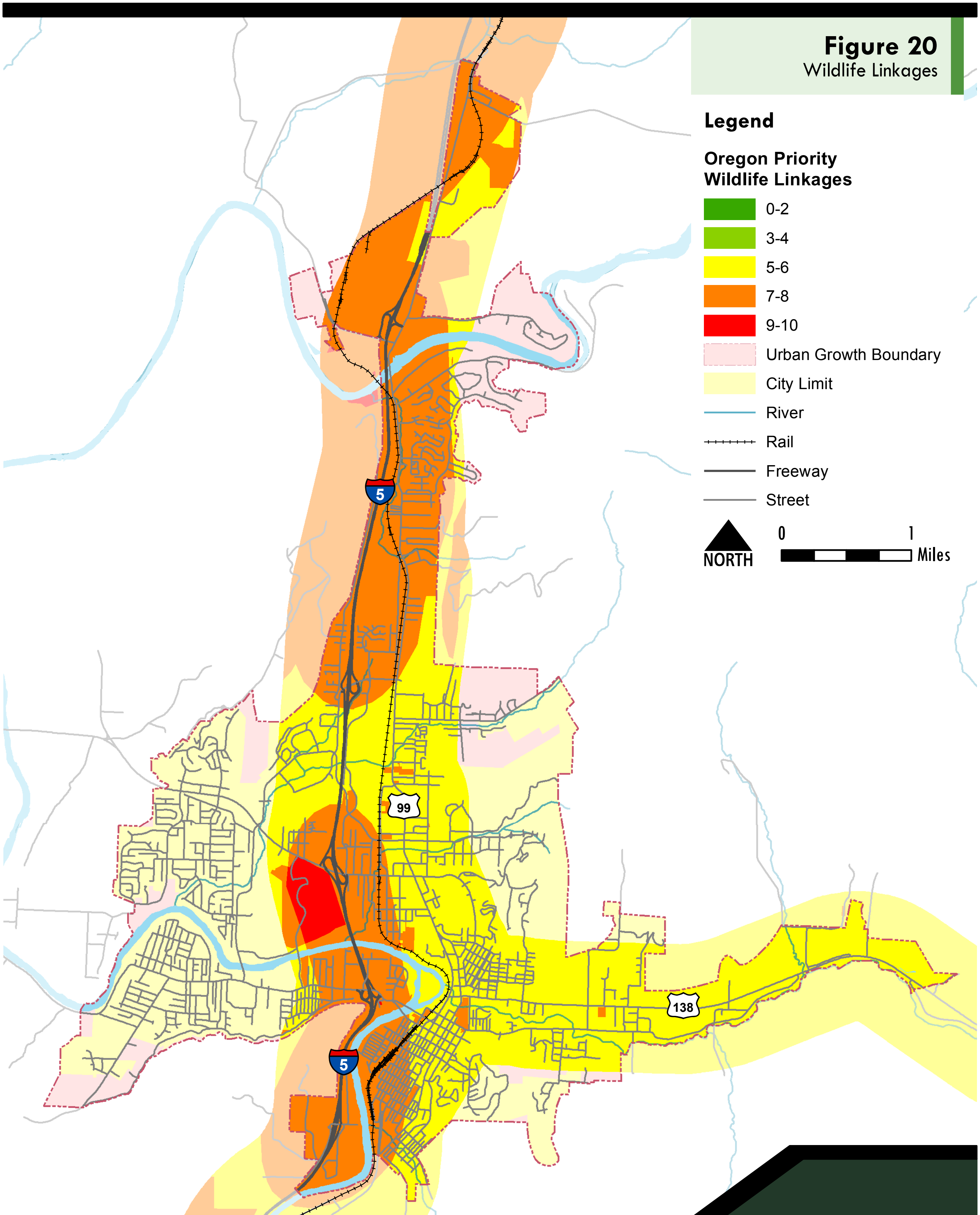


Figure 20
Wildlife Linkages
Legend
Oregon Priority Wildlife Linkages
0-2
3-4
5-6
7-8
9-10
Urban Growth Boundary
City Limit
River
Rail
Freeway
Street
NORTH
0
1
Miles
5
99
138
5

Flood Hazards

Congress enacted the National Flood Insurance Program to encourage local governments to adopt sound floodplain management programs and to provide subsidized flood insurance in flood hazard areas. Flood hazard areas are identified in the Flood Insurance Rate Map (FIRM) and can be considered high-risk areas. There is a 1% chance in any given year that a flood can occur in these areas.

There are two large rivers and two creeks in Roseburg that contribute to potential flood zones. The large rivers include the North Umpqua River and the South Umpqua River. The contributing creeks include Newton Creek and Deer Creek, each connecting to the South Umpqua River.

Figure 21 illustrates the flood hazard areas that have been identified and mapped by FEMA. The 100-year flood is the area that has 1% chance of being equaled or exceeded in any single year. The 500-year flood is the area that has 0.2% chance of being equaled or exceeded in any single year.

Environmental Hazards

The Oregon Department of Environmental Quality (DEQ) databases for Environmental Cleanup Site Information (ESCI) and Leaking Underground Storage Tank (LUST) cleanup sites were used to show the general location of hazardous material locations within Roseburg (see Figure 22).[26] These figures identify all existing locations (per current DEQ databases) that are current hazardous waste site/generators, have leaking underground storage tanks (where cleanup has not been completed), and are/were environmental cleanup sites. An assessment of each permit would be necessary to determine future impacts on transportation project development; such a review would indicate if an identified hazard location is in good standing, has completed cleanups where an issue was previously identified, is in the process of completing a cleanup, or if no further action is required to address the noted issue. The majority of hazardous sites are located near NW Garden Valley Boulevard, NE Stephens Street and around the downtown area.

[26] Source: Oregon Department of Environmental Quality (DEQ) Environmental Cleanup Site Information (ESCI) Database; Oregon DEQ Leaking Underground Storage Tank (LUST) Cleanup Database

Figure 21
FEMA Flood Zone

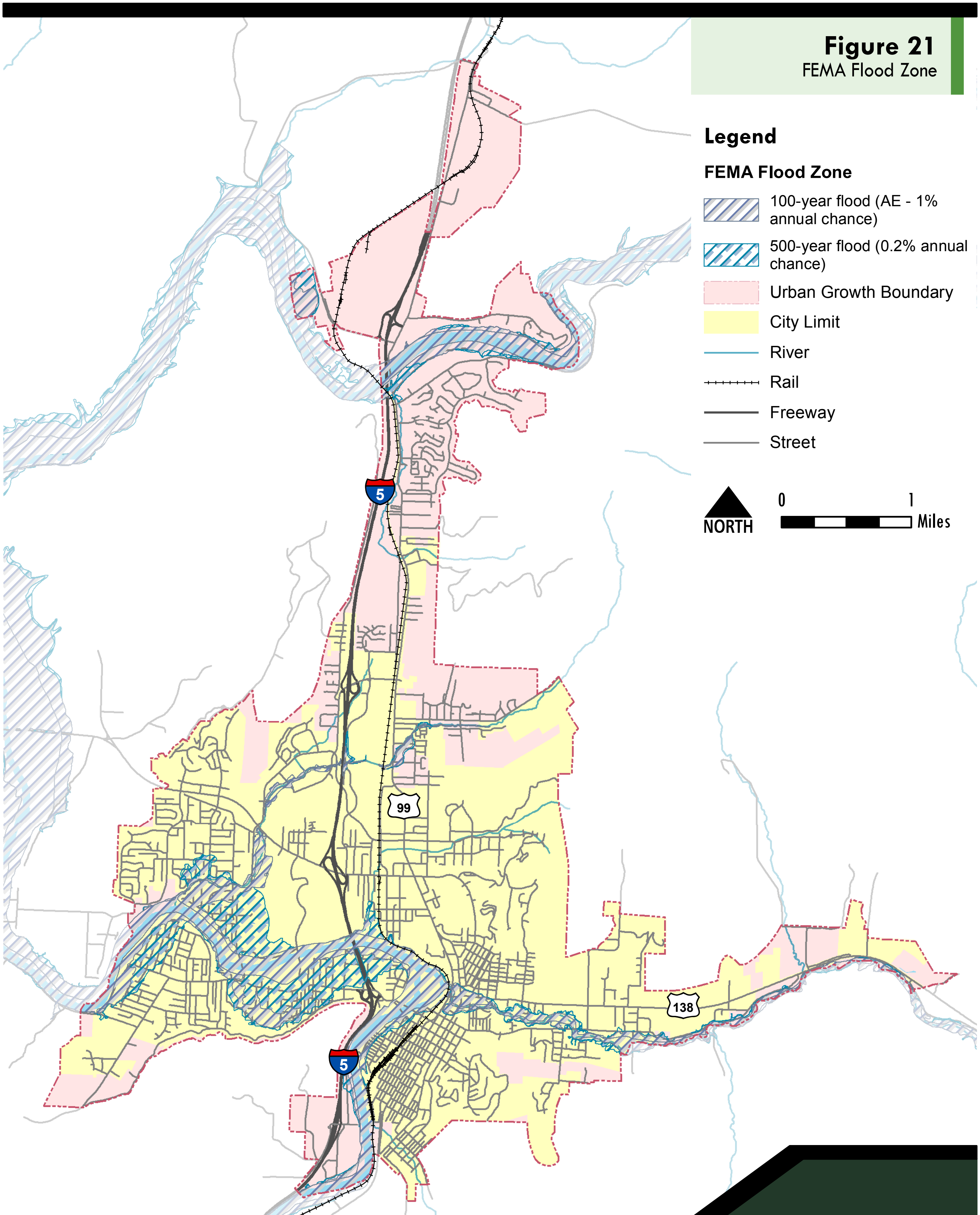
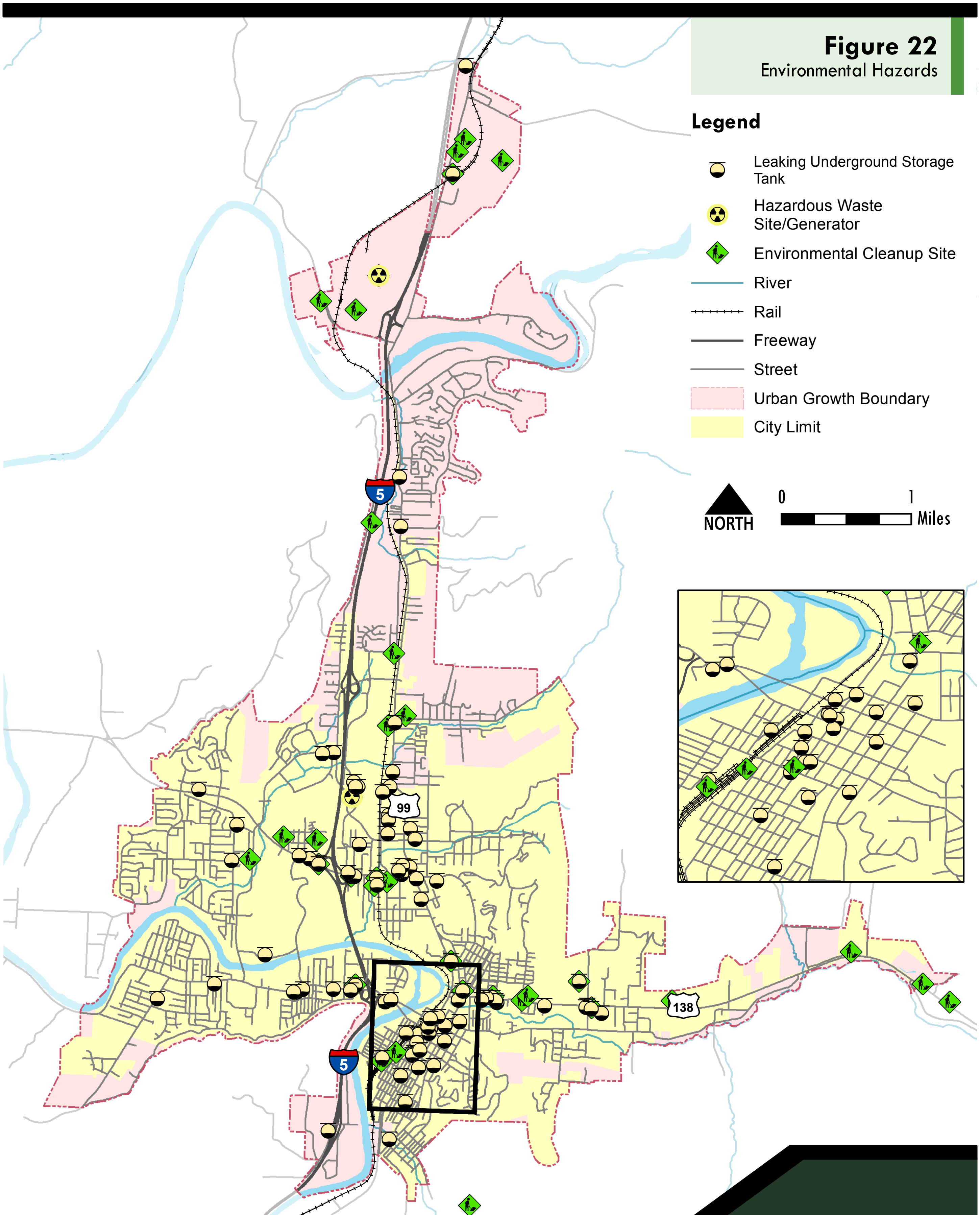


Figure 22
Environmental Hazards



City of Roseburg
Transportation System Plan

Historic Resources and Archaeological Resources

Under Section 106 of the National Historic Preservation Act of 1966, federal agencies, and the state and local agencies to which the federal agency has delegated responsibility, are directed to avoid undertakings that adversely affect properties that are included in or are eligible for inclusion in the National Register of Historic Places (NRHP). The NRHP identifies and documents (in partnership with state, federal, and tribal preservation programs) districts, sites, buildings, structures, and objects that are significant in American history, architecture, archaeology, engineering, and culture. This section summarizes NRHP resources in the study area as well as other historic, prehistoric, and cultural resources.

The State Historic Preservation Office (SHPO) database was consulted to identify any historical resources located within the interchange study area. There are four registered historic districts:

- Laurelwood Historic District – a residential neighborhood located east of Roseburg High School
- Roseburg Downtown Historic District – downtown commercial historic district listed in 2003
- Mill-Pine Neighborhood Historic District – a residential neighborhood located south of the Roseburg Downtown Historic District
- Roseburg Veterans Administration Historic District

Data for archaeological resources was not available for the update of this TSP.

Section 4(f) and 6(f) Resources

Section 4(f) refers to the original section within the U.S. Department of Transportation Act of 1966 which established a formal requirement that certain land uses be carefully considered and protected during the planning and construction of federally funded transportation improvement projects. Section 4(f) resources typically fall into the following categories:

- Recreational areas and parks (publicly owned and open to the public) of national, state, or local significance
- Wildlife and waterfowl refuges (publicly owned) of national, state, or local significance
- Historic sites (in public or private ownership) of national, state, or local significance

Under these definitions, potential 4(f) resources within Roseburg include:

- All historic resource sites listed in the Laurelwood Historic District, Roseburg Downtown Historic District, Mill-Pine Neighborhood Historic District, and the Roseburg Veterans Administration Historic District.
- Riverside Park
- Stewart Park
- Riverfront Park
- Gaddis Park
- Deer Creek Park
- Templin Beach Park
- Roseburg Municipal Golf Course

In 1965, the Land and Water Conservation Fund Act was formed to assist local, state, and federal agencies in meeting the demand for outdoor recreation sites. Section 6(f) of this act states that once a city, county, or agency has used funds for this purpose, either the land or the park cannot be eliminated or acquired without coordination with the National Park Service (NPS) and mitigation that replaces the eliminated items. There are no known lands created through this funding act within Roseburg.

National Heritage Database

Data was not available to review within the Roseburg UGB.

Appendix A: City Pavement Conditions

Network Summary Statistics

Printed: 09/02/2015

	Total Sections	Total Center Miles	Total Lane Miles	PCI
Arterial	51	14.55	56.06	73
Collector	94	16.99	35.89	76
Residential/Local	726	79.07	155.01	71
**** Combined**	1	0.06	0.06	N/A
Gravel	1	0.06	0.06	N/A
Total	**872**	**110.67**	**247.02**	

Overall Network PCI as of 9/2/2015: 72

**** Combined Sections are those without a PCI Date - they have not been inspected or had a Treatment applied.**

Section PCI/RSL Listing

Printed: 09/02/2015

Street ID	Section ID	Street Name	From	To	Length	Width	Area	Functional Class	Surface Type	Current PCI	Remaining Life
AGEEST	010	AGEE ST W	W HARVARD AVE	W BRADFORD AVE	876	27	23,652	R - Residential/Local	A - AC	85	29.24
AIRPOR	010	AIRPORT RD NE	NE GARDEN VALLEY BLVD	LOT #1528/90 DEGREE CORNER	646	37	23,902	C - Collector	O - AC/AC	91	35.38
AIRPOR	020	AIRPORT RD NE	LOT #1528/90 DEGREE CORNER	NE STEWART PKWY	821	37	30,377	C - Collector	O - AC/AC	91	35.38
AIRPOR	030	AIRPORT RD NE	NE STEWART PKWY	NE CHANNON AVE	266	38	10,108	C - Collector	O - AC/AC	91	35.38
AIRPOR	040	AIRPORT RD NE	NE CHANNON AVE	NE EXCHANGE AVE	1,913	37	70,781	C - Collector	A - AC	68	11.63
ALAMED	010	ALAMEDA AVE NE	NE STEPHENS ST	NE VINE ST	933	32	29,856	C - Collector	A - AC	91	21.19
ALAMED	020	ALAMEDA AVE NE	NE VINE ST	NE SUNSET ST	923	32	29,536	C - Collector	A - AC	62	8.54
ALAMED	030	ALAMEDA AVE NE	NE SUNSET ST	NE TODD ST	936	32	29,952	C - Collector	O - AC/AC	75	20.44
ALAMED	040	ALAMEDA AVE NE	NE TODD ST	NE WINTER ST	1,148	32	36,736	C - Collector	O - AC/AC	74	19.7
ALAMED	050	ALAMEDA AVE NE	NE WINTER ST	NE ROSE MOUNTAINS T	1,347	32	43,104	C - Collector	A - AC	91	21.19
ALAMOS	010	ALAMOSA CT W	W SHENANDOAH ST	CUL DE SAC	221	32	7,072	R - Residential/Local	O - AC/AC	79	29.03
ALDER	010	ALDER ST NE	NE WEST AVE	NE CHESTNUT AVE	434	22	9,548	R - Residential/Local	A - AC	42	6.26
ALMIRA	010	ALMIRA ST NW	100 FT S. OF MARTIN AVE	NW FLORA AVE	566	32	18,112	R - Residential/Local	A - AC	91	32.53
ALMOND	010	ALMOND AVE NW	NW KLINE ST	NW ELLIOTT ST	779	25	19,475	R - Residential/Local	A - AC	89	31.55
ALPHA	010	ALPHA COURT W	W FAIR ST	DEAD END	597	20	11,940	R - Residential/Local	A - AC	61	15.84
ALTAMO	010	ALTAMONT ST W	W MILITARY AVE	W BROWN AVE	395	27	10,665	R - Residential/Local	A - AC	46	8
AMANDA	010	AMANDA CT NW	CITY LIMITS / HOUSE #205	BROAD ST	407	31	12,617	R - Residential/Local	A - AC	83	28.05
AMANDA	020	AMANDA CT NW	BROAD ST	CUL DE SAC EAST	170	31	5,270	R - Residential/Local	A - AC	79	25.49
ANDREA	010	ANDREA ST NW	NW DELRIDGE AVE	NW SUNBERRY DR	817	32	26,144	R - Residential/Local	O - AC/AC	74	25.7
ANGELA	010	ANGELA CT NW	CUL DE SAC W/O BROAD ST	CUL DE SAC EAST	441	31	13,671	R - Residential/Local	A - AC	84	28.68
ANNAVE	010	ANN AVE W	W NEBO ST	W FAIRHAVEN ST	416	32	13,312	R - Residential/Local	O - AC/AC	87	41.85
APACHE	010	APACHE DR NW	NW BEAUMONT AVE	NW WANELL ST	683	32	21,856	R - Residential/Local	O - AC/AC	85	38.69
ARIZON	010	ARIZONA ST SE	SE TEMPLIN AVE	SE HOOVER AVE	770	21	16,170	R - Residential/Local	O - AC/AC	90	46.97
ATLANT	010	ATLANTA ST NE	NE DIAMOND LAKE BLVD	NE ODELL AVE	308	34	10,472	R - Residential/Local	A - AC	87	30.43
ATLANT	020	ATLANTA ST NE	NE ODELL AVE	NE COMMERCIAL AVE	332	32	10,624	R - Residential/Local	A - AC	88	31
AVALON	010	AVALON ST W	W LORRAINE AVE	W SHASTA AVE	499	32	15,968	R - Residential/Local	O - AC/AC	78	30.89
AVERY	010	AVERY ST NW	NW LOMA VISTA DR	100 FT N. OF GLENMAR DR	467	32	14,944	R - Residential/Local	A - AC	73	24.53
AVERY	020	AVERY ST NW	100 FT N. OF GLENMAR DR	NW WITHERSPOON AVE	1,148	32	36,736	R - Residential/Local	A - AC	71	22.38

Section PCI/RSL Listing

Printed: 09/02/2015

Street ID	Section ID	Street Name	From	To	Length	Width	Area	Functional Class	Surface Type	Current PCI	Remaining Life
HEWITT	020	AVERY ST NW	STEPHENS ST	45' E/O STEPHENS ST	45	32	1,440	R - Residential/Local	A - AC	62	15.79
RUSSEL	010	AVERY ST NW	STEPHENS ST	END OF PAVEMENT	760	20	15,200	R - Residential/Local	A - AC	75	26.09
AVIATI	010	AVIATION DR NW	NW STEWART PKWY	LOT #2350	1,703	38	64,714	C - Collector	A - AC	62	9.24
AVIATI	020	AVIATION DR NW	LOT #2350	WIDE AVE	3,753	38	142,614	C - Collector	A - AC	64	9.99
AVIATI	030	AVIATION DR NW	WIDE AVE	NW EDENBOWER BLVD	604	50	30,200	C - Collector	A - AC	90	20.66
AVIATI	040	AVIATION DR NW	NW EDENBOWER BLVD	LOWES ENTRANCE	487	38	18,506	C - Collector	A - AC	90	20.66
AVIATI	050	AVIATION DR NW	LOWES ENTRANCE	GENERAL AVE	583	38	22,154	C - Collector	A - AC	71	12.6
AVIATI	060	AVIATION DR NW	AVIATION DR NW 2300 BLOCK	DEAD END SOUTH	717	20	14,340	C - Collector	S - ST	10	0
AVOYCT	010	AVOY CT NW	NW MOORE AVE	CUL DE SAC	216	27	5,832	R - Residential/Local	A - AC	74	24.44
AZALEA	010	AZALEA ST SE	SE MAGNOLIA ST	CUL DE SAC	338	24	8,112	R - Residential/Local	A - AC	73	21.65
BALLF	010	BALLF ST W	W MYRTLE AVE	W BROWN AVE	586	32	18,752	R - Residential/Local	O - AC/AC	61	15.03
BALLF	020	BALLF ST W	W BROWN AVE	W HARVARD AVE	508	32	16,256	R - Residential/Local	O - AC/AC	67	19.53
BALLF	030	BALLF ST W	W HARVARD AVE	100 FT N. OF NEILL AVE	1,123	32	35,936	R - Residential/Local	A - AC	81	26.72
BALSAM	010	BALSAM AVE SE	SE HILLSIDE DR	SE RAMP ST	340	27	9,180	R - Residential/Local	A - AC	89	31.54
BARAGE	010	BARAGER AVE NE	NE SUNSET LN	NE TODD ST E	876	24	21,024	R - Residential/Local	A - AC	73	23.5
BARNES	010	BARNES AVE NE	NE STEPHENS ST	NE GRANDVIEW DR	275	20	5,500	R - Residential/Local	A - AC	80	29.58
BARNES	020	BARNES AVE NE	NE CRESCENT ALLEY	PARKING LOT	170	16	2,720	R - Residential/Local	A - AC	47	7.56
BASCO	010	BASCO AVE NW	NW SOUTHWATER DR	NW KRING ST	321	32	10,272	R - Residential/Local	A - AC	71	22.66
BASIL	010	BASIL ST W	WOODSIDE AVE	ROSEMARY AVE	488	25	12,200	R - Residential/Local	A - AC	93	33.38
BEACON	010	BEACON ST NW	NW GARDEN VALLEY BLVD	DEAD END	1,023	20	20,460	R - Residential/Local	O - AC/AC	76	26.77
BEAUMO	010	BEAUMONT AVE NW	CUL DE SAC W. OF APACHE DR	NW KLINE ST	854	32	27,328	R - Residential/Local	O - AC/AC	73	24.64
BEAUMO	020	BEAUMONT AVE NW	NW KLINE ST	NW KEASEY ST	940	32	30,080	R - Residential/Local	O - AC/AC	89	45.6
BELLOW	010	BELLOWS ST W	W HARVARD AVE	HIGH SCHOOL ENTRANCE	558	40	22,320	R - Residential/Local	O - AC/AC	83	35.05
BELLOW	020	BELLOWS ST W	HIGH SCHOOL ENTRANCE	W FINLAY AVE	696	32	22,272	R - Residential/Local	O - AC/AC	82	33.41
BELLVI	010	BELLVIEW CT NE	NE STEPHENS ST	DEAD END/GATE	530	18	9,540	R - Residential/Local	A - AC	40	5.15
BERDIN	010	BERDINE ST W	W HARVARD AVE	W SHARP AVE	1,474	32	47,168	R - Residential/Local	O - AC/AC	72	24.11
BERDIN	020	BERDINE ST W	W SHARP AVE	W GILBERT AVE	628	32	20,096	R - Residential/Local	O - AC/AC	69	21.26
BERTHA	010	BERTHA AVE W	W FRANCIS	W ELAINE ST	504	32	16,128	R - Residential/Local	A - AC	73	22.94
BERTHA	020	BERTHA AVE W	W ELAINE AVE	W STANTON ST	282	37	10,434	R - Residential/Local	O - AC/AC	69	19.72
BETHEL	010	BETHEL AVE NW	NW RUTTER LN	NW MULHOLLAND DR	399	22	8,778	R - Residential/Local	A - AC	58	14.15

Section PCI/RSL Listing

Printed: 09/02/2015

Street ID	Section ID	Street Name	From	To	Length	Width	Area	Functional Class	Surface Type	Current PCI	Remaining Life
BEULAH	010	BEULAH DR NE	NE CENTRAL ST	NE LINCOLN ST	267	32	8,544	R - Residential/Local	A - AC	38	4.56
BEULAH	020	BEULAH DR NE	NE LINCOLN ST	NE NASH ST	371	29	10,759	R - Residential/Local	A - AC	88	31
BEULAH	030	BEULAH DR NE	NE NASH ST	HILLVIEW CT	946	22	20,812	R - Residential/Local	A - AC	38	4.59
BEULAH	040	BEULAH DR NE	HILLVIEW CT	END OF STRIPING HOUSE #1776	1,394	22	30,668	R - Residential/Local	A - AC	43	6.57
BEULAH	050	BEULAH DR NE	END OF STRIPING HOUSE #1776	PRIVATE DRIVE	284	19	5,396	R - Residential/Local	A - AC	67	17.31
BIRCH	010	BIRCH CT W	W FINLAY AVE	CUL DE SAC	247	25	6,175	R - Residential/Local	O - AC/AC	87	41.85
BLACK	010	BLACK AVE NW	NW CROUCH ST	NW ESTELLE ST	380	25	9,500	R - Residential/Local	A - AC	90	32.06
BLACK	020	BLACK AVE NW	NW ESTELLE AVE	PARKING LOT/150 FT E/O DOGWOOD	358	30	10,740	R - Residential/Local	A - AC	96	34.05
BLAKEL	010	BLAKELY AVE SE	SE STEPHENS ST	SE JACKSON ST	515	25	12,875	R - Residential/Local	P - PCC	19	0
BLOOMF	010	BLOOMFIELD CT NE	NE CUMMINS ST	CUL DE SAC	166	32	5,312	R - Residential/Local	A - AC	89	31.54
BODIE	010	BODIE ST W	W SHARP AVE	W GILBERT AVE	759	32	24,288	R - Residential/Local	O - AC/AC	70	21.69
BOGARD	010	BOGARD ST NE	NE FLESER AVE	NE DIAMOND LAKE BLVD	433	34	14,722	R - Residential/Local	O - AC/AC	88	34.9
BOOTHA	010	BOOTH AVE SE	SE MAIN ST	SE STARMER ST	1,095	32	35,040	R - Residential/Local	O - AC/AC	79	29.81
BOOTHA	020	BOOTH AVE SE	STARMER ST	ICHABOD ST	384	19	7,296	R - Residential/Local	O - AC/AC	47	9.03
BOOTHA	030	BOOTH AVE SE	ICHABOD ST	CITY LIMITS	826	17	14,042	R - Residential/Local	S - ST	25	0
BOSTON	010	BOSTON ST NE	NE DIAMOND LAKE BLVD	NE COMMERCIAL AVE	717	32	22,944	R - Residential/Local	A - AC	65	18.22
BOSTON	020	BOSTON ST NE	NE COMMERCIAL AVE	NE KLAMATH AVE	687	25	17,175	R - Residential/Local	A - AC	73	22.92
BOULDE	010	BOULDER DR NW	EDENBOWER BLVD	190' S/O EDENBOWER BLVD	190	36	6,840	R - Residential/Local	A - AC	76	25.92
BOULDE	020	BOULDER DR NW	190' S/O EDENBOWER BLVD	640' S/O EDENBOWER BLVD	447	36	16,092	R - Residential/Local	A - AC	98	34.14
BOWDEN	010	BOWDEN ST W	W CHAPMAN AVE	W RIVERSIDE DR	522	20	10,440	R - Residential/Local	P - PCC	34	5.23
BOWDEN	020	BOWDEN ST W	W RIVERSIDE DR	DEAD END	346	32	11,072	R - Residential/Local	A - AC	63	16.78
BRADFO	005	BRADFORD DR W	W SHARP AVE	W CARROLL CT	547	32	17,504	R - Residential/Local	O - AC/AC	69	20.79
BRADFO	010	BRADFORD DR W	W CARROLL CT	W BROCCOLI ST	496	32	15,872	R - Residential/Local	O - AC/AC	73	24.64
BRADFO	020	BRADFORD DR W	W BROCCOLI ST	W ORIOLE ST/ W AGEE ST	880	32	28,160	R - Residential/Local	A - AC	73	24.68
BRENT	010	BRENT CT NW	NW KLINE ST	CUL D ESAC	383	32	12,256	R - Residential/Local	A - AC	81	31.86
BROADS	010	BROAD ST NW	EDENBOWER BLVD	WALTER CT	2,167	31	67,177	C - Collector	A - AC	90	20.92
BROADS	020	BROAD ST NW	WALTER CT	CORDELIA CT	1,058	31	32,798	R - Residential/Local	A - AC	92	39.87
BROADS	030	BROAD ST NW	CORDELIA CT	END OF PAVEMENT	303	31	9,393	R - Residential/Local	A - AC	39	4.82

Section PCI/RSL Listing

Printed: 09/02/2015

Street ID	Section ID	Street Name	From	To	Length	Width	Area	Functional Class	Surface Type	Current PCI	Remaining Life
BROCCO	010	BROCCOLI ST W	LORRAINE AVE W	W JAY ST	728	32	23,296	R - Residential/Local	A - AC	69	21.04
BROCCO	020	BROCCOLI ST W	W JAY ST	W HARVARD AVE	513	26	13,338	R - Residential/Local	A - AC	60	14.75
BROCCO	030	BROCCOLI ST W	W HARVARD AVE	W BRADFORD DR	955	32	30,560	R - Residential/Local	A - AC	88	31.01
BROCCO	040	BROCCOLI ST W	W BRADFORD AVE	W ORIOLE DR	991	32	31,712	R - Residential/Local	A - AC	88	31.01
BROCKW	010	BROCKWAY AVE SE	SE STEPHENS ST	SE JACKSON ST	505	24	12,120	R - Residential/Local	A - AC	29	1.28
BROOKL	010	BROOKLYN AVE NE	NE POPLAR ST	NE TODD ST	1,069	26	27,794	R - Residential/Local	O - AC/AC	86	39.7
BROOKL	020	BROOKLYN AVE NE	NE TODD ST	NE TAYLOR ST	740	32	23,680	R - Residential/Local	O - AC/AC	80	30.88
BROOKL	030	BROOKLYN AVE NE	NE TAYLOR ST	NE WINTER ST	426	26	11,076	R - Residential/Local	O - AC/AC	80	30.88
BROOKL	040	BROOKLYN AVE NE	NE WINTER ST	END OF PAVEMENT	174	26	4,524	R - Residential/Local	O - AC/AC	81	37.1
BROWN	010	BROWN AVE W	W NEBO ST	W FAIRHAVEN ST	454	32	14,528	R - Residential/Local	A - AC	96	34.07
BROWN	020	BROWN AVE W	W FAIRHAVEN ST	W WHARTON ST	513	32	16,416	R - Residential/Local	O - AC/AC	56	14.06
BROWN	030	BROWN AVE W	W WHARTON ST	W MILITARY AVE	1,125	32	36,000	R - Residential/Local	O - AC/AC	56	14.06
BUCKHO	010	BUCKHORN RD	ST HWY 138	CITY LIMITS	209	42	8,778	R - Residential/Local	A - AC	71	20.44
BURKE	010	BURKE AVE SE	GATE	SE MILL ST	320	24	7,680	R - Residential/Local	A - AC	65	17.55
BURKE	020	BURKE AVE SE	SE MILL ST	SE STEPHENS ST	508	32	16,256	R - Residential/Local	A - AC	83	27.98
BYRDCT	010	BYRD CT SE	SE LELAND ST	PRIVATE GATE	171	12	2,052	R - Residential/Local	A - AC	81	30.83
CABRIL	010	CABRILLO CT NW	CUL DE SAC WEST	100 FT W. OF JEFFERY ST	346	25	8,650	R - Residential/Local	O - AC/AC	83	35.92
CABRIL	020	CABRILLO CT NW	100 FT W. OF JEFFREY ST	EAST CUL DE SAC	457	25	11,425	R - Residential/Local	O - AC/AC	76	26.07
CALEY	010	CALEY CT	ELLAN ST	HICKS ST	215	23	4,945	R - Residential/Local	A - AC	66	16.21
CALIFO	010	CALIFORNIA AVE SE	SE EASTWOOD ST	SE RAMP ST	387	16	6,192	R - Residential/Local	A - AC	43	6.69
CALKIN	010	CALKINS AVE NW	NW GROVE ST	NW TROOST ST	184	32	5,888	C - Collector	A - AC	72	13.33
CALKIN	020	CALKINS AVE NW	NW TROOST ST	NW JEFFERSON ST	1,187	37	43,919	C - Collector	O - AC/AC	87	31.05
CALKIN	030	CALKINS AVE NW	NW JEFFERSON ST	NW LESTER ST	591	37	21,867	C - Collector	O - AC/AC	87	31.05
CALKIN	040	CALKINS AVE NW	NW LESTER ST	NW KEASEY ST	909	37	33,633	C - Collector	O - AC/AC	87	31.05
CALKRD	010	CALKINS RD NW	HOUSE #2281	NW CALKINS AVE	846	24	20,304	R - Residential/Local	A - AC	55	12.47
CANTER	010	CANTERBURY DR NW	NW LILA AVE	HOUSE #2390	442	27	11,934	R - Residential/Local	A - AC	73	22.93
CANTER	020	CANTERBURY DR NW	HOUSE #2390	NW ESQUIRE DR	691	32	22,112	R - Residential/Local	O - AC/AC	76	26.77
CANTER	030	CANTERBURY DR NW	NW ESQUIRE DR	NW TROOST ST	655	32	20,960	R - Residential/Local	A - AC	70	21.96
CARDIN	010	CARDINAL ST W	W SHARP AVE	W GILBERT AVE	740	32	23,680	R - Residential/Local	O - AC/AC	71	23.12
CARLAV	010	CARL AVE NW	NW KRING ST	NW ELLIS ST	132	32	4,224	R - Residential/Local	A - AC	89	31.55
CARLAV	020	CARL AVE NW	NW ELLIS ST	DEAD END E.OF KEASEY ST	229	24	5,496	R - Residential/Local	O - AC/AC	67	20.61

Section PCI/RSL Listing

Street ID	Section ID	Street Name	From	To	Length	Width	Area	Functional Class	Surface Type	Current PCI	Remaining Life
CARMEN	010	CARMEN CT NE	KIRBY AVE	DEAD END	373	31	11,563	R - Residential/Local	A - AC	71	22.45
CARROL	010	CARROLL CT W	W BRADFORD AVE	DEAD END SOUTH	396	27	10,692	R - Residential/Local	A - AC	72	21.06
CASCAD	010	CASCADE CT SE	SE TERRACE DR	CUL DE SAC	246	28	6,888	R - Residential/Local	O - AC/AC	74	26.19
CASEY	010	CASEY ST W	W CHAPMAN AVE	W RIVERSIDE DR	513	20	10,260	R - Residential/Local	P - PCC	48	15.25
CASPER	010	CASPER ST NE	NE DIAMOND LAKE BLVD	NE ODELL AVE	337	37	12,469	R - Residential/Local	A - AC	68	18.75
CASPER	020	CASPER ST NE	NE ODELL AVE	NE COMMERCIAL AVE	417	24	10,008	R - Residential/Local	C - AC/PCC	51	11.45
CASPER	030	CASPER ST NE	NE COMMERCIAL AVE	NE KLAMATH AVE	712	20	14,240	R - Residential/Local	C - AC/PCC	57	15.59
CASPER	040	CASPER ST NE	NE KLAMATH AVE	NE MALHEUR AVE	367	17	6,239	R - Residential/Local	A - AC	67	19.97
CASPER	050	CASPER ST NE	NE MALHEUR AVE	DEAD END	255	14	3,570	R - Residential/Local	A - AC	60	13.88
CASSAV	010	CASS AVE SE	SE FLINT ST	SE PARROTT ST	265	18	4,770	R - Residential/Local	S - ST	42	3.72
CASSAV	020	CASS AVE SE	SE SHERIDAN ST	SE PINE ST	133	28	3,724	R - Residential/Local	A - AC	85	36.58
CASSAV	030	CASS AVE SE	SE PINE ST	SE ROSE ST	491	32	15,712	C - Collector	A - AC	79	15.21
CASSAV	040	CASS AVE SE	SE ROSE ST	SE MAIN ST	362	32	11,584	C - Collector	A - AC	63	9.12
CASSAV	050	CASS AVE SE	SE MAIN ST	SE CHADWICK ST	509	32	16,288	C - Collector	O - AC/AC	75	20.49
CASSAV	060	CASS AVE SE	SE CHADWICK ST	SE METZGER CT	138	34	4,692	C - Collector	A - AC	73	12.69
CASSAV	070	CASS AVE SE	SE METZGER CT	SE OVERLOOK AVE	236	20	4,720	C - Collector	A - AC	77	14.33
CATHER	010	CATHERINE AVE W	W FAIRHAVEN AVE	W NEBO ST	418	32	13,376	R - Residential/Local	O - AC/AC	87	41.85
CECIL	010	CECIL AVE NW	NW RUTTER LN	NW MULHOLLAND DR	332	32	10,624	R - Residential/Local	O - AC/AC	74	24.52
CECIL	020	CECIL AVE NW	NW MULHOLLAND DR	NW EDEN ST	382	32	12,224	R - Residential/Local	A - AC	77	27.45
CECIL	030	CECIL AVE NW	NW EDEN ST	NW FAIRMOUNT ST	663	32	21,216	R - Residential/Local	A - AC	78	28.54
CEDARR	010	CEDAR RIDGE CT NW	NW TROOST ST	CUL DE SAC	761	32	24,352	R - Residential/Local	A - AC	85	36.6
CEDAR	010	CEDAR ST NE	CUL DE SAC SOUTH	NE CHESTNUT AVE	1,125	20	22,500	C - Collector	A - AC	69	11.19
CEDAR	020	CEDAR ST NE	NE CHESTNUT AVE	NE GARDEN VALLEY BLVD	1,325	38	50,350	C - Collector	A - AC	87	19.08
CENTER	010	CENTER ST W	W HARVARD AVE	W SUSAN ST	920	32	29,440	R - Residential/Local	O - AC/AC	74	26.22
CENTER	020	CENTER ST W	W SUSAN ST	W SHARP AVE	599	32	19,168	R - Residential/Local	O - AC/AC	71	23.12
CENTRA	010	CENTRAL ST NE	NE MALHEUR AVE	NE BEULAH DR	275	22	6,050	R - Residential/Local	A - AC	62	16.55
CENTRA	020	CENTRAL ST NE	NE BEULAH DR	END OF PAVEMENT	230	22	5,060	R - Residential/Local	A - AC	64	16.43
CHADWI	010	CHADWICK ST SE	DEAD END S. OF LANE AVE	SE LANE AVE	366	25	9,150	R - Residential/Local	O - AC/AC	79	30.59
CHADWI	020	CHADWICK ST SE	SE LANE AVE	SE CASS AVE	405	20	8,100	R - Residential/Local	O - AC/AC	62	15.32
CHADWI	030	CHADWICK ST SE	SE CASS AVE	SE WASHINGTON AVE	747	28	20,916	R - Residential/Local	A - AC	68	20.38
CHADWI	040	CHADWICK ST SE	SE WASHINGTON AVE	SE DOUGLAS AVE	371	28	10,388	R - Residential/Local	A - AC	72	21.07
CHAMBE	010	CHAMBERS DR NW	NW LOMA VISTA DR	NW LOMA VISTA DR	1,050	32	33,600	R - Residential/Local	A - AC	77	26.89

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Street ID	Section ID	Street Name	From	To	Length	Width	Area	Functional Class	Surface Type	Current PCI	Remaining Life
CHANNO	010	CHANNON AVE NE	NE AIRPORT RD	NE STEPHENS ST	920	32	29,440	R - Residential/Local	A - AC	74	24.88
CHANNO	020	CHANNON AVE NE	NE STEPHENS ST	NE MADISON CT	355	38	13,490	R - Residential/Local	O - AC/AC	73	23.47
CHANNO	030	CHANNON AVE NE	NE MADISON CT	NE VINE ST	549	32	17,568	R - Residential/Local	O - AC/AC	77	27.97
CHAPMA	010	CHAPMAN AVE W	GATE 100 FT W. OF BOWDEN ST	W MADRONE ST	492	24	11,808	R - Residential/Local	P - PCC	53	19.53
CHAPMA	020	CHAPMAN AVE W	W MADRONE ST	W RIVERSIDE DR	284	22	6,248	R - Residential/Local	C - AC/PCC	82	30.86
CHATEA	010	CHATEAU AVE W	W HICKORY ST	W LOOKINGGLASS RD	1,165	32	37,280	R - Residential/Local	O - AC/AC	72	24.49
CHERRY	010	CHERRY DR NW	NW JEFFERSON	NW OERDING DR	1,733	32	55,456	R - Residential/Local	A - AC	76	26.41
CHERRY	020	CHERRY DR NW	NW OERDING AVE	NW CALKINS AVE	404	32	12,928	R - Residential/Local	A - AC	73	21.67
CHESTN	010	CHESTNUT AVE NE	NW HIGHLAND ST	NW CEDAR ST	500	40	20,000	C - Collector	A - AC	83	17.08
CHESTN	020	CHESTNUT AVE NE	NE CEDAR ST	NE ALDER ST	1,046	38	39,748	C - Collector	A - AC	70	12.52
CHESTN	030	CHESTNUT AVE NE	NE ALDER ST	NE STEPHENS ST	582	40	23,280	C - Collector	A - AC	68	11.62
CHINAB	010	CHINABERRY AVE SE	DEAD END WEST	SE RAMP ST	325	29	9,425	R - Residential/Local	A - AC	74	22.27
CHINAB	020	CHINABERRY AVE SE	SE RAMP ST	150 FT E. OF CLEARWATER CT	326	32	10,432	R - Residential/Local	A - AC	84	28.6
CHINAB	030	CHINABERRY AVE SE	150 FT E. OF CLEARWATER CT	SE RIFLE RANGE ST	633	31	19,623	R - Residential/Local	A - AC	79	28.76
CHURCH	010	CHURCH AVE NE	NE VINE ST	NE POPLAR ST	696	32	22,272	R - Residential/Local	A - AC	74	24.43
CLAIRE	010	CLAIRE ST SE	SE DOUGLAS AVE	DEAD END	549	24	13,176	R - Residential/Local	P - PCC	29	2.24
CLEARW	010	CLEARWATER CT SE	SE CHINABERRY AVE	CUL DE SAC	241	32	7,712	R - Residential/Local	A - AC	87	30.42
CLOVER	010	CLOVER AVE NE	NE VINE ST	DEAD END EAST	618	32	19,776	R - Residential/Local	A - AC	59	13.93
CLOVER	020	CLOVER AVE NE	STEPHENS ST	60' E/O STEPHENS	60	30	1,800	R - Residential/Local	A - AC	71	22.45
COBBST	005	COBB ST SE	DEAD END SOUTH	BEGINNING OF PCC	243	20	4,860	R - Residential/Local	A - AC	90	41.03
COBBST	010	COBB ST SE	BEG OF PCC S. OF RICE AVE	RICE AVE	338	20	6,760	R - Residential/Local	P - PCC	35	5.87
COBBST	020	COBB ST SE	SE RICE AVE	SE WAITE AVE	703	17	11,951	R - Residential/Local	A - AC	85	35.69
COBBST	030	COBB ST SE	SE WAITE AVE	SE HAYNES AVE	354	20	7,080	R - Residential/Local	C - AC/PCC	35	3.94
COBBST	040	COBB ST SE	SE HAYNES AVE	SE BROCKWAY AVE	365	20	7,300	R - Residential/Local	P - PCC	34	5.23
COBBST	050	COBB ST SE	SE BROCKWAY AVE	SE MCCLELLAN AVE	611	20	12,220	R - Residential/Local	S - ST	28	0.46
COLLDR	010	COLLEGE DR NE	NE WEST AVE	END OF PAVEMENT	217	16	3,472	R - Residential/Local	S - ST	46	4.97
COLLEG	010	COLLEGE ST NE	NE CEDAR ST	NE WALNUT ST	508	32	16,256	R - Residential/Local	O - AC/AC	73	23.47
COLORA	010	COLORADO DR	HILLSIDE DR	EASTWOOD ST	408	10	4,080	R - Residential/Local	A - AC	52	10.64
COLVIN	010	COLVIN AVE W	W HARRIS HILLS DR	W WINTER RIDGE DR	378	32	12,096	R - Residential/Local	A - AC	84	28.62
COMMER	010	COMMERCIAL AVE NE	NE NASH ST	NE JACKSON ST	318	22	6,996	R - Residential/Local	P - PCC	33	4.71

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Street ID	Section ID	Street Name	From	To	Length	Width	Area	Functional Class	Surface Type	Current PCI	Remaining Life
COMMER	020	COMMERCIAL AVE NE	NE JACKSON ST	NE CASPER ST	887	42	37,254	R - Residential/Local	A - AC	82	27.36
COMMER	030	COMMERCIAL AVE NE	NE CASPER ST	NE DENVER ST	363	24	8,712	R - Residential/Local	A - AC	53	10.07
COMMER	040	COMMERCIAL AVE NE	NE DENVER ST	NE FULTON ST	721	15	10,815	R - Residential/Local	A - AC	20	0
COPPER	010	COPPER CT W	W FROMDAHL DR	CUL DE SAC	240	32	7,680	R - Residential/Local	A - AC	70	20.91
CORDEL	010	CORDELIA CT NW	CUL DE SAC W/O BROAD ST	CUL DE SAC EAST	480	31	14,880	R - Residential/Local	A - AC	83	28.05
COREY	010	COREY CT W	BEG OF PAVEMENT	90 DEGREE CORNER	268	27	7,236	R - Residential/Local	A - AC	15	0
COREY	020	COREY CT W	90 DEGREE CORNER	W HARVARD AVE	246	32	7,872	R - Residential/Local	A - AC	41	5.65
CORRIN	010	CORRINE DR SE	SE MAGNOLIA DR	SE MAGNOLIA DR	342	32	10,944	R - Residential/Local	A - AC	42	6.05
COURT	010	COURT AVE SE	SE ROSE ST	SE JACKSON ST	242	20	4,840	R - Residential/Local	C - AC/PCC	85	32.96
COURT	020	COURT AVE SE	SE FOWLER ST	SE ELLA ST	554	22	12,188	R - Residential/Local	A - AC	74	22.27
COURT	030	COURT AVE SE	SE ELLA ST	CUL DE SAC EAST	366	18	6,588	R - Residential/Local	O - AC/AC	81	33.13
CRESCA	010	CRESCENT ALLEY NE	NE HUNTLEY AVE	NE DIXON ST	365	18	6,570	R - Residential/Local	O - AC/AC	39	5.64
CRESCA	020	CRESCENT ALLEY NE	NE DIXON ST	NE BARNES AVE	343	14	4,802	R - Residential/Local	A - AC	37	4.13
CRESCE	010	CRESCENT ST NE	75 FT S.OF DIXON ST	150 FT N. OF DIXON ST	225	12	2,700	R - Residential/Local	A - AC	44	7.13
CRESTC	010	CREST CT NW	NW EVANS AVE	CUL DE SAC	678	19	12,882	R - Residential/Local	A - AC	61	15.97
CRESTV	010	CRESTVIEW AVE W	W INDIANOLA	W PILGER ST	911	32	29,152	R - Residential/Local	A - AC	77	27.69
CROUCH	010	CROUCH ST NW	NW GARDEN VALLEY BLVD	NW HILL AVE	757	25	18,925	R - Residential/Local	A - AC	81	26.71
CUMMIN	010	CUMMINS ST NE	NE DIAMOND LAKE BLVD	ROAD WIDENS(HOUSE#572)	824	23	18,952	R - Residential/Local	A - AC	55	12.39
CUMMIN	020	CUMMINS ST NE	ROAD WIDENS(HOUSE#572)	DEAD END NORTH	767	32	24,544	R - Residential/Local	A - AC	89	31.54
DAYSHA	010	DAYSHA DR NW	NW KLINE ST	NW HUNTER CT	1,591	27	42,957	R - Residential/Local	A - AC	76	26.15
DAYSHA	020	DAYSHA DR NW	NW HUNTER CT	DEAD END NORTH	516	25	12,900	R - Residential/Local	A - AC	92	32.95
DEEST	010	DEE ST NE	NE GARDEN VALLEY BLVD	NE OAKLAND AVE	466	32	14,912	R - Residential/Local	O - AC/AC	77	27.97
DEERCR	010	DEER CREEK DR SE	SE HENRY ST	DEAD END WEST	232	16	3,712	R - Residential/Local	A - AC	36	3.61
DELRID	010	DELRIDGE AVE NW	NW ANDREA ST	NW TROOST ST	695	32	22,240	R - Residential/Local	O - AC/AC	68	19.91
DELRID	020	DELRIDGE AVE NW	NW TROOST ST	NW LYNWOOD ST	465	32	14,880	R - Residential/Local	A - AC	71	20.46
DELYNN	010	DELYNNE CT NE	NE VENTURA ST	CUL DE SAC	215	32	6,880	R - Residential/Local	A - AC	68	18.68
DENNAV	010	DENN AVE NE	50 FT W. OF MIGUEL ST	NE VENTURA ST	536	32	17,152	R - Residential/Local	A - AC	67	19.79
DENVER	010	DENVER ST NE	NE COMMERCIAL AVE	NE KLAMATH AVE	704	20	14,080	R - Residential/Local	P - PCC	51	17.32
DENVER	020	DENVER ST NE	NE KLAMATH AVE	NE OSWEGO AVE	188	18	3,384	R - Residential/Local	P - PCC	33	4.69
DENVER	030	DENVER ST NE	NE OSWEGO AV	DEAD END	85	10	850	R - Residential/Local	A - AC	62	14.69

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DICKEY	010	DICKEY CT SE	SE HENRY ST	DEAD END	184	24	4,416	R - Residential/Local	A - AC	35	3.24
DILLAR	010	DILLARD AVE SE	SE KANE ST	DEAD END	288	10	2,880	R - Residential/Local	S - ST	17	0
DIXON	010	DIXON ST NE	NE STEPHENS ST	FULTON ST/CRESCENT (2ND INT)	617	20	12,340	R - Residential/Local	A - AC	83	27.98
DOGWOO	010	DOGWOOD ST NW	NW GARDEN VALLEY AVE	NW HILL AVE	1,048	22	23,056	R - Residential/Local	A - AC	64	17.66
DOGWOO	020	DOGWOOD ST NW	NW HILL AVE	CUL DE SAC/PRIVATE DRIVE	634	22	13,948	R - Residential/Local	A - AC	80	26.07
DOMENI	010	DOMENICO DR NW	NW HARVEY AVE	100 FT N. OF YOUNGWOOD CT	486	32	15,552	R - Residential/Local	A - AC	90	32.07
DOMENI	020	DOMENICO DR NW	100 FT N. OF YOUNGWOOD CT	NW KEASEY ST	1,144	32	36,608	R - Residential/Local	A - AC	86	29.85
DORWIN	010	DORWIN AVE NE	NE MIGUEL ST	CUL DE SAC	334	29	9,686	R - Residential/Local	A - AC	53	11.42
DOSGAT	010	DOS GATOS CT SE	SE DOUGLAS AVE	CUL DE SAC	267	27	7,209	R - Residential/Local	A - AC	77	27.44
DOUGLA	070	DOUGLAS AVE NE	WEST END OF BRIDGE	SE RIFLE RANGE DR	717	28	20,076	C - Collector	A - AC	65	10.22
DOUGLA	080	DOUGLAS AVE NE	SE RIFLE RANGE DR	NE LOMBARDY DR	2,566	21	53,886	C - Collector	O - AC/AC	92	29.31
DOUGLA	090	DOUGLAS AVE NE	NE LOMBARDY DR	CITY LIMITS	426	22	9,372	C - Collector	A - AC	67	10.46
DOUGLA	100	DOUGLAS AVE NE	210' S/O DIAMOND LAKE BLVD	DIAMOND LAKE BLVD	210	32	6,720	C - Collector	A - AC	73	12.77
DOUGLA	010	DOUGLAS AVE SE	SE SPRUCE ST	SE STEPHENS ST	517	28	14,476	R - Residential/Local	A - AC	40	5.42
DOUGLA	020	DOUGLAS AVE SE	SE STEPHENS ST	SE JACKSON ST	525	35	18,375	C - Collector	A - AC	72	11.94
DOUGLA	030	DOUGLAS AVE SE	SE JACKSON ST	SE CHADWICK ST	722	40	28,880	C - Collector	A - AC	67	9.73
DOUGLA	040	DOUGLAS AVE SE	SE CHADWICK ST	SE CLAIRE ST	1,030	32	32,960	C - Collector	A - AC	77	14.64
DOUGLA	050	DOUGLAS AVE SE	SE CLAIRE ST	SE LELAND ST	1,732	32	55,424	C - Collector	A - AC	66	10.63
DOUGLA	060	DOUGLAS AVE SE	SE LELAND ST	WEST END OF BRIDGE	1,578	32	50,496	C - Collector	A - AC	65	10.22
DOWNEY	010	DOWNEY AVE SE	SE RAMP ST	DEAD END	307	32	9,824	R - Residential/Local	A - AC	81	26.7
EASTWO	010	EASTWOOD ST SE	SE COLORADO ST	SE DOUGLAS AVE	605	29	17,545	R - Residential/Local	A - AC	85	35.1
EDDYAL	010	EDDY ALLEY SE	SE MARTERS AVE	SE STRONG AVE	458	12	5,496	R - Residential/Local	A - AC	81	31.56
EDDYST	010	EDDY ST SE	SE STRONG AVE	SE MARTERS AVE	430	18	7,740	R - Residential/Local	A - AC	17	0
EDDYST	020	EDDY ST SE	SE MARTERS AVE	SE BOOTH AVE	434	18	7,812	R - Residential/Local	O - AC/AC	67	19.05
EDDYST	030	EDDY ST SE	SE BOOTH AVE	HOUSE #1617 (ROAD NARROWS)	784	18	14,112	R - Residential/Local	O - AC/AC	82	32.44
EDDYST	040	EDDY ST SE	HOUSE #1617 (ROAD NARROWS)	SE KANE ST	513	10	5,130	R - Residential/Local	O - AC/AC	83	34.07
EDENST	010	EDEN ST NW	NW GARDEN VALLEY BLVD	NW CECIL AVE	1,107	28	30,996	R - Residential/Local	A - AC	77	27.45

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EDENST	020	EDEN ST NW	NW CECIL AVE	END OF PAVEMENT	522	28	14,616	R - Residential/Local	A - AC	84	28.61
EDENBO	010	EDENBOWER BLVD NW	SW RENANN AVE	300 FT S. OF VERMILION ST	1,395	42	58,590	C - Collector	A - AC	63	9.14
EDENBO	020	EDENBOWER BLVD NW	300 FT S. OF VERMILLION ST	NW STEWART PKWY	1,116	42	46,872	C - Collector	A - AC	78	14.78
EDENBO	030	EDENBOWER BLVD NW	NW STEWART PKWY	SWEETBRIAR AVE	2,185	50	109,250	A - Arterial	A - AC	75	16.95
EDENBO	040	EDENBOWER BLVD NW	SWEETBRIAR AVE	BEGIN ODOT R/W (I-5 OFF RAMP)	680	50	34,000	A - Arterial	A - AC	88	22.94
EDENBO	060	EDENBOWER BLVD NW	END ODOT R/W (E. I-5 OFF RAMP)	NW AVIATION DR	500	74	37,000	A - Arterial	A - AC	86	22.07
EDENBO	070	EDENBOWER BLVD NW	NW AVIATION DR	STEPHENS ST (HWY 99)	1,030	50	51,500	A - Arterial	A - AC	79	18.81
EDENBO	080	EDENBOWER BLVD NW	STEPHENS ST	DEAD END EAST	209	33	6,897	R - Residential/Local	A - AC	85	30.54
ELDORA	010	EL DORADO ST NW	CUL DE SAC SOUTH	NW CALKINS AVE	621	32	19,872	R - Residential/Local	A - AC	89	31.55
ELAINE	010	ELAINE AVE W	W STANTON ST	W BERTHA AVE	551	37	20,387	R - Residential/Local	A - AC	72	23.25
ELIZAB	010	ELIZABETH ST W	W HARVARD AVE	W NEILL AVE	1,048	32	33,536	R - Residential/Local	A - AC	72	21.06
ELLAST	010	ELLA ST SE	SE DOUGLAS AVE	SE COURT AVE	488	32	15,616	R - Residential/Local	O - AC/AC	73	24.62
ELLAN	010	ELLAN ST NW	CALEY CT	NW GARDEN VALLEY BLVD	807	16	12,912	R - Residential/Local	A - AC	78	24.79
ELLIOT	010	ELLIOTT ST NW	NW ALMOND AVE	NW EVANS AVE	220	25	5,500	R - Residential/Local	A - AC	68	20.55
ELLIS	010	ELLIS ST NW	NW CARL AVE	DEAD END NORTH/FENCE	167	22	3,674	R - Residential/Local	A - AC	80	26.07
ELLIS	020	ELLIS ST NW	SOUTH DEAD END/FENCE	NW HARVEY AVE	195	32	6,240	R - Residential/Local	A - AC	80	26.07
ELMST	010	ELM ST W	W SHERWOOD AVE	W FILBERT AVE	358	32	11,456	R - Residential/Local	O - AC/AC	79	29.85
EMERAL	010	EMERALD DR NE	NE STEPHENS ST (NORTH INT)	NE STEPHENS ST (SOUTH INT)	1,174	19	22,306	R - Residential/Local	S - ST	57	9.26
ERIEST	010	ERIE ST NE	NE COMMERCIAL ST	NE FREEMONT AVE	355	12	4,260	R - Residential/Local	A - AC	35	3.38
ERIEST	020	ERIE ST NE	NE KLAMATH AVE	NE OSWEGO AVE	190	24	4,560	R - Residential/Local	A - AC	23	0
ERIEST	030	ERIE ST NE	NE OSWEGO AVE	END OF PAVEMENT	361	10	3,610	R - Residential/Local	A - AC	57	11.15
ESPERA	010	ESPERANZA CT W	W UMPQUA ST	DEAD END EAST	218	25	5,450	R - Residential/Local	A - AC	77	24.15
ESQUIR	010	ESQUIRE DR NW	NW AVERY ST	NW CANTERBURY DR	965	32	30,880	R - Residential/Local	A - AC	67	19.8
ESTELL	010	ESTELLE ST NW	NW GARDEN VALLEY BLVD	NW BLACK AVE	462	37	17,094	R - Residential/Local	A - AC	77	27.88
ESTELL	020	ESTELLE ST NW	NW BLACK AVE	PRIVATE DRIVE NORTH	590	26	15,340	R - Residential/Local	A - AC	81	26.71

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ETHELC	010	ETHEL CT NW	NW HARVEY AVE	DEAD END NORTH	393	20	7,860	R - Residential/Local	S - ST	60	10.66
EVANS	010	EVANS AVE NW	NW KLINE ST	DEAD END EAST/BARRICADE	284	27	7,668	R - Residential/Local	A - AC	80	26.07
EVANS	020	EVANS AVE NW	DEAD END W/BARRICADE	NW KEASEY ST	672	27	18,144	R - Residential/Local	A - AC	78	24.8
EXCELL	010	EXCELLO DR NW	NW ANDREA ST (SOUTH INT)	HOUSE #2001	679	32	21,728	R - Residential/Local	O - AC/AC	75	26.82
EXCELL	020	EXCELLO DR NW	HOUSE #2001	NW ANDREA ST (NORTH INT)	1,165	25	29,125	R - Residential/Local	O - AC/AC	72	23.61
EXCHAN	010	EXCHANGE AVE NE	NE AIRPORT RD	NE STEPHENS ST	429	37	15,873	C - Collector	A - AC	71	13
FAIRST	010	FAIR ST W	115 FT S. OF BRADFORD AVE	W BRADFORD AVE	116	32	3,712	R - Residential/Local	O - AC/AC	74	25.71
FAIRST	020	FAIR ST W	W HARVARD AVE	115 FT S. OF BRADFORD AVE	758	18	13,644	R - Residential/Local	O - AC/AC	72	23.62
FAIRHA	010	FAIRHAVEN ST W	W DEAD END	W MYRTLE AVE	313	18	5,634	R - Residential/Local	A - AC	58	14
FAIRHA	020	FAIRHAVEN ST W	W MYRTLE AVE	W HARVARD AVE	1,028	32	32,896	R - Residential/Local	A - AC	77	27.45
FAIRMO	010	FAIRMOUNT ST NW	NW GARDEN VALLEY BLVD	NW CECIL AVE	1,100	20	22,000	R - Residential/Local	O - AC/AC	73	23.47
FAIRMO	020	FAIRMOUNT ST NW	NW CECIL AVE	NW STEWART PKWY	321	32	10,272	R - Residential/Local	O - AC/AC	71	21.51
FILBER	010	FILBERT AVE W	W CENTER ST	W ELM ST	222	32	7,104	R - Residential/Local	O - AC/AC	81	32.71
FINCH	010	FINCH CT NW	NW WATTERS ST	CUL DE SAC	250	25	6,250	R - Residential/Local	A - AC	68	19.77
FINLAY	010	FINLAY AVE W	W BIRCH CT	100 FT E. OF SELMAR CT	495	25	12,375	R - Residential/Local	A - AC	87	37.94
FINLAY	020	FINLAY AVE W	100 FT E. OF SELMAR CT	DEAD END EAST	513	16	8,208	R - Residential/Local	A - AC	75	22.9
FIRST	010	FIR ST W	W HARVARD AVE	PAVEMENT NARROWS	145	10	1,450	R - Residential/Local	A - AC	81	31.58
FIRST	020	FIR ST W	PAVEMENT NARROWS	END OF PAVEMENT	357	8	2,856	R - Residential/Local	A - AC	23	0
FISHER	010	FISHER DR SE	SE LANE AVE	DEAD END	853	16	13,648	R - Residential/Local	S - ST	22	0
FLAGG	010	FLAGG ST NE	DEAD END SOUTH	NE DIAMOND LAKE BLVD	771	17	13,107	R - Residential/Local	O - AC/AC	78	29.22
FLANGA	010	FLANGAS AVE W	LOOKING GLASS DR	CUL DE SAC	479	32	15,328	R - Residential/Local	A - AC	91	32.54
FLESER	010	FLESER AVE NE	NE FULTON ST	NE LAKE ST	533	34	18,122	R - Residential/Local	O - AC/AC	85	40.29
FLINT	010	FLINT ST SE	SE TEMPLIN AVE	150 FT N. OF MILLER AVE	728	24	17,472	R - Residential/Local	A - AC	13	0
FLINT	020	FLINT ST SE	150 FT N. OF MILLER ST	SE MOSHER AVE	328	24	7,872	R - Residential/Local	O - AC/AC	90	43.32
FLINT	030	FLINT ST SE	SE MOSHER AVE	SE LANE AVE	367	24	8,808	R - Residential/Local	O - AC/AC	92	49.78
FLINT	040	FLINT ST SE	SE LANE AVE	BEG OF CUL DE SAC	647	25	16,175	R - Residential/Local	P - PCC	31	3.38

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FLINT	050	FLINT ST SE	BEG OF CUL DE SAC	END OF CUL DE SAC	105	62	6,510	R - Residential/Local	A - AC	60	15.34
FLOED	010	FLOED AVE SE	BEG OF PAVEMENT	SE MILL ST	132	14	1,848	R - Residential/Local	S - ST	7	0
FLOED	020	FLOED AVE SE	SE MILL ST	SE STEPHENS ST	504	32	16,128	R - Residential/Local	S - ST	75	17.67
FLORA	010	FLORA AVE NW	NW LESTER ST	NW ALMIRA ST	238	32	7,616	R - Residential/Local	A - AC	87	30.44
FLORID	010	FLORIDA AVE SE	SE TERRACE ST	DEAD END EAST	354	10	3,540	R - Residential/Local	A - AC	80	27.33
FOOTHI	010	FOOTHILL DR W	W HARVARD AVE	W MYRTLEWOOD CT	741	26	19,266	R - Residential/Local	A - AC	76	25.85
FOWLER	010	FOWLER ST SE	SE DOUGLAS AVE	NE DIAMOND LAKE BLVD	1,352	31	41,912	R - Residential/Local	O - AC/AC	79	29
FRANCI	010	FRANCIS ST W	W BERTHA AVE	W HARVARD AVE	1,249	32	39,968	R - Residential/Local	A - AC	76	25.85
FREEMA	010	FREEMONT ALLEY	NE FULTON ST	NE GARDINER ST	334	18	6,012	R - Residential/Local	A - AC	34	3.02
FREEMO	010	FREEMONT AVE NE	NE LINCOLN ST	NE JACKSON ST	691	32	22,112	R - Residential/Local	O - AC/AC	87	38.55
FREEMO	020	FREEMONT AVE NE	NE JACKSON ST	NE CASPER ST	715	20	14,300	R - Residential/Local	P - PCC	26	0.51
FREEMO	030	FREEMONT AVE NE	NE CASPER ST	GATE/NE DENVER ST	342	20	6,840	R - Residential/Local	P - PCC	43	11.05
FREEMO	040	FREEMONT AVE NE	NE ERIE ST	NE FULTON ST	341	32	10,912	R - Residential/Local	A - AC	73	21.66
FREEMO	050	FREEMONT AVE NE	NE FULTON ST	NE GARDINER ST	345	26	8,970	R - Residential/Local	A - AC	43	6.67
FROMDC	010	FROMDAHL CT SW	W FROMDAHL DR	CUL DE SAC	95	50	4,750	R - Residential/Local	A - AC	74	24.45
FROMDA	010	FROMDAHL DR W	W MILITARY AVE	W PILGER ST	940	32	30,080	R - Residential/Local	A - AC	65	17.13
FULLER	010	FULLERTON ST SE	SE MICELLI ST	SE HOOVER AVE	1,065	32	34,080	R - Residential/Local	A - AC	76	27.3
FULLER	020	FULLERTON ST SE	SE HOOVER AVE	SE MOSHER AVE	255	24	6,120	R - Residential/Local	A - AC	78	24.99
FULLER	030	FULLERTON ST SE	SE MOSHER AVE	SE LANE AVE	365	14	5,110	R - Residential/Local	A - AC	81	26.7
FULTON	010	FULTON ST NE	NE FLESER AVE	NE DIAMOND LAKE BLVD	458	34	15,572	R - Residential/Local	C - AC/PCC	85	40.29
FULTON	020	FULTON ST NE	NE DIAMOND LAKE BLVD	NE COMMERCIAL AVE	707	45	31,815	C - Collector	C - AC/PCC	56	9.57
FULTON	030	FULTON ST NE	NE COMMERCIAL AVE	NE KLAMATH AVE	713	20	14,260	R - Residential/Local	C - AC/PCC	42	7.26
FULTON	040	FULTON ST NE	NE KLAMATH AVE	NE OSWEGO AVE	199	16	3,184	R - Residential/Local	P - PCC	45	12.51
FULTON	050	FULTON ST NE	NE OSWEGO AVE	NE TAHOE AVE	324	19	6,156	R - Residential/Local	A - AC	26	0.25
FULTON	060	FULTON ST NE	NE TAHOE AVE	DEAD END WEST / GATE /ROCKY DR	333	20	6,660	R - Residential/Local	A - AC	76	24.13
GARDEN	010	GARDEN ST NW	NW RIVERVIEW DR	NW WHIPPLE AVE	558	32	17,856	R - Residential/Local	O - AC/AC	82	36.3
GARDVA	070	GARDEN VALLEY BLVD NE	NE CEDAR ST	NE STEPHENS ST	1,059	55	58,245	A - Arterial	A - AC	54	8.26
GARDVA	080	GARDEN VALLEY BLVD NE	NE STEPHENS ST	NE VINE ST	483	45	21,735	C - Collector	A - AC	67	11.21
GARDVA	090	GARDEN VALLEY BLVD NE	NE VINE ST	150 FT W. OF SUNSET LN	611	38	23,218	C - Collector	O - AC/AC	62	12.43

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Street ID	Section ID	Street Name	From	To	Length	Width	Area	Functional Class	Surface Type	Current PCI	Remaining Life
GARDVA	100	GARDEN VALLEY BLVD NE	150 FT W. OF SUNSET LN	NE LINCOLN ST/ NE JUNKER AVE	1,090	38	41,420	C - Collector	A - AC	70	12.53
GARDVA	010	GARDEN VALLEY BLVD NW	CITY LIMITS WEST	NW KLINE ST	2,330	74	172,420	A - Arterial	A - AC	83	20.69
GARDVA	020	GARDEN VALLEY BLVD NW	NW KLINE ST	NW STEWART PKWY	2,050	74	151,700	A - Arterial	A - AC	82	20.22
GARDVA	030	GARDEN VALLEY BLVD NW	NW STEWART PKWY	BLM ENTRANCE	2,694	70	188,580	A - Arterial	A - AC	83	20.69
GARDVA	040	GARDEN VALLEY BLVD NW	BLM ENTRANCE	NW MULHOLLAND DR	1,548	63	97,524	A - Arterial	A - AC	85	21.62
GARDVA	050	GARDEN VALLEY BLVD NW	NW MULHOLLAND DR	100 FT W. OF NW PARK ST	1,023	57	58,311	A - Arterial	O - AC/AC	84	26.44
GARDVA	060	GARDEN VALLEY BLVD NW	100 FT W. OF NW PARK ST	NE CEDAR ST	622	57	35,454	A - Arterial	O - AC/AC	54	8.77
GARDIN	010	GARDINER ST NE	NE FULTON ST	90 DEGREE CORNER	326	10	3,260	R - Residential/Local	A - AC	80	26.06
GARDIN	020	GARDINER ST NE	90 DEGREE CORNER	FREEMONT ALLEY	361	14	5,054	R - Residential/Local	A - AC	45	7.57
GARREC	010	GARRECHT ST NE	NE DOUGLAS AVE	NE DIAMOND LAKE BLVD	995	32	31,840	R - Residential/Local	A - AC	74	25.2
GARYAV	010	GARY AVE W	W BRADFORD AVE	W BROCCOLI ST	511	32	16,352	R - Residential/Local	A - AC	74	23.52
GENERA	010	GENERAL AVE	WEST DEAD END	AVIATION BLVD	158	38	6,004	R - Residential/Local	A - AC	73	23.52
GENERA	020	GENERAL AVE	AVIATION BLVD	JOSEPH ST	876	38	33,288	C - Collector	A - AC	76	15.24
GERMON	010	GERMOND AVE SE	SE MAIN ST	SE KANE ST	504	20	10,080	R - Residential/Local	O - AC/AC	49	10.36
GILBER	010	GILBERT AVE W	W BERDINE ST	W CARDINAL ST	490	32	15,680	R - Residential/Local	O - AC/AC	71	23.12
GILES	010	GILES ST SE	DEAD END S. OF MARSTERS AVE	SE BOOTH AVE	533	17	9,061	R - Residential/Local	O - AC/AC	88	41.69
GILES	020	GILES ST SE	SE BOOTH AVE	SE SANFORD AVE	440	16	7,040	R - Residential/Local	A - AC	3	0
GLENMA	010	GLENMAR DR NW	NW AVERY ST	NW LOMA VISTA DR	1,054	32	33,728	R - Residential/Local	A - AC	77	28.29
GLENN	010	GLENN ST SE	DEAD END SOUTH	SE RESERVOIR AVE	388	28	10,864	R - Residential/Local	O - AC/AC	77	27.95
GLENN	020	GLENN ST SE	SE RESERVOIR AVE	SE LANE AVE	316	20	6,320	R - Residential/Local	O - AC/AC	77	27.95
GOEDEC	010	GOEDECK AVE W	OLD MELROSE RD	W LOOKINGGLASS RD	1,608	24	38,592	R - Residential/Local	A - AC	36	3.72
GOETZ	005	GOETZ ST NW	FRED MEYER PARKING LOT	NW GARDEN VALLEY BLVD	316	37	11,692	C - Collector	A - AC	65	9.86
GOETZ	010	GOETZ ST NW	NW GARDEN VALLEY BLVD	DEAD END NORTH	828	34	28,152	R - Residential/Local	A - AC	72	21.05
GOLDEN	010	GOLDEN EAGLE SE	DEAD END	SE STELLERS EAGLE ST	844	32	27,008	R - Residential/Local	A - AC	85	34.43
GORDON	010	GORDON AVE NE	NE CUMMINS ST	NE MANZANITA CT	416	22	9,152	R - Residential/Local	O - AC/AC	85	40.29

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GORDON	020	GORDON AVE NE	NE MANZANITA CT	PRIVATE DRIVE/DEAD END	176	12	2,112	R - Residential/Local	S - ST	7	0
GRANDV	010	GRANDVIEW DR NE	NE IMBLER AVE	NE HOLLIS ST	1,048	13	13,624	R - Residential/Local	O - AC/AC	86	42.3
GRANDV	020	GRANDVIEW DR NE	NE HUNTLEY AVE	NE DIXON ST	350	24	8,400	R - Residential/Local	A - AC	77	24.59
GRANDV	030	GRANDVIEW DR NE	NE BARNES AVE	ROAD WIDENS	291	21	6,111	R - Residential/Local	O - AC/AC	69	18.42
GRANDV	040	GRANDVIEW DR NE	ROAD WIDENS	NE GARDEN VALLEY BLVD	374	34	12,716	R - Residential/Local	A - AC	65	18.35
GROVE	010	GROVE ST NW	BEG OF PAVEMENT	NW LOMA VISTA DR	683	12	8,196	R - Residential/Local	S - ST	43	4.03
GROVE	020	GROVE ST NW	NW LOMA VISTA AVE	NW CALKINS ST	672	27	18,144	R - Residential/Local	A - AC	75	25.41
HAGGER	020	HAGGERTY ST W	PAVEMENT NARROWS	W HARVARD AVE	475	22	10,450	R - Residential/Local	A - AC	40	5.32
HALLAV	010	HALL AVE NE	NE PATTERSON ST	DEAD END WEST	342	18	6,156	R - Residential/Local	A - AC	16	0
HAMILT	010	HAMILTON ST SE	SE MAIN ST	SE RICE AVE	895	28	25,060	R - Residential/Local	A - AC	59	13.68
HAMILT	020	HAMILTON ST SE	SE RICE AVE	SE ROBERTS AVE	358	28	10,024	R - Residential/Local	A - AC	87	30.43
HAMILT	030	HAMILTON ST SE	SE ROBERTS AVE	HOUSE #1339	528	28	14,784	R - Residential/Local	A - AC	84	28.61
HAMILT	040	HAMILTON ST SE	HOUSE #1339	SE ORCUTT AVE	447	32	14,304	R - Residential/Local	A - AC	82	27.35
HARRHI	010	HARRIS HILLS DR W	DEAD END W. OF SYCAN CT	W JUNIPER ST	833	32	26,656	R - Residential/Local	A - AC	85	29.24
HARRHI	020	HARRIS HILLS DR W	W JUNIPER ST	W LORRAINE AVE	530	32	16,960	R - Residential/Local	A - AC	88	31.01
HARRIS	010	HARRISON ST W	W BROWN AVE	W HARVARD AVE	507	32	16,224	R - Residential/Local	A - AC	76	23.53
HARRIS	020	HARRISON ST W	W HARVARD AVE	W YALE AVE	811	27	21,897	R - Residential/Local	A - AC	88	31.01
HARRIS	030	HARRISON ST W	W YALE AVE	PVT DRIVE NORTH/DEAD END	475	27	12,825	R - Residential/Local	A - AC	74	25.44
HARVAR	010	HARVARD AVE W	W OLD MELROSE RD	W LOOKINGGLASS RD	1,679	34	57,086	A - Arterial	A - AC	90	23.73
HARVAR	020	HARVARD AVE W	W LOOKINGGLASS RD	STEWART PKWY	3,082	63	194,166	A - Arterial	O - AC/AC	68	14.94
HARVAR	030	HARVARD AVE W	STEWART PKWY	KEADY CT	1,098	63	69,174	A - Arterial	A - AC	74	16.89
HARVAR	040	HARVARD AVE W	KEADY CT	BELLOWS ST	3,870	63	243,810	A - Arterial	O - AC/AC	87	28.45
HARVEY	010	HARVEY AVE NW	NW JEFFERSON/RIVERVIEW	NW LITTLEWOOD CT	628	37	23,236	C - Collector	A - AC	75	14.91
HARVEY	020	HARVEY AVE NW	NW LITTLEWOOD CT	NW STEWART PKWY	836	37	30,932	C - Collector	O - AC/AC	83	27.36
HAWTHO	010	HAWTHORNE DR SE	SE MAIN ST	SE KANE ST	203	34	6,902	R - Residential/Local	A - AC	72	23.78
HAWTHO	020	HAWTHORNE DR SE	SE KANE ST	HOUSE #1297	1,062	37	39,294	R - Residential/Local	A - AC	78	28.94
HAWTHO	030	HAWTHORNE DR SE	HOUSE #1297	MAGNOLIA ST	449	32	14,368	R - Residential/Local	O - AC/AC	74	25.68
HAYNES	010	HAYNES AVE SE	SE STEPHENS ST	SE JACKSON ST	491	20	9,820	R - Residential/Local	P - PCC	40	9.22
HAZEL	010	HAZEL ST W	W MOOSE DR	W HARVARD AVE	592	32	18,944	R - Residential/Local	A - AC	79	28.39
HAZEL	020	HAZEL ST W	W HARVARD AVE	W SHERWOOD AVE	446	32	14,272	R - Residential/Local	A - AC	77	24.16

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HAZEL	030	HAZEL ST W	W SHERWOOD AVE	W SHARP AVE	1,021	20	20,420	R - Residential/Local	O - AC/AC	72	23.62
HAZEL	040	HAZEL ST W	W SHARP AVE	DEAD END N. OF SHARP AVE	365	20	7,300	R - Residential/Local	O - AC/AC	69	20.79
HENRY	010	HENRY ST SE	SE DOUGLAS AVE	DEAD END N. OF DEER CREEK DR	442	28	12,376	R - Residential/Local	A - AC	62	16.32
HICKOR	010	HICKORY ST W	DEAD END S. OF NORMANDY AVE	CUL DE SAC (N. OF SHASTA)	1,225	32	39,200	R - Residential/Local	O - AC/AC	73	24.95
HICKOR	020	HICKORY ST W	W HARVARD AVE	W SHARP AVE	1,473	32	47,136	R - Residential/Local	O - AC/AC	72	24.11
HICKS	010	HICKS ST NW	CEMETERY GATE	NW GARDEN VALLEY BLVD	827	20	16,540	R - Residential/Local	O - AC/AC	71	21.51
HIGHLA	010	HIGHLAND ST NW	CUL DE SAC	NW CHESTNUT AVE	490	42	20,580	R - Residential/Local	A - AC	89	31.55
HIGHLA	020	HIGHLAND ST NW	NW CHESTNUT AVE	NW GARDEN VALLEY BLVD	1,487	32	47,584	R - Residential/Local	A - AC	92	32.95
HILLAV	010	HILL AVE NW	NW CROUCH ST	NW ESTELLE ST	399	25	9,975	R - Residential/Local	O - AC/AC	87	43.69
HILLAV	020	HILL AVE NW	NW ESTELLE AVE	NW DOGWOOD ST	240	18	4,320	R - Residential/Local	A - AC	84	28.61
HILLAV	030	HILL AVE NW	NW DOGWOOD ST	HOTEL PARKING LOT	890	37	32,930	R - Residential/Local	A - AC	72	22.61
HILLSI	010	HILLSIDE DR SE	SE COLORADO DR	SE LELAND ST	397	12	4,764	R - Residential/Local	A - AC	30	1.62
HILLVI	010	HILLVIEW CT NE	NE BEULAH DR	DEAD END	341	20	6,820	R - Residential/Local	A - AC	44	7.1
HOLLIS	010	HOLLIS ST NE	NE MALHEUR AVE	END OF PAVEMENT	213	14	2,982	R - Residential/Local	A - AC	33	2.66
HOLLIS	030	HOLLIS ST NE	DEAD END SOUTH	NE BROOKLYN AVE	461	26	11,986	R - Residential/Local	A - AC	30	1.61
HOLLIS	040	HOLLIS ST NE	NE BROOKLYN AVE	NE ALAMEDA AVE	561	26	14,586	R - Residential/Local	O - AC/AC	83	35.05
HOLLY	010	HOLLY AVE NW	NW CHERRY DR	NW CHERRY DR	378	32	12,096	R - Residential/Local	A - AC	76	26.41
HOOKER	010	HOOKER RD	STEPHENS ST	KELLER RD	107	34	3,638	C - Collector	A - AC	69	12.18
HOOVER	010	HOOVER AVE SE	SE ARIZONA ST	SE FULLERTON AVE	540	24	12,960	R - Residential/Local	A - AC	48	8.72
HOOVER	020	HOOVER AVE SE	SE FULLERTON ST	SE FLINT ST	263	24	6,312	R - Residential/Local	S - ST	83	19.18
HOPPER	010	HOPPER ST NW	NW GROVE ST	NW MERLE AVE	190	24	4,560	R - Residential/Local	S - ST	67	14.14
HOPPER	020	HOPPER ST NW	NW CANTERBURY DR	CUL DE SAC	374	27	10,098	R - Residential/Local	A - AC	76	23.53
HOUCK	010	HOUCK AVE SE	SE ARIZONA ST	SE FULLERTON ST	500	24	12,000	R - Residential/Local	A - AC	65	18.47
HOUCK	020	HOUCK AVE SE	SE FULLERTON ST	SE FLINT ST	175	24	4,200	R - Residential/Local	A - AC	24	0
HUGHWO	010	HUGHWOOD AVE NW	PRIVATE RD	NW TROOST ST	140	25	3,500	R - Residential/Local	A - AC	79	26.83
HUGHWO	020	HUGHWOOD AVE NW	NW TROOST ST	LOT #1901	528	27	14,256	R - Residential/Local	A - AC	82	30.64
HUGHWO	030	HUGHWOOD AVE NW	LOT #1901	WEST CINEMA ENTRANCE	508	38	19,304	R - Residential/Local	O - AC/AC	91	44.13
HUGHWO	040	HUGHWOOD AVE NW	WEST CINEMA ENTRANCE	KLINE ST	513	28	14,364	R - Residential/Local	A - AC	65	17.13

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HUGHWO	050	HUGHWOOD CT NW	KLINE ST	CUL DE SAC	404	37	14,948	R - Residential/Local	O - AC/AC	71	22.63
HUNTER	010	HUNTER CT NW	NW DAYSHA DR	DEAD END WEST	222	25	5,550	R - Residential/Local	A - AC	88	39.89
HUNTLE	010	HUNTLEY AVE NE	NE GRANDVIEW DR	NE CRESCENT ST	154	24	3,696	R - Residential/Local	A - AC	79	29.68
ICHABO	010	ICHABOD ST SE	100 FT S. OF MARSTERS AVE	SE BOOTH AVE	480	18	8,640	R - Residential/Local	O - AC/AC	54	12.96
IMBLER	010	IMBLER AVE NE	NE STEPHENS ST	NE GRANDVIEW DR	307	18	5,526	R - Residential/Local	O - AC/AC	85	40.3
INDIAN	010	INDIANOLA ST W	W LUELLEN	W LORRAINE AVE	457	32	14,624	R - Residential/Local	A - AC	71	21.99
INDIAN	020	INDIANOLA ST W	W LORRAINE AVE	W JAY AVE	717	32	22,944	R - Residential/Local	A - AC	74	24.68
IVANST	010	IVAN ST NE	DEAD END SOUTH	NE DIAMOND LAKE BLVD	436	32	13,952	R - Residential/Local	A - AC	52	9.56
IVYDRI	010	IVY DR	DOUGLAS AVE	PRIVATE DR	88	14	1,232	R - Residential/Local	A - AC	90	32.13
JACKSO	100	JACKSON ST NE	NE ODELL AVE	NE MALHEUR AVE	1,592	42	66,864	R - Residential/Local	A - AC	45	7.37
JACKSO	110	JACKSON ST NE	NE MALHEUR AVE	PRIVATE DRIVE	234	10	2,340	R - Residential/Local	A - AC	37	4.23
JACKSO	010	JACKSON ST SE	SE STONE AVE	SE RICE AVE	513	34	17,442	R - Residential/Local	A - AC	63	15.9
JACKSO	020	JACKSON ST SE	SE RICE AVE	SE ROBERTS AVE	378	34	12,852	R - Residential/Local	A - AC	77	27.45
JACKSO	030	JACKSON ST SE	SE ROBERTS AVE	SE ORCUTT AVE	965	24	23,160	R - Residential/Local	A - AC	81	32.1
JACKSO	040	JACKSON ST SE	SE ORCUTT AVE	200 FT N. OF BLAKELY AVE	588	22	12,936	R - Residential/Local	A - AC	60	15.32
JACKSO	050	JACKSON ST SE	200 FT N. OF BLAKELEY AVE	SE MOSHER AVE	451	24	10,824	R - Residential/Local	A - AC	37	4.2
JACKSO	060	JACKSON ST SE	SE MOSHER AVE	SE LANE AVE	366	38	13,908	R - Residential/Local	A - AC	76	26.85
JACKSO	070	JACKSON ST SE	SE LANE AVE	SE OAK AVE	771	36	27,756	R - Residential/Local	A - AC	72	23.07
JACKSO	080	JACKSON ST SE	SE OAK AVE	SE DOUGLAS AVE	755	36	27,180	R - Residential/Local	A - AC	73	23.97
JACKSO	090	JACKSON ST SE	SE DOUGLAS AVE	NE DIAMOND LAKE BLVD	1,058	38	40,204	R - Residential/Local	O - AC/AC	75	25.63
JACOBS	010	JACOBSON ST NE	NE BROOKLYN AVE	NE ALAMEDA AVE	540	26	14,040	R - Residential/Local	A - AC	83	30.57
JAYAVE	010	JAY AVE W	W LOOKINGGLASS RD	W LUELLEN DR	1,126	32	36,032	R - Residential/Local	A - AC	75	25.41
JAYAVE	020	JAY AVE W	W LUELLEN DR	W KENWOOD ST	683	32	21,856	R - Residential/Local	A - AC	76	27.02
JEFFER	010	JEFFERSON ST NW	NW HARVEY AVE	NW WHIPPLE AVE	1,065	32	34,080	R - Residential/Local	A - AC	79	29.69
JEFFER	020	JEFFERSON ST NW	NW WHIPPLE AVE	NW CALKINS AVE	996	32	31,872	R - Residential/Local	A - AC	75	25.41
JEFFRE	010	JEFFERY ST NW	NW SUNBERRY DR	NW CABRILLO CT	167	25	4,175	R - Residential/Local	O - AC/AC	78	28.52
JENNIF	010	JENNIFER CT NW	NW DOMENICO DR	CUL DE SAC	182	32	5,824	R - Residential/Local	A - AC	87	30.44
JERRYS	010	JERRYS DR	STEPHENS ST	KENNETH FORD DR	1,069	24	25,656	R - Residential/Local	A - AC	84	33.64
JOHNST	010	JOHN ST NE	NE OAKLAND AVE	END OF PAVEMENT	193	16	3,088	R - Residential/Local	S - ST	16	0
JUNIPC	010	JUNIPER CT W	W WINTER RIDGE DR	CUL DE SAC	224	32	7,168	R - Residential/Local	A - AC	83	34.27

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Street ID	Section ID	Street Name	From	To	Length	Width	Area	Functional Class	Surface Type	Current PCI	Remaining Life
JUNIPE	010	JUNIPER ST W	W HARRIS HILLS DR	WINTER RIDGE DR	346	32	11,072	R - Residential/Local	A - AC	86	29.85
JUNKER	010	JUNKER AVE NE	DEAD END WEST	LINCOLN ST	100	32	3,200	R - Residential/Local	A - AC	79	29.67
JUNKER	020	JUNKER AVE NE	NE LINCOLN ST	CUL DE SAC	272	32	8,704	R - Residential/Local	A - AC	74	22.67
KANEST	010	KANE ST SE	SE MARTERS AVE	SE BOOTH AVE	433	18	7,794	R - Residential/Local	O - AC/AC	68	19.89
KANEST	020	KANE ST SE	SE BOOTH AVE	SE SANFORD AVE	433	20	8,660	R - Residential/Local	O - AC/AC	81	31.84
KANEST	030	KANE ST SE	SE SANFORD AVE	100 FT N. OF SE EDDY ST	871	18	15,678	R - Residential/Local	O - AC/AC	69	18.4
KANEST	040	KANE ST SE	100 FT N. OF SE EDDY ST	SE GERMOND AVE	544	19	10,336	R - Residential/Local	A - AC	86	29.83
KANEST	050	KANE ST SE	SE GERMOND AVE	HOUSE #1247	333	30	9,990	R - Residential/Local	A - AC	85	34.43
KANEST	060	KANE ST SE	HOUSE #1247	SE HAWTHORNE DR	898	32	28,736	R - Residential/Local	A - AC	73	21.65
KANEST	070	KANE ST SE	SE HAWTHORNE DR	ROAD NARROWS (HOUSE #862)	630	37	23,310	R - Residential/Local	A - AC	77	28.17
KANEST	080	KANE ST SE	ROAD NARROWS (HOUSE #862)	SE LANE AVE	395	24	9,480	R - Residential/Local	A - AC	69	20.88
KANEST	090	KANE ST SE	SE LANE AVE	SE DOUGLAS AVE	1,522	32	48,704	R - Residential/Local	O - AC/AC	84	29.94
KANSAS	010	KANSAS AVE SE	SE TERRACE ST	END OF PAVEMENT	208	10	2,080	R - Residential/Local	A - AC	73	23.49
KATHLE	010	KATHLEEN CT SE	WALDON AVE SE	CUL DE SAC	140	32	4,480	R - Residential/Local	A - AC	89	40.81
KATRIN	010	KATRINA CT NE	NE VENTURA ST	CUL DE SAC	222	32	7,104	R - Residential/Local	A - AC	71	20.44
KEADY	010	KEADY CT W	CUL DE SAC SOUTH	W HARVARD AVE	826	37	30,562	R - Residential/Local	A - AC	76	23.53
KEADY	020	KEADY CT W	W HARVARD AVE	DEAD END NORTH	47	37	1,739	R - Residential/Local	A - AC	66	19.07
KEASEY	010	KEASEY ST NW	DEAD END SOUTH	NW CARL AVE	999	22	21,978	R - Residential/Local	O - AC/AC	87	41.87
KEASEY	020	KEASEY ST NW	NW HARVEY AVE	NW CALKINS AVE	2,170	32	69,440	C - Collector	A - AC	85	18.07
KEASEY	030	KEASEY ST NW	NW CALKINS AVE	NW VALLEY VIEW DR	1,550	32	49,600	C - Collector	A - AC	69	11.19
KELSAY	010	KELSAY CT NW	NW CHAMBERS DR	CUL DE SAC	292	32	9,344	R - Residential/Local	A - AC	82	32.89
KENNETH	010	KENNETH FORD DR	STEPHENS ST	JERRYS DR	587	45	26,415	C - Collector	A - AC	73	12.51
KENNETH	020	KENNETH FORD DR	JERRYS DR	PRIVATE DRIVE	825	32	26,400	C - Collector	A - AC	88	20.8
KENWOO	010	KENWOOD ST W	W HARVARD AVE	W CRESTVIEW AVE	1,582	32	50,624	R - Residential/Local	A - AC	69	21.33
KESTER	010	KESTER RD	DIAMOND LAKE BLVD	CITY LIMITS(200 FT. N/O D.LAK)	200	25	5,000	R - Residential/Local	A - AC	68	20.35
KILLDE	010	KILLDEER ST W	W SHARP AVE	W ORIOLE DR	496	32	15,872	R - Residential/Local	A - AC	83	27.99
KINCAI	010	KINCAID DR	DOUGLAS ST	POMONA ST	1,020	38	38,760	R - Residential/Local	A - AC	86	36.78
KINCAI	020	KINCAID DR	POMONA ST	DOUGLAS AVE(EAST INT)/CITY LIM	757	24	18,168	R - Residential/Local	A - AC	72	21.04

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KIRBYA	010	KIRBY AVE	CITY LIMTS / HOUSE #226	DEAD END EAST	1,180	31	36,580	R - Residential/Local	A - AC	73	24.21
KLAMAT	010	KLAMATH AVE NE	NE WINCHESTER ST	NE LINCOLN ST	778	22	17,116	R - Residential/Local	A - AC	75	26.17
KLAMAT	020	KLAMATH AVE NE	NE LINCOLN ST	NE NASH ST	351	22	7,722	R - Residential/Local	A - AC	69	21.16
KLAMAT	030	KLAMATH AVE NE	NE NASH ST	NASH ALLEY	180	20	3,600	R - Residential/Local	P - PCC	30	2.86
KLAMAT	040	KLAMATH AVE NE	NASH ALLEY	NE JACKSON ST	161	20	3,220	R - Residential/Local	C - AC/PCC	26	0.31
KLAMAT	050	KLAMATH AVE NE	NE JACKSON ST	NE BOSTON ST	190	22	4,180	R - Residential/Local	O - AC/AC	51	11.96
KLAMAT	060	KLAMATH AVE NE	NE BOSTON ST	NE DENVER ST	717	20	14,340	R - Residential/Local	O - AC/AC	58	15.26
KLAMAT	070	KLAMATH AVE NE	NE DENVER ST	DEAD END	184	16	2,944	R - Residential/Local	O - AC/AC	60	16.35
KLAMAT	080	KLAMATH AVE NE	NE ERIE ST	GARDINER ST	676	16	10,816	R - Residential/Local	O - AC/AC	27	0.69
KLINE	010	KLINE ST NW	NW CALKINS AVE	NW BEAUMONT AVE	626	32	20,032	C - Collector	A - AC	68	10.83
KLINE	020	KLINE ST NW	NW BEAUMONT AVE	NW MOORE AVE	846	32	27,072	C - Collector	A - AC	73	12.71
KLINE	030	KLINE ST NW	NW MOORE AVE	NW VALLEY VIEW DR	762	32	24,384	C - Collector	O - AC/AC	82	25.6
KLINE	040	KLINE ST NW	NW VALLEY VIEW DR	NW GARDEN VALLEY BLVD	430	37	15,910	C - Collector	O - AC/AC	89	33.88
KLINE	050	KLINE ST NW	NW GARDEN VALLEY BLVD	NW WOODWILLOW DR (SOUTH INT)	1,158	38	44,004	C - Collector	A - AC	85	18.07
KLINE	060	KLINE ST NW	NW WOODWILLOW DR (SOUTH INT)	HOUSE #2850	1,380	37	51,060	C - Collector	A - AC	87	19.09
KLINE	070	KLINE ST NW	HOUSE #2850	MOOREA DR	920	22	20,240	C - Collector	A - AC	82	18.04
KRING	010	KRING ST NW	NW SOUTHWATER DR	NW HARVEY AVE	909	32	29,088	R - Residential/Local	A - AC	89	31.56
KRISTE	010	KRISTEN CT	CUL DE SAC W/O BROAD ST	CUL DE SAC EAST	472	31	14,632	R - Residential/Local	A - AC	82	27.41
LAKEST	010	LAKE ST NE	NE FLESER AVE	NE DIAMOND LAKE BLVD	432	34	14,688	R - Residential/Local	O - AC/AC	87	44.42
LAMONT	010	LAMONT AVE NW	NW TROOST ST	NW SELLWOOD ST	392	32	12,544	R - Residential/Local	A - AC	81	26.71
LANEAV	010	LANE AVE SE	DEAD END WEST OF FULLERTON ST	SE PARROTT ST	824	32	26,368	R - Residential/Local	A - AC	76	26.39
LANEAV	020	LANE AVE SE	SE SHERIDAN ST	SE STEPHENS ST	470	32	15,040	R - Residential/Local	A - AC	70	20.92
LANEAV	030	LANE AVE SE	SE STEPHENS ST	SE ROSE ST	255	32	8,160	R - Residential/Local	A - AC	68	19.33
LANEAV	040	LANE AVE SE	SE ROSE ST	SE KANE ST	629	32	20,128	R - Residential/Local	A - AC	78	24.8
LANEAV	050	LANE AVE SE	SE KANE ST	SE TERRACE DR	1,327	28	37,156	R - Residential/Local	A - AC	77	24.17
LANEAV	060	LANE AVE SE	SE TERRACE AVE	SE FISHER AVE	440	12	5,280	R - Residential/Local	A - AC	27	0.6
LANGEN	010	LANGENBERG AVE W	W BROCCOLI ST	CUL DE SAC WEST	550	32	17,600	R - Residential/Local	O - AC/AC	81	31.88
LAURLC	010	LAUREL CT SE	SE TERRACE ST	CUL DE SAC	1,515	26	39,390	R - Residential/Local	O - AC/AC	79	28.99

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LAUREL	010	LAURELWOOD CT W	DEAD END WEST	W MADRONE ST	288	20	5,760	R - Residential/Local	P - PCC	56	22.32
LEMANS	010	LE MANS ST NW	CUL DE SAC/GATE	NW VALLEY VIEW DR	886	32	28,352	R - Residential/Local	O - AC/AC	68	20.37
LELAND	010	LELAND ST SE	120 FT S. OF BYRD CT	BYRD CT	120	10	1,200	R - Residential/Local	P - PCC	11	0
LELAND	020	LELAND ST SE	SE BYRD CT	SE DOUGLAS AVE	978	18	17,604	R - Residential/Local	O - AC/AC	74	23.07
LESTER	010	LESTER ST NW	NW MARTIN AVE	NW CALKINS AVE	670	32	21,440	R - Residential/Local	A - AC	70	21.57
LILAAV	010	LILA AVE NW	NW AVERY ST	CUL DE SAC EAST	566	27	15,282	R - Residential/Local	A - AC	69	19.54
LILBUR	010	LILBURN AVE W	W DEAD END	W MADRONE ST	286	20	5,720	R - Residential/Local	P - PCC	45	12.88
LILBUR	020	LILBURN AVE W	W MADRONE ST	W RIVERSIDE DR	307	24	7,368	R - Residential/Local	C - AC/PCC	83	31.56
LINCOL	010	LINCOLN ST NE	NE JUNKER AVE/ NE GARDEN VALL	100 FT W. OF STEELE CT	603	38	22,914	C - Collector	A - AC	69	12.08
LINCOL	020	LINCOLN ST NE	100 FT W. OF STEELE CT	NW BEULAH DR	1,571	37	58,127	C - Collector	A - AC	70	12.46
LINCOL	030	LINCOLN ST NE	NE BEULAH DR	NE MALHEUR AVE	290	37	10,730	C - Collector	A - AC	73	13.92
LINCOL	040	LINCOLN ST NE	NE MALHEUR AVE	NE KLAMATH AVE	388	27	10,476	C - Collector	A - AC	75	14.99
LINCOL	050	LINCOLN ST NE	NE KLAMATH AVE	NE WRIGHT AVE	774	26	20,124	C - Collector	A - AC	67	11.13
LINDEL	010	LINDELL AVE NW	NW LUTH ST	NW KLINE ST	415	32	13,280	R - Residential/Local	A - AC	45	7.45
LITTLE	010	LITTLEWOOD CT NW	NW HARVEY AVE	CUL DE SAC	141	32	4,512	R - Residential/Local	A - AC	87	30.44
LOISST	010	LOIS ST SE	SE SHARON AVE	SE RAMP ST	1,257	32	40,224	R - Residential/Local	O - AC/AC	85	37.69
LOMAVI	010	LOMA VISTA DR NW	NW TROOST ST	HOUSE #2620	740	32	23,680	R - Residential/Local	A - AC	71	22.95
LOMAVI	020	LOMA VISTA DR NW	HOUSE #2620	100 FT N. OF CHAMBERS ST	551	32	17,632	R - Residential/Local	A - AC	81	29.89
LOMAVI	030	LOMA VISTA DR NW	100 FT N. OF CHAMBERS ST	100 FT N. OF PARKDALE AVE	230	32	7,360	R - Residential/Local	A - AC	74	22.28
LOMAVI	040	LOMA VISTA DR NW	100 FT N. OF PARKDALE AVE	100 FT W. OF VALLEJO ST	787	32	25,184	R - Residential/Local	A - AC	76	26.41
LOMAVI	050	LOMA VISTA DR NW	100 FT W. OF VALLEJO ST	NW GROVE ST	774	32	24,768	R - Residential/Local	A - AC	77	26.54
LOMBAR	010	LOMBARDY DR NE	NE DOUGLAS AVE	NE PATTERSON ST	1,029	23	23,667	R - Residential/Local	A - AC	47	7.79
LOOKIN	005	LOOKINGGLASS RD W	WOODSIDE AVE	ROSEMARY AVE	723	38	27,474	C - Collector	O - AC/AC	79	22.52
LOOKIN	010	LOOKINGGLASS RD W	CITY LIMITS 400 FT. S/O GOEDEC	W LORRAINE AVE	1,383	41	56,703	C - Collector	O - AC/AC	84	27.76
LOOKIN	020	LOOKINGGLASS RD W	W LORRAINE AVE	W HARVARD AVE	1,441	43	61,963	C - Collector	O - AC/AC	75	20.32
LORRAI	010	LORRAINE AVE W	W HICKORY ST	LOOKINGGLASS RD	1,099	32	35,168	R - Residential/Local	O - AC/AC	72	24.49
LORRAI	020	LORRAINE AVE W	W LOOKING GLASS DR	W HARRIS HILLS DR	645	37	23,865	R - Residential/Local	O - AC/AC	76	27.99
LORRAI	030	LORRAINE AVE W	W HARRIS HILLS DR	W BROCCOLI ST	788	32	25,216	R - Residential/Local	O - AC/AC	72	23.62
LORRAI	040	LORRAINE AVE W	W BROCCOLI ST	W INDIANOLA ST	374	32	11,968	R - Residential/Local	A - AC	75	25.14

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LORRAI	050	LORRAINE AVE W	W INDIANOLA ST	W KENWOOD ST	547	32	17,504	R - Residential/Local	A - AC	76	26.15
LUELLE	010	LUELLEN DR W	DEAD END EAST	W INDIANOLA ST	395	32	12,640	R - Residential/Local	A - AC	76	27.37
LUELLE	020	LUELLEN DR W	W INDIANOLA ST	W JAY AVE	1,461	32	46,752	R - Residential/Local	A - AC	73	24.53
LUELLE	030	LUELLEN DR W	W JAY AVE	W HARVARD AVE	526	32	16,832	R - Residential/Local	O - AC/AC	75	26.82
LUTHST	010	LUTH ST NW	NW MOORE AVE	NW VALLEY VIEW DR	916	32	29,312	R - Residential/Local	A - AC	65	18.17
LYNWOO	010	LYNWOOD ST NW	NW CALKINS AVE	TROOST ST	1,662	32	53,184	R - Residential/Local	O - AC/AC	92	47.55
MADISO	010	MADISON AVE NE	NE MADISON CT	NE VINE ST	558	24	13,392	R - Residential/Local	O - AC/AC	96	38.3
MADICT	010	MADISON CT NE	NE CHANNON AVE	NE MADISON AVE	238	24	5,712	R - Residential/Local	O - AC/AC	96	38.3
MADRON	010	MADRONE ST W	W HARVARD AVE	100 FT S. OF LAURELWOOD CT	279	32	8,928	R - Residential/Local	O - AC/AC	71	21.51
MADRON	020	MADRONE ST W	100 FT S. OF LAURELWOOD CT	W CHAPMAN AVE	636	24	15,264	R - Residential/Local	O - AC/AC	73	23.47
MADRON	030	MADRONE ST W	W CHAPMAN AVE	W RIVERSIDE DR	487	24	11,688	R - Residential/Local	P - PCC	48	15.25
MAGNOL	010	MAGNOLIA DR SE	SE CORRINE DR	SE HAWTHORNE DR	1,363	32	43,616	R - Residential/Local	A - AC	67	19.91
MAGNOL	020	MAGNOLIA DR SE	SE HAWTHORNE DR	DEAD END (EAST)	929	28	26,012	R - Residential/Local	A - AC	90	32.05
MAINST	010	MAIN ST SE	DEAD END/ 180 DEGREE CORNER	SE MARSTERS AVE	515	16	8,240	R - Residential/Local	A - AC	16	0
MAINST	020	MAIN ST SE	SE MARSTERS AVE	SE BOOTH AVE	441	22	9,702	R - Residential/Local	O - AC/AC	69	21.9
MAINST	030	MAIN ST SE	SE BOOTH AVE	SE RICE AVE	979	22	21,538	R - Residential/Local	O - AC/AC	78	28.53
MAINST	040	MAIN ST SE	SE RICE AVE	SE ROBERTS AVE	387	28	10,836	R - Residential/Local	O - AC/AC	78	28.53
MAINST	050	MAIN ST SE	SE ROBERTS AVE	SE ORCUTT AVE	1,037	28	29,036	R - Residential/Local	O - AC/AC	80	31.25
MAINST	060	MAIN ST SE	SE ORCUTT AVE	50 FT. N. OF HAWTHORNE DR	387	28	10,836	R - Residential/Local	O - AC/AC	81	32.72
MAINST	070	MAIN ST SE	50 FT N. OF HAWTHORNE AVE	257 FT S. OF MOSHER AVE	396	28	11,088	R - Residential/Local	A - AC	52	10.88
MAINST	080	MAIN ST SE	257 FT S. OF MOSHER AVE	SE MOSHER AVE	257	28	7,196	R - Residential/Local	A - AC	77	27.89
MAINST	090	MAIN ST SE	SE MOSHER AVE	SE LANE AVE	382	36	13,752	R - Residential/Local	A - AC	79	30.09
MAINST	100	MAIN ST SE	SE LANE AVE	SE OAK AVE	767	38	29,146	R - Residential/Local	A - AC	79	25.44
MAINST	110	MAIN ST SE	SE OAK AVE	SE DOUGLAS AVE	757	38	28,766	R - Residential/Local	A - AC	71	22.96
MAINST	120	MAIN ST SE	DOUGLAS ST	DEAD END (END OF LOT)	227	41	9,307	R - Residential/Local	A - AC	79	28.79
MALHEU	010	MALHEUR AVE NE	DEAD END WEST OF HOLLIS ST	NE CENTRAL ST	653	16	10,448	R - Residential/Local	A - AC	38	4.59
MALHEU	020	MALHEUR AVE NE	NE CENTRAL ST	NE LINCOLN ST	267	29	7,743	R - Residential/Local	A - AC	77	24.15
MALHEU	030	MALHEUR AVE NE	NE LINCOLN ST	NE JACKSON ST	794	32	25,408	R - Residential/Local	A - AC	79	25.43

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MALHEU	040	MALHEUR AVE NE	NE JACKSON ST	NE CASPER ST	378	14	5,292	R - Residential/Local	A - AC	41	5.84
MALHEU	050	MALHEUR AVE NE	NE FULTON ST	DEAD END EAST	321	22	7,062	R - Residential/Local	A - AC	38	4.59
MANZAN	010	MANZANITA CT NE	CUL DE SAC	NE GORDON AVE	416	32	13,312	R - Residential/Local	A - AC	74	22.27
MAPLE	010	MAPLE ST W	W HARVARD AVE	W NEILL AVE	1,095	32	35,040	R - Residential/Local	A - AC	80	26.08
MARSTE	010	MARSTERS AVE SE	SE MAIN ST	SE ICHABOD ST	1,409	18	25,362	R - Residential/Local	A - AC	24	0
MARTIN	010	MARTIN AVE NW	NW LESTER ST	ALMIRA ST	271	32	8,672	R - Residential/Local	A - AC	71	22.66
MARTIN	020	MARTIN AVE NW	ALMIRA ST	CUL DE SAC EAST	408	27	11,016	R - Residential/Local	A - AC	91	32.53
MCLELL	010	MCCLELLAN AVE SE	SE COBB ST	SE JACKSON ST	258	18	4,644	R - Residential/Local	A - AC	70	19.86
MEADOW	010	MEADOW AVE	KERR ST	NE VINE ST	575	21	12,075	R - Residential/Local	A - AC	18	0
MEADOW	020	MEADOW AVE	NE VINE ST	END OF PAVEMENT	424	21	8,904	R - Residential/Local	A - AC	51	9.62
MERLE	010	MERLE AVE NW	BEG OF PAVEMENT	NW HOPPER ST	137	24	3,288	R - Residential/Local	A - AC	4	0
METZGE	010	METZGER CT	CASS AVE	PRIVATE DR	168	18	3,024	R - Residential/Local	P - PCC	28	1.68
MICELL	010	MICELLI ST SE	CUL DE SAC SOUTH	SE FULLERTON ST	363	32	11,616	R - Residential/Local	A - AC	78	24.99
MICELL	020	MICELLI ST SE	SE FULLERTON ST	DEAD END NORTH	186	20	3,720	R - Residential/Local	A - AC	0	0
MIGUEL	010	MIGUEL ST NE	NE DIAMOND LAKE BLVD	NE DENN AVE	838	32	26,816	R - Residential/Local	O - AC/AC	71	21.5
MILITA	010	MILITARY AVE W	300 FT N OF LOT #2950 CTY LMT	HOUSE #2485	1,756	16	28,096	R - Residential/Local	S - ST	18	0
MILITA	020	MILITARY AVE W	HOUSE #2485	W PILGER ST	859	20	17,180	R - Residential/Local	A - AC	36	3.69
MILITA	030	MILITARY AVE W	W PILGER ST	W FROMDAHL DR	368	22	8,096	R - Residential/Local	A - AC	41	5.66
MILITA	040	MILITARY AVE W	W FROMDAH DR	W MYRTLE AVE	4,097	12	49,164	R - Residential/Local	S - ST	23	0
MILITA	050	MILITARY AVE W	W MYRTLE AVE	ALTAMONT ST	163	18	2,934	R - Residential/Local	A - AC	18	0
MILITA	060	MILITARY AVE W	ALTAMONT ST	HOUSE #1102	330	22	7,260	R - Residential/Local	A - AC	34	2.9
MILITA	070	MILITARY AVE W	HOUSE #1102	BROWN AVE	324	16	5,184	R - Residential/Local	A - AC	16	0
MILITA	080	MILITARY AVE W	BROWN AVE	UMPQUA ST	450	24	10,800	R - Residential/Local	A - AC	53	10.67
MILITA	090	MILITARY AVE W	UMPQUA ST	CUL DE SAC	433	24	10,392	R - Residential/Local	A - AC	87	30.43
MILLST	010	MILL ST SE	SE PINE ST	2ND 90 DEG CORNER	595	12	7,140	R - Residential/Local	A - AC	41	5.84
MILLST	020	MILL ST SE	2ND 90 DEG CORNER	SE RICE AVE	1,015	20	20,300	R - Residential/Local	S - ST	63	12.12
MILLST	030	MILL ST SE	SE RICE AVE	SE SYKES AVE	770	32	24,640	R - Residential/Local	O - AC/AC	85	38.68
MILLST	040	MILL ST SE	SE SYKES AVE	SE MOSHER AVE	1,515	32	48,480	R - Residential/Local	O - AC/AC	81	31.86
MILLER	010	MILLER AVE SE	SE ARIZONA ST	40 FT W. OF FULLERTON ST	478	24	11,472	R - Residential/Local	A - AC	77	24.15
MILLER	020	MILLER AVE SE	40 FT W. OF FULLERTON ST	78 FT E. OF FULLERTON ST	150	24	3,600	R - Residential/Local	A - AC	68	18.74

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Street ID	Section ID	Street Name	From	To	Length	Width	Area	Functional Class	Surface Type	Current PCI	Remaining Life
MILLER	030	MILLER AVE SE	78 FT E. OF FULLERTON ST	SE FLINT ST	163	24	3,912	R - Residential/Local	A - AC	19	0
MOORE	010	MOORE AVE NW	NW LYNWOOD ST	NW KLINE ST	1,134	32	36,288	R - Residential/Local	A - AC	75	25.41
MOORE	020	MOORE AVE NW	NW KLINE ST	NW MOTAH AVE	197	25	4,925	R - Residential/Local	A - AC	72	23.8
MOOREA	010	MOOREA DR	KLINE ST	PRIVATE RD	82	26	2,132	R - Residential/Local	A - AC	78	25.69
MOOSE	010	MOOSE DR W	150 FT W. OF HAZEL ST	CUL DE SAC EAST	630	32	20,160	R - Residential/Local	A - AC	79	28.39
MORITZ	010	MORITZ CT NW	NW KEASEY ST	CUL DE SAC	336	31	10,416	R - Residential/Local	O - AC/AC	75	26.82
MORRIS	010	MORRIS ST NE	DEAD END SOUTH	NE ALAMEDA AVE	890	26	23,140	R - Residential/Local	O - AC/AC	91	46.4
MOSHER	010	MOSHER AVE SE	DEAD END W. OF FULLERTON ST	SE FLINT ST	769	25	19,225	R - Residential/Local	A - AC	72	22.59
MOSHER	020	MOSHER AVE SE	SE FLINT ST	SE PARROTT ST	286	39	11,154	R - Residential/Local	A - AC	68	20.54
MOSHER	030	MOSHER AVE SE	SE PARROTT ST	SE MILL ST	267	33	8,811	R - Residential/Local	A - AC	62	16.31
MOSHER	040	MOSHER AVE SE	SE MILL ST	SE PINE ST	285	32	9,120	R - Residential/Local	A - AC	61	15.9
MOSHER	050	MOSHER AVE SE	SE PINE ST	SE STEPHENS ST	253	38	9,614	R - Residential/Local	O - AC/AC	87	39.37
MOSHER	060	MOSHER AVE SE	SE STEPHENS ST	SE MAIN ST	700	32	22,400	R - Residential/Local	A - AC	75	22.89
MOTAH	010	MOTAH ST NW	NW MOORE AVE	NW UTAH DR	488	25	12,200	R - Residential/Local	A - AC	77	24.16
MULHOL	010	MULHOLLAND DR NW	NW GARDEN VALLEY BLVD	NW BETHEL AVE	697	38	26,486	C - Collector	A - AC	90	20.66
MULHOL	020	MULHOLLAND DR NW	NW BETHEL AVE	NW STEWART PKWY	1,865	38	70,870	C - Collector	A - AC	90	20.66
MUNSON	010	MUNSON CT	NW GARDEN VALLEY BLVD	DEAD END SOUTH	630	10	6,300	R - Residential/Local	A - AC	55	12.22
MURRAY	010	MURRAY CT SE	SE LOIS ST	CUL DE SAC	126	32	4,032	R - Residential/Local	O - AC/AC	85	37.69
MYRTLE	010	MYRTLE AVE W	W NEBO ST	W FAIRHAVEN ST (WEST INT)	499	32	15,968	R - Residential/Local	A - AC	68	19.06
MYRTLE	020	MYRTLE AVE W	FAIRHAVEN ST (WEST INT)	W BALLF ST	819	32	26,208	R - Residential/Local	O - AC/AC	69	20.79
MYRTLE	030	MYRTLE AVE W	W BALFF ST	W MILITARY AVE	182	14	2,548	R - Residential/Local	A - AC	32	2.35
MYRTLW	010	MYRTLEWOOD CT W	W FOOTHILL DR	DEAD END NORTH	374	20	7,480	R - Residential/Local	O - AC/AC	83	37.96
NASHST	010	NASH ST NE	NE WINCHESTER ST	NE COMMERCIAL AVE	490	32	15,680	R - Residential/Local	A - AC	87	30.44
NASHST	020	NASH ST NE	NE COMMERCIAL AVE	NE FREEMONT AVE	383	31	11,873	R - Residential/Local	A - AC	63	16.8
NASHST	030	NASH ST NE	NE FREEMONT AVE	NE MALHEUR AVE	755	20	15,100	R - Residential/Local	A - AC	88	31.02
NASHST	040	NASH ST NE	NE MALHEUR AVE	NE BEULAH DR	391	32	12,512	R - Residential/Local	A - AC	82	27.36
NEBOST	010	NEBO ST W	SOUTH DEAD END	W MYRTLE AVE	467	27	12,609	R - Residential/Local	A - AC	61	15.82
NEBOST	020	NEBO ST W	W MYRTLE AVE	W BROWN AVE	779	32	24,928	R - Residential/Local	O - AC/AC	72	23.6
NEILL	010	NEILL AVE W	W BALLF ST	W MAPLE ST	507	32	16,224	R - Residential/Local	A - AC	80	26.08

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Street ID	Section ID	Street Name	From	To	Length	Width	Area	Functional Class	Surface Type	Current PCI	Remaining Life
NEUNER	010	NEUNER DR NE	NE CHESTNUT AVE	NE STEPHENS ST	805	21	16,905	R - Residential/Local	A - AC	42	6.26
NEUNER	020	NEUNER DR NE	STEPHENS ST	DEAD END	120	30	3,600	R - Residential/Local	A - AC	89	38.18
NEVADA	010	NEVADA CT W	W MYRTLE AVE	CUL DE SAC	203	27	5,481	R - Residential/Local	O - AC/AC	77	23.42
NEWCAS	010	NEWCASTLE ST NW	NW GARDEN VALLEY BLVD	NW HUGHWOOD AVE	320	37	11,840	C - Collector	O - AC/AC	64	13.81
NEWTON	010	NEWTON CREEK RD	STEPHENS ST	HUGHES ST	2,011	38	76,418	C - Collector	A - AC	79	15.97
NEWTON	020	NEWTON CREEK RD	HUGHES ST	MARLENE DR	2,116	38	80,408	C - Collector	A - AC	82	18.12
NEWTON	030	NEWTON CREEK RD	MARLENE DR	CITY LIMITS	3,038	38	115,444	C - Collector	A - AC	83	18.92
NORMAN	010	NORMANDY AVE W	CUL DE SAC	W LOOKINGGLASS RD	1,212	33	39,996	R - Residential/Local	O - AC/AC	90	36.1
OAKAV	010	OAK AVE SE	SE STEPHENS ST	SE JACKSON ST	536	39	20,904	A - Arterial	O - AC/AC	76	19.78
OAKAV	020	OAK AVE SE	SE JACKSON ST	SE KANE ST	390	39	15,210	A - Arterial	O - AC/AC	85	25.43
OAKAV	030	OAK AVE SE	SE KANE ST	SE CHADWICK ST	257	32	8,224	A - Arterial	A - AC	66	14.65
OAKBRI	010	OAKBRIAR AVE SE	SE RIFLE RANGE ST	SE CHINABERRY AVE	562	32	17,984	R - Residential/Local	A - AC	74	24.16
OAKLAN	010	OAKLAND AVE NE	NE WILLOW ST	NE STEPHENS ST	580	37	21,460	R - Residential/Local	A - AC	83	27.98
OAKLAN	020	OAKLAND AVE NE	NE STEPHENS ST	NE VINE ST	707	32	22,624	R - Residential/Local	A - AC	87	30.43
ODELL	010	ODELL AVE NE	NE WINCHESTER AVE	NE JACKSON ST	411	39	16,029	R - Residential/Local	A - AC	90	32.07
ODELL	020	ODELL AVE NE	NE JACKSON ST	NE CASPER ST	1,062	39	41,418	R - Residential/Local	A - AC	90	32.07
OERDIN	010	OERDING AVE NW	NW CHERRY DR	NW JEFFERSON ST	911	32	29,152	R - Residential/Local	A - AC	70	22.13
OHIOAV	010	OHIO AVE SE	SE RAMP ST	DEAD END	288	16	4,608	R - Residential/Local	A - AC	59	13.79
OLDMEL	010	OLD MELROSE RD W	CITY LIMITS 400 FT W/O GOEDECK	W HARVARD AVE	2,765	34	94,010	A - Arterial	A - AC	90	23.73
ORCUTT	010	ORCUTT AVE SE	SE JACKSON ST	SE MAIN ST	371	28	10,388	R - Residential/Local	O - AC/AC	92	37.1
ORIOLE	010	ORIOLE DR W	W CARDINAL ST	W BROCCOLI ST	834	32	26,688	R - Residential/Local	A - AC	82	27.35
ORIOLE	020	ORIOLE DR W	W BROCCOLI ST	W BRADFORD AVE/AGEE ST	1,270	32	40,640	R - Residential/Local	A - AC	86	29.85
OSWEGO	010	OSWEGO AVE NE	DEAD END WEST	NE DENVER ST	147	17	2,499	R - Residential/Local	A - AC	11	0
OSWEGO	020	OSWEGO AVE NE	NE DENVER ST	NE FULTON ST	717	16	11,472	R - Residential/Local	P - PCC	20	0
OTIEST	010	OTIE ST NW	NW CECIL AVE	ROAD NARROWS	563	32	18,016	R - Residential/Local	A - AC	80	26.07
OTIEST	020	OTIE ST NW	ROAD NARROWS	PARKING LOT	266	16	4,256	R - Residential/Local	A - AC	41	5.72
OVERLO	010	OVERLOOK AVE SE	SE CHADWICK ST	SE TERRACE DR	958	18	17,244	R - Residential/Local	O - AC/AC	68	19.89
OVERLO	020	OVERLOOK AVE SE	SE TERRACE DR	SE FISHER DR	307	16	4,912	R - Residential/Local	S - ST	11	0
PARKST	010	PARK ST NW	PARKING LOT/ GATE	GARDEN VALLEY BLVD	612	20	10,620	R - Residential/Local	A - AC	58	12.71
PARKDA	010	PARKDALE AVE NW	NW LOMA VISTA	NW VALLEJO AVE	713	32	22,816	R - Residential/Local	A - AC	77	24.16
PARKVI	010	PARKVIEW CT NE	NE BEULAH DR	DEAD END SOUTH	425	22	9,350	R - Residential/Local	A - AC	41	5.82

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PARKWO	010	PARKWOOD DR SE	SE TERRACE DR	SE SUMMIT DR	1,452	32	46,464	R - Residential/Local	O - AC/AC	70	22.15
PARROT	010	PARROTT ST SE	SE MOSHER AVE	SE LANE AVE	366	28	10,248	R - Residential/Local	A - AC	4	0
PARROT	020	PARROTT ST SE	SE LANE AVE	SE CASS AVE	374	24	8,976	R - Residential/Local	A - AC	16	0
PARROT	030	PARROTT ST SE	SE CASS AVE	SE OAK AVE	372	24	8,928	R - Residential/Local	A - AC	42	6.2
PARROT	040	PARROTT ST SE	SE OAK AVE	DEAD END NORTH	170	39	6,630	R - Residential/Local	A - AC	59	14.52
PATRIC	010	PATRICIA ST NW	NW BLACK AVE	NW HILL AVE	426	25	10,650	R - Residential/Local	O - AC/AC	87	42.83
PATRIC	020	PATRICIA ST NW	NW HILL AVE	PRIVATE DRIVE	116	10	1,160	R - Residential/Local	A - AC	21	0
PATTER	010	PATTERSON ST NE	NE DOUGLAS AVE	NE DIAMOND LAKE BLVD	965	17	16,405	R - Residential/Local	A - AC	74	25.04
PILGER	010	PILGER ST W	W MILITARY AVE	W HARVARD AVE	1,982	32	63,424	R - Residential/Local	A - AC	91	32.54
PINEST	010	PINE ST SE	SE STEPHENS ST	SE LANE AVE	3,340	34	113,560	A - Arterial	O - AC/AC	84	24.96
PINEST	020	PINE ST SE	SE LANE AVE	SE OAK AVE	790	34	26,860	A - Arterial	O - AC/AC	83	23.91
PINEST	030	PINE ST SE	DOUGLAS AVE	BIKE PATH	1,000	10	10,000	R - Residential/Local	A - AC	45	7.31
PITZER	010	PITZER ST SE	SE DOUGLAS AVE	SE COURT AVE	480	24	11,520	R - Residential/Local	A - AC	65	18.55
PITZER	020	PITZER ST SE	SE COURT AVE	DEAD END NORTH	341	23	7,843	R - Residential/Local	A - AC	77	24.15
POLKST	010	POLK ST NE	NE WINCHESTER ST	NE KLAMATH AVE	511	18	9,198	R - Residential/Local	A - AC	31	1.9
POLKST	020	POLK ST NE	NE KLAMATH AVE	NE MALHEUR AVE	179	16	2,864	R - Residential/Local	A - AC	36	3.7
POMONA	010	POMONA ST	KINCAID DR	DIAMOND LAKE BLVD	288	32	9,216	R - Residential/Local	A - AC	86	29.83
POMONA	020	POMONA ST	DIAMOND LAKE BLVD	END OF PAVEMENT	812	20	16,240	R - Residential/Local	A - AC	71	22.93
POPLAR	010	POPLAR ST NE	DEAD END SOUTH	NE CHURCH AVE	318	32	10,176	R - Residential/Local	A - AC	21	0
POPLAR	020	POPLAR ST NE	NE CHURCH AVE	NE BROOKLYN AVE	153	32	4,896	R - Residential/Local	A - AC	64	16.43
POSTST	010	POST ST NE	NE WEST AVE	NE CHESTNUT AVE	449	22	9,878	R - Residential/Local	A - AC	20	0
PRIMRO	010	PRIMROSE LN NW	NW KEASEY ST	CUL DE SAC	496	32	15,872	R - Residential/Local	A - AC	74	22.28
PRINCE	010	PRINCETON AVE W	W UMPQUA ST	DEAD END EAST	526	28	14,728	R - Residential/Local	A - AC	87	30.43
PRIVAD	010	PRIVADO CT NE	NE VENTURA ST	CUL DE SAC	218	32	6,976	R - Residential/Local	A - AC	70	19.85
QUARRY	010	QUARRY RD	KESTER RD	ST HWY 138	1,810	24	43,440	R - Residential/Local	A - AC	86	29.83
RACHEL	010	RACHEL AVE NW	NW ALMIRA ST	NW KEASEY AVE	637	32	20,384	R - Residential/Local	A - AC	66	18.62
RAINBO	010	RAINBOW ST W	DEAD END/GATE SOUTH	W HARVARD AVE	1,211	20	24,220	R - Residential/Local	A - AC	78	28.55
RAMPST	010	RAMP ST SE	SE LOIS DR	SE DOWNEY AVE	1,144	27	30,888	C - Collector	O - AC/AC	82	25.92
RAMPST	020	RAMP ST SE	SE DOWNY AVE	SE BALSAM AVE	532	27	14,364	C - Collector	A - AC	89	20.12
RAMPST	030	RAMP ST SE	SE BALSAM AVE	SE DOUGLAS AVE	544	27	14,688	C - Collector	A - AC	65	10.42
RANDAL	010	RANDALL CT NW	NW KEASEY ST	CUL DE SAC	225	27	6,075	A - Arterial	A - AC	88	22.93
RENANN	010	RENANN AVE NW	NW EDENBOWER BLVD	NW STEWART PKWY	958	42	40,236	C - Collector	A - AC	62	8.82
RESERV	010	RESERVOIR AVE SE	DEAD END WEST	SE GLENN AVE	629	28	17,612	R - Residential/Local	A - AC	49	9.2

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RESERV	020	RESERVOIR AVE SE	SE GLENN AVE	SE TERRACE ST	250	28	7,000	R - Residential/Local	A - AC	35	3.3
RICEAV	010	RICE AVE SE	SE MILL ST	SE PINE ST	263	32	8,416	R - Residential/Local	A - AC	88	31
RICEAV	020	RICE AVE SE	SE PINE ST	SE STEPHENS ST	253	34	8,602	R - Residential/Local	A - AC	87	30.43
RICEAV	030	RICE AVE SE	SE STEPHENS ST	SE COBB ST	253	24	6,072	R - Residential/Local	A - AC	79	29.12
RICEAV	040	RICE AVE SE	SE COBB ST	SE MAIN ST	929	22	20,438	R - Residential/Local	C - AC/PCC	62	18.74
RIDGEV	010	RIDGEVIEW CT W	W MYRTLE AVE	DEAD END SOUTH	370	27	9,990	R - Residential/Local	A - AC	56	12.85
RIFLER	030	RIFLE RANGE ST NE	NE DIAMOND LAKE BLVD	NE SPENCER CT	1,434	41	58,794	R - Residential/Local	A - AC	56	11.97
RIFLER	040	RIFLE RANGE ST NE	NE SPENCER CT	NE SCHICK AVE	3,285	22	72,270	R - Residential/Local	A - AC	36	3.81
RIFLER	050	RIFLE RANGE ST NE	NE SHICK AVE	CITY LIMITS	124	20	2,480	R - Residential/Local	A - AC	42	6.07
RIFLER	010	RIFLE RANGE ST SE	SE WALDEN AVE	DEAD END N. OF OAKBRIAR AVE	708	32	22,656	R - Residential/Local	A - AC	80	30.6
RIFLER	020	RIFLE RANGE ST SE	SE DOUGLAS AVE	SE DIAMOND LAKE BLVD	948	37	35,076	R - Residential/Local	A - AC	85	29.22
RIVERF	010	RIVERFRONT DR NW	NW HARVEY AVE	HOUSE #1244	271	32	8,672	R - Residential/Local	A - AC	83	27.99
RIVERF	020	RIVERFRONT DR NW	HOUSE #1244	NW KRING ST	437	32	13,984	R - Residential/Local	A - AC	76	27.56
RIVERS	010	RIVERSIDE DR W	W BOWDEN ST	W LILBURN AVE	1,488	24	35,712	R - Residential/Local	C - AC/PCC	70	25.59
RIVERV	010	RIVERVIEW DR NW	NW WHIPPLE AVE	100 FT W OF GARDEN ST	249	20	4,980	R - Residential/Local	A - AC	84	33.54
RIVERV	020	RIVERVIEW DR NW	100 FT W OF GARDEN ST	NW JEFFERSON AVE/ NW HARVEY	600	32	19,200	R - Residential/Local	A - AC	79	29.69
ROBERT	010	ROBERTS AVE SE	SE STEPHENS ST	SE COBB ST	258	24	6,192	R - Residential/Local	C - AC/PCC	85	42.38
ROBERT	020	ROBERTS AVE SE	SE COBB ST	SE MAIN ST	941	20	18,820	R - Residential/Local	C - AC/PCC	38	5.14
ROCKYR	010	ROCKY RIDGE DR NE	NE GARDEN VALLEY BLVD	875 FT EAST OF GARDEN VAL BLVD	875	32	28,000	R - Residential/Local	A - AC	72	22.62
ROCKYR	020	ROCKY RIDGE DR NE	875 FT EAST OF GARDEN VAL BLVD	NE CAMBRIAN CT	871	32	27,872	R - Residential/Local	A - AC	71	21.18
ROCKYR	030	ROCKY RIDGE DR NE	NE CAMBRIAN CT	NE ROCKY DR	742	32	23,744	R - Residential/Local	A - AC	68	18.77
ROCKYR	040	ROCKY RIDGE DR NE	NE ROCKY DR	540 FT N. OF ROCKY DR	541	32	17,312	R - Residential/Local	A - AC	72	20.88
ROCKYR	050	ROCKY RIDGE DR NE	540 FT N. OF ROCKY DR	50 FT N. OF REAGAN DR	1,087	32	34,784	R - Residential/Local	A - AC	75	23.14
ROCKYR	060	ROCKY RIDGE DR NE	50 FT N OF REAGAN DR	100 FT N OF ALAMEDA AVE	655	32	20,960	R - Residential/Local	A - AC	92	32.96
ROSEST	010	ROSE ST SE	SE MOSHER AVE	SE CASS AVE	729	38	27,702	R - Residential/Local	A - AC	78	27.99
ROSEST	020	ROSE ST SE	SE CASS AVE	SE WASHINGTON AVE	705	38	26,790	R - Residential/Local	A - AC	65	16.84
ROSEST	030	ROSE ST SE	SE WASHINGTON AVE	SE DOUGLAS AVE	353	58	20,474	R - Residential/Local	A - AC	81	32.11
ROSEST	040	ROSE ST SE	SE DOUGLAS AVE	SE COURT AVE	347	20	6,940	R - Residential/Local	A - AC	87	30.44

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ROSELA	010	ROSELAND AVE NE	NE STEPHENS ST	NE VINE ST	887	32	28,384	R - Residential/Local	A - AC	83	27.98
ROSEMA	010	ROSEMARY AVE	LOOKINGGLASS RD	TEMP DEAD END	1,394	31	43,214	R - Residential/Local	A - AC	92	32.96
ROSEMO	010	ROSEMOND AVE W	W BALLF ST	DEAD END EAST	376	32	12,032	R - Residential/Local	A - AC	80	26.08
ROSSAV	010	ROSS AVE NE	NE LINCOLN ST	END OF PAVEMENT	125	32	4,000	R - Residential/Local	A - AC	77	24.15
ROWEST	010	ROWE AVE NE	WINCHESTER ST	DEAD END WEST	241	22	5,302	R - Residential/Local	P - PCC	16	0
RUSTCT	010	RUST CT SE	SE LELAND ST	DEAD END	383	8	3,064	R - Residential/Local	A - AC	10	0
RUTTER	010	RUTTER LN NW	NW BETHEL AVE	NW CECIL AVE	315	20	6,300	R - Residential/Local	A - AC	79	27.42
RUTTER	020	RUTTER LN NW	NW CECIL AVE	PARKING LOT	190	20	3,800	R - Residential/Local	A - AC	53	9.66
SAFFRO	010	SAFFRON DR W	TARRAGON DR	DEAD END WEST	100	25	2,500	R - Residential/Local	A - AC	95	33.89
SALIDA	010	SALIDA CT W	W SHENANDOAH ST	CUL DE SAC	230	32	7,360	R - Residential/Local	O - AC/AC	79	29.03
SANDER	010	SANDERS AVE W	W BROCOLLI ST	CUL DE SAC WEST	700	32	22,400	R - Residential/Local	A - AC	79	25.44
SANFOR	010	SANFORD AVE SE	SE MAIN ST	SE STARMER ST	1,078	17	18,326	R - Residential/Local	O - AC/AC	81	31.84
SELLWO	010	SELLWOOD ST NW	NW LAMONT ST	NW DELRIDGE AVE	282	32	9,024	R - Residential/Local	A - AC	75	26.17
SELMAR	010	SELMAR CT W	W FINLAY AVE	CUL DE SAC	292	25	7,300	R - Residential/Local	O - AC/AC	88	44.17
SHAMBR	010	SHAMBROOK AVE NE	SE STEPHENS ST	NE WINCHESTER ST	358	32	11,456	R - Residential/Local	O - AC/AC	71	21.53
SHANTE	010	SHANTEL ST NW	NW DAYSHA DR	END OF PAVEMENT	412	32	13,184	R - Residential/Local	A - AC	81	31.86
SHARON	010	SHARON AVE SE	DEAD END SOUTH	HOUSE #946	553	32	17,696	R - Residential/Local	A - AC	85	33.99
SHARON	020	SHARON AVE SE	HOUSE #946	SE LOIS DR (NORTH INT)	767	32	24,544	R - Residential/Local	O - AC/AC	82	32.44
SHARP	010	SHARP AVE W	W HICKORY ST	W BROCCOLI ST	1,675	32	53,600	R - Residential/Local	O - AC/AC	80	31.24
SHASTA	010	SHASTA AVE W	W HICKORY ST	W LOOKINGGLASS RD	1,205	32	38,560	R - Residential/Local	O - AC/AC	70	21.81
SHENAN	010	SHENANDOAH ST W	W HARVARD AVE	W BRADFORD AVE	890	32	28,480	R - Residential/Local	O - AC/AC	78	27.72
SHERID	010	SHERIDAN ST SE	SE MOSHER AVE	145 FT S. OF CASS AVE	628	32	20,096	R - Residential/Local	O - AC/AC	82	34.24
SHERID	020	SHERIDAN ST SE	145 FT S. OF CASS AVE	SE CASS AVE	145	24	3,480	R - Residential/Local	A - AC	82	27.34
SHERWO	010	SHERWOOD AVE W	DEAD END W. OF HICKORY ST	W CENTER ST	1,034	32	33,088	R - Residential/Local	O - AC/AC	72	24.11
SHERWO	020	SHERWOOD AVE W	W CENTER ST	W BROCCOLI ST	991	32	31,712	R - Residential/Local	O - AC/AC	72	24.11
SHORT	010	SHORT ST SE	SE SYKES AVE	SE SPRING ST	391	22	8,602	R - Residential/Local	P - PCC	44	12.12
SHORT	020	SHORT ST SE	BURKE AVE	GATE	90	24	2,160	R - Residential/Local	A - AC	81	26.77
SILVER	010	SILVER COURT SE	W FROMDAHL DR	CUL DE SAC	203	32	6,496	R - Residential/Local	A - AC	60	13.89
SOMERS	010	SOMERSET CT	KINCAID DR	CUL DE SAC	229	31	7,099	R - Residential/Local	A - AC	86	36.78
SOUTHW	010	SOUTHWATER DR NW	CUL DE SAC S.OF KRING ST	NW BASCO AVE	634	32	20,288	R - Residential/Local	A - AC	64	17.61
SPRAGU	010	SPRAGUE CT W	W HARRIS HILLS DR	CUL DE SAC	275	32	8,800	R - Residential/Local	A - AC	89	31.56

Section PCI/RSL Listing

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Street ID	Section ID	Street Name	From	To	Length	Width	Area	Functional Class	Surface Type	Current PCI	Remaining Life
SPRAYC	010	SPRAY CT NW	NW KEASEY ST	CUL DE SAC	376	27	10,152	R - Residential/Local	O - AC/AC	78	28.52
SPRING	010	SPRING AVE SE	SE SHORT ST	SE MILL ST	252	24	6,048	R - Residential/Local	P - PCC	33	4.6
SPRING	020	SPRING AVE SE	SE MILL ST	SE PINE ST	266	32	8,512	R - Residential/Local	A - AC	80	26.07
SPRING	030	SPRING AVE SE	SE PINE ST	SE STEPHENS ST	251	32	8,032	R - Residential/Local	A - AC	85	29.23
SPRUCE	010	SPRUCE ST SE	SE PARROTT ST	HOUSE #673	526	20	10,520	R - Residential/Local	A - AC	26	0.25
SPRUCE	020	SPRUCE ST SE	HOUSE #673	SE OAK AVE	281	22	6,182	R - Residential/Local	A - AC	24	0
SPRUCE	030	SPRUCE ST SE	SE OAK AVE	SE WASHINGTON AVE	375	38	14,250	R - Residential/Local	A - AC	84	28.62
SPRUCE	040	SPRUCE ST SE	SE WASHINGTON AVE	SE DOUGLAS AVE	357	28	9,996	R - Residential/Local	A - AC	49	9.22
STANTO	020	STANTON ST W	MEYERS ACTIVITY CENTER PARKLOT	W BERTHA AVE	642	37	23,754	R - Residential/Local	A - AC	80	26.08
STANTO	030	STANTON ST W	W BERTHA AVE	W HARVARD AVE	925	32	29,600	R - Residential/Local	O - AC/AC	68	18.87
STARME	010	STARMER ST SE	SE MARSTERS AVE	SE BOOTH AVE	440	20	8,800	R - Residential/Local	O - AC/AC	81	33.43
STARME	020	STARMER ST SE	SE BOOTH AVE	DEAD END NORTH OF SANFORD	969	16	15,504	R - Residential/Local	A - AC	18	0
STEELE	010	STEELE CT NE	NE LINCOLN ST	CUL DE SAC	176	32	5,632	R - Residential/Local	A - AC	74	22.17
STELLE	010	STELLERS EAGLE ST SE	SE GOLDEN EAGLE ST	TEMP DEAD END	382	32	12,224	R - Residential/Local	A - AC	86	36.12
STEPHE	050	STEPHENS ST NE	SE DIAMOND LAKE BLVD	NE GARDEN VALLEY BLVD	5,235	68	355,980	A - Arterial	O - AC/AC	67	14.38
STEPHE	060	STEPHENS ST NE	NE GARDEN VALLEY BLVD	NE ALAMEDA AVE	1,540	70	107,800	A - Arterial	O - AC/AC	85	25.35
STEPHE	070	STEPHENS ST NE	NE ALAMEDA AVE	NE MEADOW AVE	2,453	70	171,710	A - Arterial	O - AC/AC	43	4.96
STEPHE	080	STEPHENS ST NE	NE MEADOW AVE	NE NEWTON CREEK RD	2,720	70	190,400	A - Arterial	O - AC/AC	44	5.39
STEPHE	090	STEPHENS ST NE	NE NEWTON CREEK RD	NE EDENBOWER BLVD	1,577	70	110,390	A - Arterial	O - AC/AC	84	24.14
STEPHE	100	STEPHENS ST NE	NE EDENBOWER BLVD	ISABELL AVE	2,459	46	113,114	A - Arterial	O - AC/AC	76	19.83
STEPHE	110	STEPHENS ST NE	ISABELL AVE	KENNETH FORD DR	2,245	46	103,270	A - Arterial	O - AC/AC	79	21.68
STEPHE	120	STEPHENS ST NE	KENNETH FORD DR	200' N/O MARY ANN LN	1,264	46	58,144	A - Arterial	O - AC/AC	79	21.68
STEPHE	010	STEPHENS ST SE	CITY LIMITS SOUTH	BEG OF DIVIDED HWY (ONE WAY)	1,370	45	61,650	A - Arterial	O - AC/AC	72	17.42
STEPHE	020	STEPHENS ST SE	BEG OF DIVIDED HWY (ONE WAY)	W BURKE AVE	990	42	41,580	A - Arterial	C - AC/PCC	77	20.14
STEPHE	030	STEPHENS ST SE	W BURKE AVE	SE LANE AVE	2,292	42	96,264	A - Arterial	C - AC/PCC	79	21.73
STEPHE	040	STEPHENS ST SE	SE LANE AVE	SE OAK AVE	750	37	27,750	A - Arterial	C - AC/PCC	77	20.14
STERLI	010	STERLING DR	STEPHENS ST	PRIVATE DR	860	22	18,920	R - Residential/Local	A - AC	81	26.77
STEWPA	010	STEWART PARK DR NW	NW STEWART PKWY	VETERANS WAY	2,574	26	66,924	R - Residential/Local	A - AC	68	19.33

Street ID	Section ID	Street Name	From	To	Length	Width	Area	Functional Class	Surface Type	Current PCI	Remaining Life
STEWPA	020	STEWART PARK DR NW	NW VETERANS WAY	W HARVARD AVE	1,606	20	32,120	R - Residential/Local	A - AC	69	20.11
STEWAR	140	STEWART PKWY NE	NW FAIRMOUNT ST	NE AIRPORT RD	305	58	17,690	A - Arterial	A - AC	87	22.51
STEWAR	150	STEWART PKWY NE	NE AIRPORT RD	NE STEPHENS ST	913	66	60,258	A - Arterial	O - AC/AC	84	26
STEWAR	010	STEWART PKWY NW	W HARVARD AVE	SOUTH END OF BRIDGE	274	51	13,974	A - Arterial	A - AC	58	10.21
STEWAR	020	STEWART PKWY NW	SOUTH END OF BRIDGE	NORTH END OF BRIDGE	670	32	21,440	A - Arterial	P - PCC	92	61.54
STEWAR	030	STEWART PKWY NW	NORTH END OF BRIDGE	175 FT N.OF STEWART PARK DR	471	46	21,666	A - Arterial	O - AC/AC	67	14.52
STEWAR	040	STEWART PKWY NW	175 N. OF STEWART PARK DR	NW HARVEY AVE	1,280	46	58,880	A - Arterial	O - AC/AC	52	8.04
STEWAR	050	STEWART PKWY NW	NW HARVEY AVE	BOX CULVERT S/O FORD FOUND.	1,924	42	80,808	A - Arterial	A - AC	50	7.5
STEWAR	060	STEWART PKWY NW	BOX CULVERT S/O FORD FOUND.	ROAD WIDENS/BEGIN 5 LANES	1,233	52	64,116	A - Arterial	A - AC	73	18.15
STEWAR	070	STEWART PKWY NW	ROAD WIDENS/BEGIN 5 LANES	NW VALLEY VIEW DR	550	67	36,850	A - Arterial	A - AC	64	12.76
STEWAR	080	STEWART PKWY NW	NW VALLEY VIEW DR	NW GARDEN VALLEY BLVD	305	67	20,435	A - Arterial	A - AC	74	16.49
STEWAR	090	STEWART PKWY NW	NW GARDEN VALLEY DR	442 FT N. OF GARDEN VALLEY DR	442	92	40,664	A - Arterial	A - AC	57	9.78
STEWAR	100	STEWART PKWY NW	442 FT N. OF GARDEN VALLEY BLV	NW RENANN AVE	1,987	66	131,142	A - Arterial	O - AC/AC	76	19.86
STEWAR	110	STEWART PKWY NW	NW RENANN AVE	EDENBOWER BLVD	2,540	66	167,640	A - Arterial	O - AC/AC	75	19.15
STEWAR	120	STEWART PKWY NW	EDENBOWER BLVD	NW AVIATION DR	2,637	58	152,946	A - Arterial	A - AC	56	9.06
STEWAR	130	STEWART PKWY NW	NW AVIATION BLVD	NW FAIRMOUNT ST	1,503	58	87,174	A - Arterial	O - AC/AC	86	27.23
STONE	010	STONE AVE SE	SE JACKSON ST	SE HAMILTON ST	255	14	3,570	R - Residential/Local	S - ST	3	0
STRONG	010	STRONG AVE SE	SE EDDY ALLEY	DEAD END	529	10	5,290	R - Residential/Local	A - AC	25	0
SUMMIT	010	SUMMIT DR SE	DEAD END SOUTH	SE PARKWOOD DR	1,238	32	39,616	R - Residential/Local	O - AC/AC	77	27.95
SUMMIT	020	SUMMIT DR SE	SE PARKWOOD DR	SE TERRACE DR	934	32	29,888	R - Residential/Local	O - AC/AC	77	27.95
SUNBER	010	SUNBERRY DR NW	DEAD END WEST OF ANDREA ST	NW TROOST ST	1,044	32	33,408	R - Residential/Local	A - AC	76	26.15
SUNSLP	010	SUNSET LP NE	NE SUNSET ST	NE SUNSET ST	1,008	32	32,256	R - Residential/Local	A - AC	88	39.88
SUNSET	010	SUNSET ST NE	NE GARDEN VALLEY BLVD	APT PARKING LOT	204	22	4,488	R - Residential/Local	A - AC	61	14.5
SUNSET	020	SUNSET ST NE	NE ALAMEDA AVE	NE BARAGER AVE	434	32	13,888	R - Residential/Local	A - AC	73	21.66
SUNSET	030	SUNSET ST NE	NE BARAGER AVE	200 FT N. OF TODD ST	1,481	32	47,392	R - Residential/Local	A - AC	87	37.94

Street ID	Section ID	Street Name	From	To	Length	Width	Area	Functional Class	Surface Type	Current PCI	Remaining Life
SUNSHI	010	SUNSHINE DR	ST HWY 138	CITY LIMITS NORTH	1,149	32	36,768	R - Residential/Local	A - AC	62	14.59
SUSAN	010	SUSAN ST W	W CENTER ST	W SHARP AVE	588	32	18,816	R - Residential/Local	A - AC	79	29.43
SYCAN	010	SYCAN CT	W HARRIS HILLS DR	CUL DE SAC	234	32	7,488	R - Residential/Local	A - AC	84	28.62
SYKES	010	SYKES AVE SE	SE SHORT ST	SE MILL ST	272	22	5,984	R - Residential/Local	P - PCC	54	20.44
SYKES	020	SYKES AVE SE	SE MILL ST	SE PINE ST	258	32	8,256	R - Residential/Local	A - AC	85	29.23
SYKES	030	SYKES AVE SE	SE PINE ST	SE STEPHENS ST	253	34	8,602	R - Residential/Local	A - AC	84	28.61
TAHOE	010	TAHOE AVE NE	NE FULTON ST	DEAD END EAST	297	17	5,049	R - Residential/Local	A - AC	36	3.81
TANAGE	010	TANAGER ST W	W SHARP AVE	W ORIOLE DR	430	32	13,760	R - Residential/Local	A - AC	81	31.24
TARRAG	010	TARRAGON DR W	DEAD END S. OF WOODSIDE AVE	DEAD END N. OF ROSEMARY AVE	855	31	26,505	R - Residential/Local	A - AC	95	33.89
TAYLOR	010	TAYLOR ST NE	NE BROOKLYN AVE	NE ALAMEDA AVE	486	26	12,636	R - Residential/Local	O - AC/AC	83	35.05
TEMPLI	010	TEMPLIN AVE SE	SE ARIZONA ST	SE FULLERTON ST	480	22	10,560	R - Residential/Local	O - AC/AC	87	39.36
TEMPLI	020	TEMPLIN AVE SE	SE FULLERTON ST	SE FLINT ST	137	22	3,014	R - Residential/Local	A - AC	40	5.28
TERRAC	010	TERRACE DR SE	SE SUMMIT DR	SE CASCADE CT	2,250	25	56,250	R - Residential/Local	A - AC	53	11.41
TERRAC	020	TERRACE DR SE	SE CASCADE CT	SE LANE AVE	525	25	13,125	R - Residential/Local	A - AC	47	8.45
TERRAC	030	TERRACE DR SE	SE LANE AVE	SE PARKWOOD DR	1,527	28	42,756	R - Residential/Local	O - AC/AC	74	26.19
THOMPS	010	THOMPSON ST SE	SE RICE AVE	SE ROBERTS AVE	370	20	7,400	R - Residential/Local	O - AC/AC	73	21.25
THOMPS	020	THOMPSON ST SE	SE ROBERTS AVE	SE WAITE AVE	350	32	11,200	R - Residential/Local	A - AC	82	27.35
TOBYCT	010	TOBY CT	LOOKINGGLASS	HAMMERHEAD	509	31	15,779	R - Residential/Local	A - AC	85	32.25
TODDST	010	TODD ST NE	NE SUNSET ST	HOUSE #2069 SUNSET (PRIVATE RD	125	20	2,500	R - Residential/Local	A - AC	90	32.06
TODDST	020	TODD ST NE	HOUSE #1889	NE ALAMEDA AVE	934	32	29,888	R - Residential/Local	A - AC	73	23.95
TODDST	030	TODD ST NE	NE ALAMEDA AVE	NE BROOKLYN AVE	665	32	21,280	R - Residential/Local	A - AC	77	28.17
TODDST	040	TODD ST NE	NE BROOKLYN AVE	BEG OF PAVEMENT	433	32	13,856	R - Residential/Local	A - AC	44	7
TROOST	010	TROOST ST NW	LOT #1441/CTY LMTS S	NW CALKINS AVE	782	48	37,536	C - Collector	A - AC	65	10.22
TROOST	024	TROOST ST NW	NW CALKINS AVE	NW DELRIDGE AVE	1,377	48	66,096	C - Collector	A - AC	72	12.32
TROOST	026	TROOST ST NW	NW DELRIDGE AVE	NW MOORE AVE	460	48	22,080	C - Collector	A - AC	75	13.51
TROOST	032	TROOST ST NW	NW MOORE AVE	NW SUNBERRY DRIVE	648	48	31,104	C - Collector	A - AC	69	11.19
TROOST	034	TROOST ST NW	NW SUNBERRY DRIVE	NW GARDEN VALLEY BLVD	521	48	25,008	C - Collector	A - AC	71	11.93
TROOST	040	TROOST ST NW	NW GARDEN VALLEY BLVD	NW HUGHWOOD AVE	350	37	12,950	C - Collector	A - AC	74	12.94
TROOST	050	TROOST ST NW	NW HUGHWOOD AVE	CUL DE SAC	346	25	8,650	C - Collector	A - AC	77	14.63
ULRICH	010	ULRICH AVENUE NW	NW KEASEY ST	DEAD END EAST	435	24	10,440	R - Residential/Local	A - AC	42	6.21

Section PCI/RSL Listing

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Street ID	Section ID	Street Name	From	To	Length	Width	Area	Functional Class	Surface Type	Current PCI	Remaining Life
UMPQUA	010	UMPQUA ST W	W MILITARY AVE	W HARVARD AVE	380	32	12,160	R - Residential/Local	A - AC	72	21.68
UMPQUA	020	UMPQUA ST W	W HARVARD AVE	W PRINCETON AVE	1,007	32	32,224	R - Residential/Local	A - AC	76	23.52
UMPQUA	030	UMPQUA ST W	W PRINCETON AVE	50 FT N. OF ESPERANZA CT	580	32	18,560	R - Residential/Local	A - AC	73	21.66
UNION	010	UNION ST W	W MYRTLE AVE	W BROWN AVE	576	27	15,552	R - Residential/Local	A - AC	54	11.75
UNION	020	UNION ST W	W BROWN AVE	W HARVARD AVE	399	27	10,773	R - Residential/Local	A - AC	74	22.28
UTAHDR	010	UTAH DR NW	NW LUTH ST	NW KLINE ST	620	32	19,840	R - Residential/Local	A - AC	71	21.75
UTAHDR	020	UTAH DR NW	NW KLINE ST	NW MOTAH ST	229	25	5,725	R - Residential/Local	A - AC	78	24.8
VALECT	010	VALE CT NW	NW KLINE ST	CUL DE SAC	625	32	20,000	R - Residential/Local	A - AC	77	24.16
VALLEJ	010	VALLEJO DR NW	NW CHAMBERS DR	NW LOMA VISTA DR	1,208	32	38,656	R - Residential/Local	A - AC	82	27.35
VALLEY	010	VALLEY VIEW DR NW	CUL DE SAC W. OF WATTERS ST	NW KLINE ST	1,481	32	47,392	R - Residential/Local	A - AC	91	32.53
VALLEY	020	VALLEY VIEW DR NW	NW KLINE ST	NW KEASEY ST	1,088	24	26,112	C - Collector	C - AC/PCC	82	24.29
VALLEY	030	VALLEY VIEW DR NW	NW KEASEY ST	NW STEWART PKWY	813	38	30,894	C - Collector	A - AC	61	7.88
VENTUR	010	VENTURA ST NE	NE DENN AVE	HOUSE #796	1,358	32	43,456	R - Residential/Local	A - AC	69	21.31
VENTUR	020	VENTURA ST NE	HOUSE #796	HOUSE #951	594	32	19,008	R - Residential/Local	A - AC	87	37.93
VERMIL	010	VERMILLION ST NW	NW EDENBOWER BLVD	DEAD END	258	37	9,546	R - Residential/Local	A - AC	69	21.12
VERONI	010	VERONICA CT NW	NW ESQUIRE DR	CUL DE SAC	168	32	5,376	R - Residential/Local	A - AC	69	21.33
VINEST	010	VINE ST NE	NE GARDEN VALLEY BLVD	NE ALAMEDA AVE	1,404	32	44,928	C - Collector	A - AC	65	9.65
VINEST	020	VINE ST NE	NE ALAMEDA AVE	NE MEADOW AVE	2,311	32	73,952	C - Collector	A - AC	90	20.65
VIRGIN	010	VIRGINIA CT SE	CUL DE SAC SOUTH	SE GERMOND AVE	404	24	9,696	R - Residential/Local	A - AC	81	26.7
VISTA	010	VISTA FE CT NE	NE ROCKY RIDGE DR	CUL DE SAC	409	32	13,088	R - Residential/Local	A - AC	83	33.13
WAITE	010	WAITE AVE SE	SE STEPHENS ST	SE JACKSON ST	492	24	11,808	R - Residential/Local	A - AC	81	32.1
WAITE	020	WAITE AVE SE	SE HAMILTON ST	SE MAIN ST	287	32	9,184	R - Residential/Local	A - AC	75	22.9
WALDON	010	WALDON AVE SE	SE RAMP ST	SCHOOL PARKING LOT	1,203	32	38,496	R - Residential/Local	A - AC	82	32.16
WALNUT	010	WALNUT ST NE	NE COLLEGE AVE	NE WEST AVE	490	32	15,680	R - Residential/Local	O - AC/AC	51	11.39
WALNUT	020	WALNUT ST NE	NE WEST AVE	NE CHESTNUT AVE	451	32	14,432	R - Residential/Local	A - AC	75	24.83
WALNUT	030	WALNUT ST NE	NE CHESTNUT AVE	NW GARDEN VALLEY BLVD	1,312	38	49,856	C - Collector	A - AC	61	8.39
WALTER	010	WALTER CT	BROAD ST	CUL DE SAC EAST	162	17	2,754	R - Residential/Local	A - AC	82	27.41
WANELL	010	WANELL ST NW	NW CALKINS AVE	NW BEAUMONT AVE	621	32	19,872	R - Residential/Local	O - AC/AC	81	32.71
WARDAV	010	WARD AVE NE	NE CEDAR ST	DEAD END/GATE	717	38	27,246	R - Residential/Local	A - AC	74	23.51
WARREN	010	WARREN CT W	W OLD MELROSE RD	DEAD END NORTH	222	27	5,994	R - Residential/Local	A - AC	86	29.85

Section PCI/RSL Listing

Street ID	Section ID	Street Name	From	To	Length	Width	Area	Functional Class	Surface Type	Current PCI	Remaining Life
WASHIN	010	WASHINGTON AVE SE	SE STEPHENS ST	SE KANE ST	903	34	30,702	A - Arterial	O - AC/AC	83	23.06
WASHIN	020	WASHINGTON AVE SE	SE KANE ST	SE CHADWICK ST	262	34	8,908	A - Arterial	O - AC/AC	77	20.71
WASHIN	030	WASHINGTON AVE SE	SE CHADWICK ST	END OF CURB	421	29	12,209	R - Residential/Local	O - AC/AC	75	24.94
WATSON	010	WATSON ST SE	DEAD END SOUTH	SE LANE AVE	320	20	6,400	R - Residential/Local	O - AC/AC	78	29.22
WATTER	010	WATTERS ST NW	NW MOORE AVE	NW VALLEY VIEW DR	979	32	31,328	R - Residential/Local	A - AC	61	14.91
WESTAV	010	WEST AVE NE	NE COLLEGE DR	NE CEDAR ST	234	20	4,680	R - Residential/Local	S - ST	40	3.17
WESTAV	020	WEST AVE NE	NE CEDAR ST	NE POST ST	736	18	13,248	R - Residential/Local	S - ST	29	0.65
WESTAV	030	WEST AVE NE	NE POST ST	NE ALDER ST	242	17	4,114	R - Residential/Local	A - AC	48	8.95
WHART	010	WHARTON ST W	W MYRTLE AVE	W BROWN AVE	599	32	19,168	R - Residential/Local	O - AC/AC	83	35.05
WHART	020	WHARTON ST W	W BROWN AVE	W HARVARD AVE	403	32	12,896	R - Residential/Local	O - AC/AC	80	30.39
WHIPPL	010	WHIPPLE AVE NW	NW RIVERVIEW DR	NW GARDEN ST	405	20	8,100	R - Residential/Local	A - AC	80	28.04
WHIPPL	020	WHIPPLE AVE NW	NW GARDEN ST	NW JEFFERSON ST	511	32	16,352	R - Residential/Local	A - AC	79	29.13
WIDEAV	010	WIDE AVE NW	HOME DEPOT PARKING LOT	AVIATION BLVD	315	38	11,970	R - Residential/Local	A - AC	86	36.15
WILDWO	010	WILDWOOD AVE SE	SE TERRACE ST	DEAD END	408	10	4,080	R - Residential/Local	A - AC	29	1.27
WILLOW	010	WILLOW ST NE	NE GARDEN VALLEY BLVD	NE OAKLAND AVE	476	37	17,612	R - Residential/Local	A - AC	83	27.98
WINCHE	010	WINCHESTER ST NE	NE DIAMOND LAKE BLVD	NE KLAMATH AVE	2,087	42	87,654	R - Residential/Local	A - AC	55	11.74
WINCHE	020	WINCHESTER ST NE	NE KLAMATH AVE	NE STEPHENS ST	782	30	23,460	R - Residential/Local	A - AC	64	17.21
WINTER	010	WINTER RIDGE DR W	125 FT S. OF JUNIPER ST	W LORRAINE AVE	658	32	21,056	R - Residential/Local	A - AC	72	23.07
WINTER	022	WINTER ST NE	DEAD END SOUTH	BROOKLYN AVE	644	26	16,744	R - Residential/Local	A - AC	30	1.63
WINTER	024	WINTER ST NE	BROOKLYN AVE	ALAMEDA AVE	502	26	13,052	R - Residential/Local	O - AC/AC	86	37.21
WINTER	030	WINTER ST NE	NE ALAMEDA AVE	DEAD END NORTH	154	26	4,004	R - Residential/Local	A - AC	74	21.61
WITHER	010	WITHERSPOON AVE NW	CUL DE SAC WEST OF AVERY ST	HOUSE #2070	1,119	32	35,808	R - Residential/Local	A - AC	81	32.31
WITHER	020	WITHERSPOON AVE NW	HOUSE #2070	TROOST ST	655	32	20,960	R - Residential/Local	A - AC	79	29.43
WOODOA	010	WOODOAK DR NW	WOODWILLOW DR	WOODWILLOW DR	624	32	19,968	R - Residential/Local	A - AC	79	29.43
WOODRO	010	WOODROSE LN NW	WOODWILLOW DR	CUL DE SAC	357	32	11,424	R - Residential/Local	A - AC	83	27.99
WOODSI	010	WOODSIDE AVE W	LOOKINGGLASS RD	TARRAGON DR	563	31	17,453	R - Residential/Local	A - AC	93	33.38
WOODWA	010	WOODWARD AVE SE	SE MILL ST	SE PINE ST	258	32	8,256	R - Residential/Local	A - AC	73	21.66
WOODWA	020	WOODWARD AVE SE	SE PINE ST	SE STEPHENS ST	260	38	9,880	R - Residential/Local	A - AC	74	25.51
WOODWI	010	WOODWILLOW DR NW	NW KLINE ST	NW KLINE ST	1,425	32	45,600	R - Residential/Local	A - AC	79	29.43
WRIGHT	010	WRIGHT AVE NE	NE STEPHENS ST	NE WINCHESTER ST	237	22	5,214	C - Collector	A - AC	79	15.25

Section PCI/RSL Listing

Printed: 09/02/2015

Street ID	Section ID	Street Name	From	To	Length	Width	Area	Functional Class	Surface Type	Current PCI	Remaining Life
WRIGHT	020	WRIGHT AVE NE	NE WINCHESTER ST	NE LINCOLN ST	193	24	4,632	C - Collector	A - AC	37	2.32
YALEAV	010	YALE AVE W	W MAPLE ST	W HARRISON ST	233	28	6,524	R - Residential/Local	A - AC	76	26.85
YOUNGW	010	YOUNGWOOD CT NW	NW DOMENICO DR	CUL DE SAC	250	32	8,000	R - Residential/Local	O - AC/AC	73	24.64
YOUNT	010	YOUNT AVE NE	NE GARRECHT ST	NE PATTERSON ST	542	20	10,840	R - Residential/Local	O - AC/AC	73	22.32

Total Section Length:	584,046
Total Section Area:	19,019,120

Appendix B: Median Locations on City Roadways

CITY OF ROSEBURG
Public Works Department

Nikki Messenger, P.E. - DIRECTOR

Public Works Department

MEDIAN ISLANDS

DATE: 02/23/17	DESIGN:
REVISIONS	DRAWN: NRS
1.	SCALE: 1" = 500'
2.	SHEET: 1/1
3.	
4.	

Appendix C: ODOT Sidewalk and Multi-Use Path Inventories

Bike-Ped Preservation Program
Sidewalk Ownership Survey

REG	DIST	City	County	ROUTE	RD ID	BEG MP	END MP	Side	Sidewalk	Type	BUFFER	COND	EFFECTV_DT	Width (feet)	Length	AREA (SF)	Ownership (ODOT, City, County, Private, Public, Joint, Other, Unknown)
3	7	ROSEBURG	DOUGLAS	OR 138E	Harvard Ave	-0.96	-0.84	Left	Y	PCC		F		6	0.12	3801.6	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E	Harvard Ave	-0.96	-0.80	Right	Y	PCC		F		6	0.16	5068.8	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E	Harvard Ave	-0.84	-0.77	Right	Y	PCC		F		6	0.07	2217.6	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E	Harvard Ave	-0.80	-0.77	Left	Y	PCC		F		6	0.03	950.4	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E	Harvard Ave	-0.77	-0.60	Left	Y	PCC		F		6	0.17	5385.6	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E	Harvard Ave	-0.77	-0.60	Right	Y	PCC		F		6	0.17	5385.6	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E	Harvard Ave	-0.60	-0.76	Left	Y	PCC	Y	F	2009	7	0.16	5913.6	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E	Washington St	-0.65	-0.29	Right	Y	PCC		F		4	0.36	7603.2	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E	Washington St	-0.65	-0.29	Left	Y	PCC		F		4	0.36	7603.2	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E	Oak St	-0.65	-0.48	Right	Y	PCC		F	2009	4	0.17	3590.4	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E	Oak St	-0.65	-0.48	Left	Y	PCC		F	2009	4	0.17	3590.4	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E	Oak St	-0.48	-0.45	Left	Y	PCC		F		6	0.03	950.4	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E	Oak St	-0.48	-0.45	Right	Y	PCC		F		6	0.03	950.4	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E	Oak St	-0.45	-0.30	Right	Y	PCC		F		6	0.15	4752.0	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E	Oak St	-0.45	-0.30	Left		PCC		F		6	0.15	4752.0	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E	Oak St	-0.45	-0.30	Left	Y	PCC		F		7	0.15	5544.0	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E	Washington St	-0.27	-0.20	Right	Y	PCC	Y	F		7	0.07	2587.2	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E	Washington St	-0.27	-0.20	Left	Y	PCC	Y	F		6	0.07	2217.6	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		0.00	-0.12	Left	Y	PCC		F	2009	6	0.12	3801.6	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		0.05	0.00	Left	Y	PCC	Y	F	2009	6	0.05	1584.0	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		0.14	0.05	Left	Y	PCC	Y	F	2009	10	0.09	4752.0	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		0.29	0.32	Left	Y	PCC		F		7	0.03	1108.8	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		0.36	0.46	Left	Y	PCC		F		7	0.10	3696.0	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		0.46	0.50	Left						7	0.04	1441.4	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		0.56	0.14	Left	Y	PCC		F	2009	4	0.42	8870.4	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		1.00	0.56	Left	Y	PCC		F	2009	5	0.44	11616.0	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		1.07	1.00	Left	Y	PCC		F	2009	4	0.07	1478.4	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		1.12	1.07	Left	Y	PCC		F	2009	5	0.05	1320.0	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		1.20	1.12	Left	Y	PCC	Y	F	2009	7	0.08	2956.8	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		1.38	1.20	Left	Y	PCC		F	2009	5	0.18	4752.0	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		1.42	1.38	Left	Y	PCC		F	2009	6	0.04	1267.2	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		1.61	1.42	Left	Y	PCC		F	2009	5	0.19	5016.0	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E	Stephens ST	-0.30	-0.15	Left	Y	PCC		F	2009	5	0.15	4039.2	City
3	7	ROSEBURG	DOUGLAS	OR 138E	Stephens ST	-0.15	0.00	Left	Y	PCC		F	2009	4	0.15	3168.0	City
3	7	ROSEBURG	DOUGLAS	OR 138E	Stephens ST	0.00	0.10	Right	Y	PCC	Y	F	2009	8	0.10	4224.0	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E	Stephens ST	-0.15	0.10	Left	Y	PCC	Y	F	2009	7	0.25	9240.0	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E	Pine Street	-0.31	-0.21	Right	Y	PCC	Y	F	2009	5	0.10	2640.0	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E	Pine Street	-0.31	-0.21	Left	Y	PCC		F	2009	6	0.10	3168.0	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		0.00	0.05	Right	Y	PCC	Y	F	2009	5	0.05	1320.0	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		0.05	0.18	Right	Y	PCC	Y	F	2009	10	0.13	6864.0	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		0.18	0.22	Right	Y	PCC	Y	F	2009	8	0.04	1689.6	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		0.22	0.47	Right	Y	PCC	Y	F	2009	7	0.25	9240.0	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		0.47	0.52	Right	Y	PCC		F	2009	6	0.05	1584.0	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		0.52	0.59	Right	Y	PCC	Y	F	2009	8	0.07	2956.8	ODOT

Bike-Ped Preservation Program
Sidewalk Ownership Survey

REG	DIST	City	County	ROUTE	RD ID	BEG MP	END MP	Side	Sidewalk	Type	BUFFER	COND	EFFECTV_DT	Width (feet)	Length	AREA (SF)	Ownership (ODOT, City, County, Private, Public, Joint, Other, Unknown)
3	7	ROSEBURG	DOUGLAS	OR 138E		0.59	0.75	Right	Y	PCC	Y	F	2009	7	0.16	5913.6	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		0.75	1.47	Right	Y	PCC		F	2009	6	0.72	22809.6	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		0.75	0.78	Right	Y	PCC		F		7	0.03	1108.8	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		0.78	0.92	Right	Y	PCC		F		6	0.14	4435.2	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		1.17	1.30	Right	Y	PCC		F		6	0.13	4118.4	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		1.47	1.56	Right	Y	PCC		F	2009	7	0.09	3326.4	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		1.56	1.61	Right	Y	PCC		F	2009	5	0.05	1320.0	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		1.66	1.71	Right	Y	PCC		F	2009	7	0.05	1848.0	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		-0.93	-0.91	Right	Y	PCC		F	2009	6	0.02	633.6	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		-0.91	-0.87	Right	Y	PCC		F	2009	5	0.04	1056.0	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		-0.57	-0.48	Right	Y	PCC		F	2009	5	0.09	2376.0	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		-0.48	-0.35	Right	Y	PCC		F	2009	5	0.13	3432.0	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		-0.35	-0.30	Right	Y	PCC		F	2009	8	0.05	2112.0	ODOT
3	7	ROSEBURG	DOUGLAS	OR 138E		-0.30	-0.22	Right	Y	PCC		F	2009	7	0.08	2956.8	ODOT

Shared Use Paths

REG	DIST	HWY	RDWY	MLGE	OVLP	BMP	EMP	Roadside	AddMileage	WC	Width	Length
3	7	001	1			120.41	120.46	Left	Non-Add	HMAC	12	0.05
3	7	001	1			120.46	120.81	Attached under Bridge	Non-Add	PCC	14	0.35
3	7	001	1			120.81	122.60	Right	Non-Add	HMAC	12	1.79
3	7	001	1			123.38	124.08	Right	Non-Add	HMAC	12	0.70
3	7	001	1			124.13	124.50	Right	Non-Add	HMAC	12	0.37
3	7	001	1			124.50	124.64	Attached under bridge	Non-Add	HMAC	12	0.14
3	7	138E	1			16.48	17.00	Right	Non-Add	HMAC	10	0.52
3	7	138E	1			16.42	16.56	Left	Non-Add	HMAC	10	0.15
3	7	138E	1			16.67	17.21	Left	Non-Add	HMAC	10	0.55
3	7	035	1			73.86	74.39	Left	Non-Add	HMAC	12	0.53
3	7	035	1			74.39	74.50	Left	Non-Add	PCC	12	0.11
3	7	035				74.50	76.20	Left	Non-Add	HMAC	12	1.70
3	7	241	1			0.64	0.57	Left	Non-Add	HMAC	4	0.07
3	7	242	1			17.52	18.21	Right	Add	HMAC	7	0.69

City of Roseburg
Transportation System Plan Update

Technical Memorandum #3
(Task 5.4 – Current System Operations)

Prepared for

City of Roseburg
900 SE Douglas Avenue
Roseburg, Oregon

Prepared by

David Evans and Associates, Inc.
2100 SW River Parkway
Portland, Oregon

August 2018

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The Transportation System Today

This memorandum provides an overview of the current transportation system operations and deficiencies for all modes within Roseburg's Urban Growth Boundary (UGB).

The information included in this memorandum will be used in conjunction with *Technical Memorandum #2* and input from the project team to determine the existing transportation system needs for the Roseburg Transportation System Plan (TSP) update.

Introduction

Roseburg serves as the county seat and regional center of Douglas County and thus, its transportation network plays a central role in supporting the region's economic vitality and overall livability. Roseburg is also an important waypoint along Interstate 5 (I-5), located roughly midway between Eugene and Medford. By way of its central location in the county, the transportation system supports a significant share of regional automobile and truck trips. At a more localized scale, the transit, bicycle and pedestrian network serve residents and visitors alike either by commute necessity or for recreation.

All transportation modes are important to serve the needs of residents and businesses in Roseburg and the surrounding region. The Roseburg TSP will consider how well the multimodal system of highways and roads, public transit and active transportation facilities serves the transportation needs of residents, visitors, and freight shippers within and through Roseburg.

Roseburg TSP - A Comprehensive, Citywide Assessment

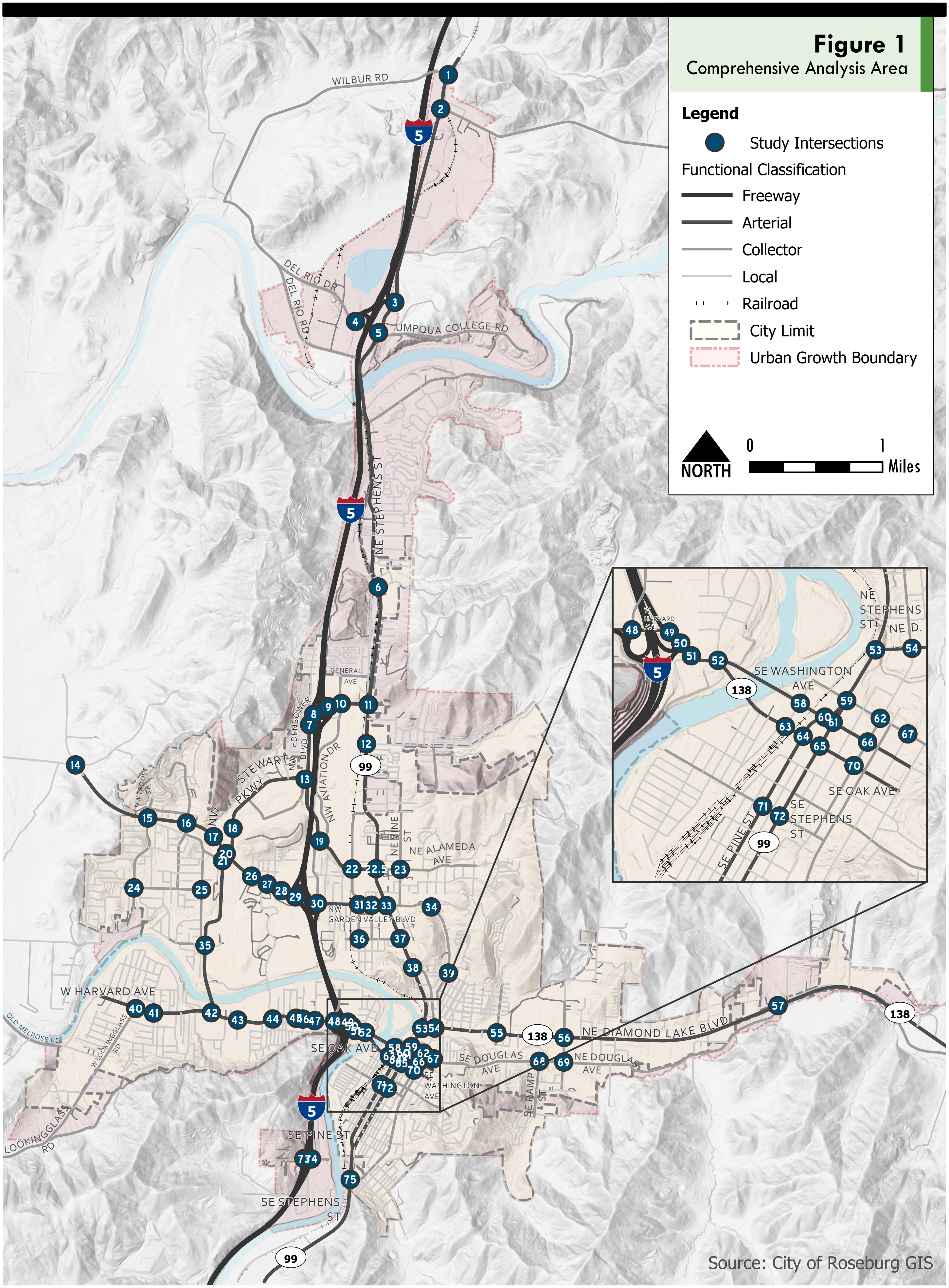
A TSP examines the City's multimodal transportation system as a whole, considers planning for street maintenance, connectivity, access, safety and the impact of future growth throughout the network. In order to review the system that is most likely to affect an average Roseburg citizen or visitor, and to efficiently use time and resources for analysis, TSPs generally focus on the higher-order, arterial and collector street system. Arterials and collectors, by definition, are meant to provide connections across a city and between neighborhoods and activity centers. As such, Roseburg's arterial and collector street intersections and corridors are the focus of the TSP Update.

Figure 1 summarizes Roseburg's arterial and collector street network and the study intersections. The analysis area is bounded by the Urban Growth Boundary (UGB). It should be noted that in some cases, local roadways or private streets may also have operational or safety concerns. For example, the system-wide assessment may flag either safety or traffic congestion issues on a local street that results from operational problems at adjacent intersections of the arterial/collector street network.

Street and Highway System

The assessment of traffic conditions includes development of existing traffic volumes and assessment of traffic operations for 76 study intersections within the Roseburg UGB. Of these study intersections, significant data was sourced from existing or recent studies and did not require new processing (results will still be summarized). Appendix A of this memorandum documents these locations and lists the previous study where the original analysis is found.

Figure 1
Comprehensive Analysis Area



Volume Development

Standard practice is to analyze a single system peak hour which represents a single hour of the day that has the highest hourly vehicular volume. For Roseburg, the common weekday peak hour for the study intersections was found to occur from 4:30 pm to 5:30 pm. The peak hour at each intersection may or may not correspond to the common peak hour. During the summer months, traffic volumes are generally higher due to an influx of visitors to the region; recreational opportunities and agriculture production are higher in the drier months as well.

The intersections that experience the highest level of vehicle traffic during the PM peak hour are concentrated near the Roseburg City Center, I-5 Exit 124 and 125 interchanges or the nexus of arterials with community destinations (commercial centers and the Roseburg VA). The top 10 most traveled study intersections during the PM Peak Hour are listed here from highest to lowest:

1. I-5 Exit 125 Southbound Ramps at Garden Valley Blvd
2. Garden Valley Blvd at Stewart Pkwy
3. Garden Valley Blvd at Stephens St
4. I-5 Exit 125 Northbound Ramps at Garden Valley Blvd / Mulholland Dr
5. Garden Valley Blvd at Garden Valley Shopping Center
6. I-5 Exit 124 SB Ramps at Harvard Ave
7. I-5 Exit 124 NB Off Ramp / Harvard Ave
8. Garden Valley Blvd at Centennial Dr / Estelle St
9. Garden Valley Blvd at Goetz St / Duck Pond St
10. I-5 Exit 124 Northbound On-Ramps at Harvard Ave

See Appendix A for a summary of volumes by movement and intersection.

Truck Traffic (Freight)

The percentage of truck traffic at the study intersections (measured by approach) ranges from 0-15% during the peak hour. Truck traffic volumes are highest along Diamond Lake Boulevard (east of Stephens Street), Stephens Street and at the intersections that access commercial centers, which is consistent with land uses along these corridors.

Heavy vehicles are more likely to be traveling north-south along I-5 and Stephens Street or east-west along OR 138. Much of the truck movement in Roseburg is attributed to the logging operations in the region (via OR 138) and interstate and regional commercial activity. In Roseburg, Reddaway Trucking and Umpqua Diary generate freight traffic along Stephens Street. Stephens Street is also used to access the Green District outside of Roseburg.

Similarly, Roseburg Regional Airport generates truck traffic from FedEx and other freight carriers.

Vehicular Analysis

Mobility Targets / Operational Criteria

Transportation engineers have established various methods for measuring traffic operations of roadways and intersections. Most jurisdictions in Oregon apply measures outlined in the Highway Capacity Manual using either the volume-to-capacity (v/c) ratio or level of service (LOS) to report intersection operations and performance. Both the LOS and v/c ratio concepts require consideration of factors that include traffic demand, capacity of the intersection or roadway, delay, frequency of interruptions in traffic flow, relative freedom for traffic maneuvers, driving comfort, convenience, and operating cost. The V/C and LOS are defined here. Also included is a description of 95th percentile queues. Queuing analysis can provide additional context to the operational outputs.

> ***Volume-to-Capacity (V/C) Ratio:*** A comparison of traffic volume demand to intersection capacity. As the v/c ratio approaches 1.00, traffic becomes more congested and unstable, with longer delays.
>
> ***Level of Service (LOS):*** Level of service is a function of control delay, which includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.
>
> It should be noted that, although delays can sometimes be long for some movements at a STOP-controlled intersection, the v/c ratio may indicate that there is adequate capacity to process the demand for that movement. Similarly at signalized intersections, some movements, particularly side street approaches or left turns onto side streets, may experience longer delays because they receive only a small portion of the green time during a signal cycle, but their v/c ratio may be relatively low. For these reasons, it is important to examine both v/c ratio and LOS when evaluating overall intersection operations.
>
> ***95th Percentile Queues:*** The 95th percentile queue length (meaning 95 percent of all queues will be shorter) is used to examine queuing and where demand may exceed available storage.

The City of Roseburg identifies a dual performance measure in the city's TSP. The dual performance measure refers to v/c ratio standards based on roadway classifications and also specifies a LOS performance standard of LOS D or better for signalized intersections and LOS E or better for unsignalized intersections. Roseburg also has specific standards for intersections within the downtown district boundary that allow for slightly more congestion.

Not all roadways serving the city are under Roseburg's jurisdiction. The Oregon Highway Plan (OHP) Highway Mobility Standards are the overriding operations standards for Oregon highways (I-5, freeway ramps and OR 138). Douglas County's performance standards utilize volume-to-capacity ratios that vary according to the county's roadway classifications.

The specific mobility targets for each intersection are listed in Appendix A.

Traffic Operations Analysis Procedures

All operations were evaluated using the methodology outlined in the *2010 Highway Capacity Manual* (HCM) along with the procedures outlined in ODOT's Analysis Procedures Manual (APM). The Synchro/SimTraffic analysis software was selected to perform the intersection analysis since it can provide the v/c ratio and LOS output of an HCM analysis and consider the systematic interaction of the intersections with regard to queuing and delays.

The signal timing for the existing conditions analysis was collected from the most recent signal timing worksheets provided by ODOT; in order to most accurately reflect current conditions, timing was not optimized for analysis.

Appendix A provides detailed descriptions of the nuances of the simulation software.

Driving Conditions

Figure 2 reports a summary of the vehicular traffic operational results for each analysis intersection. Level of service is indicated by color of intersection marker, with the v/c indicated in text. If an intersection marker is outlined in bold, it exceeds the applicable mobility target.

Analysis of the PM peak shows that of the 76 study intersections, two are currently not meeting mobility targets. Table 1 (Page 7) below provides a detailed summary of the existing operations for each study area intersection. The two intersections exceeding mobility targets are shaded in grey.

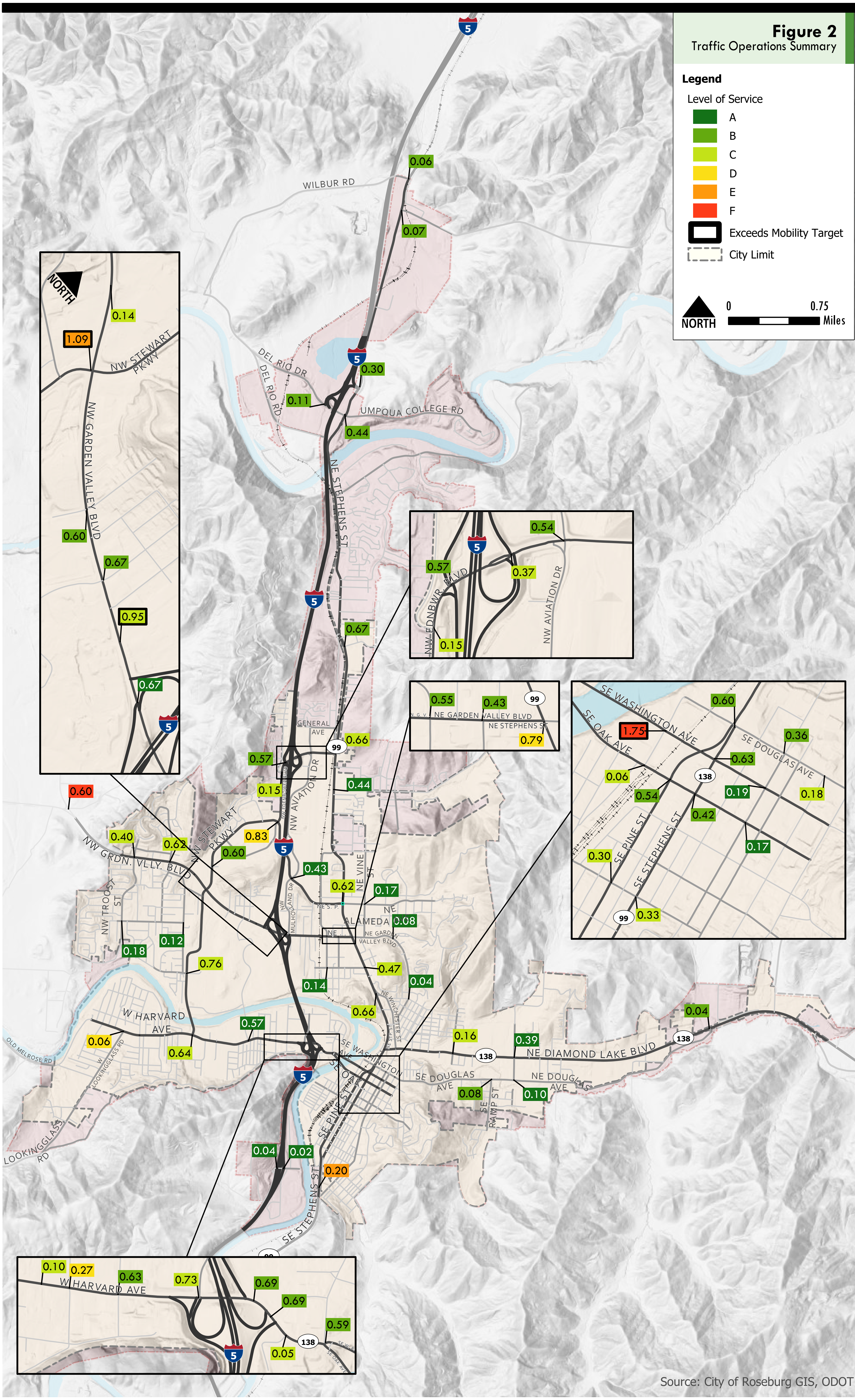


Figure 2
Traffic Operations Summary
Legend
Level of Service
A
B
C
D
E
F
Exceeds Mobility Target
City Limit
NORTH
0
0.75
Miles
WILBUR RD
DEL RIO DR
DEL RIO RD
UMPQUA COLLEGE RD
NE STEPHENS ST
NW STEWART PKWY
NW GARDEN VALLEY BLVD
NW GRDN. VLLY. BLVD
NW AVIATION DR
NW EDENBOWER BLVD
NW TROOST ST
NW MULHOLLAND DR
GENERAL AVE
NE VINE ST
NE ALAMEDA
NE GARDEN VALLEY BLVD
NE WINCHESTER ST
W HARVARD AVE
OLD MELROSE RD
W LOOKINGGLASS RD
LOOKINGGLASS RD
SE WASHINGTON AVE
SE OAK AVE
SE PINE ST
SE STEPHENS ST
SE DOUGLAS AVE
NE DIAMOND LAKE BLVD
NE DOUGLAS AVE
SE RAMP ST
0.06
0.07
0.30
0.11
0.44
0.67
0.66
0.57
0.15
0.44
0.60
0.40
0.62
0.83
0.60
0.43
0.62
0.17
0.08
0.12
0.18
0.76
0.47
0.04
0.14
0.66
0.57
0.06
0.64
0.16
0.39
0.04
0.08
0.10
0.04
0.02
0.20
0.14
1.09
0.60
0.67
0.95
0.67
0.54
0.57
0.37
0.15
0.55
0.43
0.79
0.60
1.75
0.36
0.63
0.06
0.54
0.19
0.18
0.42
0.30
0.17
0.33
0.10
0.27
0.63
0.73
0.69
0.69
0.59
0.05
Source: City of Roseburg GIS, ODOT

TABLE 1. EXISTING (YEAR 2016) PM PEAK HOUR – INTERSECTION OPERATIONS

ID	Intersection	Critical Movement[1]	V/C[2]	LOS[2]	Mobility Target[3]
1	OR 99 at Wilbur Rd	EB L/R	0.06	B	0.85
2	OR 99 at N Bank Rd	WB L/R	0.07	B	0.85
3	OR 99 at I-5 Exit 129 NB Ramps	Overall	0.30	B	0.75
4	I-5 Exit 129 SB Ramps at Del Rio Rd	SB L	0.11	B	0.95
5	OR 99 at Del Rio Rd at Umpqua College Rd	Overall	0.44	B	0.85, LOS D
6	Stephens St at Kenneth Ford Dr	Overall	0.67	B	0.85, LOS D
7	Edenbower Blvd at Broad St*	EB L/R	0.15	C	0.85, LOS E
8	I-5 Exit 127 SB Ramps at Edenbower Blvd*	Overall	0.57	B	0.85
9	I-5 Exit 127 NB Ramps at Edenbower Blvd*	NB L/T	0.37	C	0.85
10	Edenbower Blvd at Aviation Dr*	Overall	0.54	B	0.85, LOS D
11	Edenbower Blvd at Stephens St*	Overall	0.66	C	0.85, LOS D
12	Stephens St at Newton Creek Rd	Overall	0.44	A	0.85, LOS D
13	Stewart Pkwy at Edenbower Blvd*	Overall	0.83	D	0.85, LOS D
14	Garden Valley Blvd at Melrose Rd	EB L/T	0.60	F	0.85
15	Garden Valley Blvd at Troost St	Overall	0.40	C	0.85, LOS D
16	Garden Valley Blvd at Kline St	Overall	0.62	C	0.85, LOS D
17	Garden Valley Blvd at Roseburg Valley Mall (Middle Entrance)	SB L/R	0.14	C	0.85, LOS E
18	Stewart Pkwy at Roseburg Mall Entrance	Overall	0.60	B	0.85, LOS D
19	Stewart Pkwy at Aviation Dr/Mullholland Dr	Overall	0.43	A	0.85, LOS D
20	Garden Valley Blvd at Stewart Pkwy	Overall	0.74	C	0.85, LOS D
21	Stewart Pkwy at Valley View Dr	EB L	0.46	E	0.85, LOS E
22	Stewart Pkwy at Airport Rd	Overall	0.40	B	0.85, LOS D
22.5	Stewart Pkwy at Stephens St	Overall	0.62	C	0.85, LOS D
23	Vine St at Alameda Ave	NB L/T/R	0.17	A	0.90, LOS E
24	Troost St at Calkins Rd	SB L/T/R	0.18	A	0.90, LOS E
25	Keasey St at Calkins Rd	EB L/R	0.12	A	0.90, LOS E
26	Garden Valley Blvd at Goetz St/Duck Pond St	Overall	0.60	B	0.85, LOS D
27	Garden Valley Blvd at Centennial Dr at Estelle St**	Overall	0.67	B	0.85, LOS D
28	**Garden Valley Blvd at Garden Valley Shopping Center****	**Overall**	**0.95**	**C**	**0.85, LOS D**
29	I-5 Exit 125 SB Ramps at Garden Valley Blvd**	Overall	0.67	A	0.85
30	I-5 Exit 125 NB Ramps at Garden Valley Blvd at Mulholland Dr**	Overall	0.80	C	0.85
31	Garden Valley Blvd at Airport Rd at Cedar St**	Overall	0.55	B	0.85, LOS D
32	Garden Valley Blvd at Walnut St	Overall	0.43	B	0.85, LOS D
33	Garden Valley Blvd at Stephens St	Overall	0.79	D	0.85, LOS D
34	Garden Valley Blvd at Rocky Ridge Dr	SB L/R	0.08	A	0.85, LOS E
35	Stewart Pkwy at Harvey Ave	Overall	0.76	C	0.85, LOS D
36	Chestnut Ave at Cedar St	WB L/T/R	0.14	A	0.90, LOS E
37	Stephens St at Chestnut Ave	Overall	0.62	A	0.85, LOS E
38	Stephens St at Winchester St	SB L	0.66	C	0.85, LOS E
39	Lincoln St at Malheur Ave	WB L/T/R	0.04	A	0.90, LOS E
40	Harvard Ave at Lookingglass Rd	NB L	0.06	D	0.85, LOS E
41	Harvard Ave at W Broccoli St	SB L/T/R	0.31	C	0.85, LOS E
42	Harvard Ave at Stewart Pkwy	Overall	0.64	C	0.85, LOS D
43	Harvard Ave at W Keady Ct.	Overall	0.50	B	0.85, LOS D

TABLE 1. EXISTING (YEAR 2016) PM PEAK HOUR – INTERSECTION OPERATIONS

ID	Intersection	Critical Movement[1]	V/C[2]	LOS[2]	Mobility Target[3]
44	Harvard Ave at Centennial Dr	Overall	0.57	A	0.85, LOS D
45	Harvard Ave at Maple St **	SB L/R	0.10	C	0.85, LOS E
46	Harvard Ave at Harrison St **	NB L/T/R	0.27	D	0.85, LOS E
47	Harvard Ave at Umpqua St **	Overall	0.63	B	0.85, LOS D
48	I-5 Exit 124 SB Ramps at Harvard Ave**	Overall	0.73	C	0.85
49	I-5 Exit 124 NB On-Ramps at Harvard Ave**	Overall	0.69	B	0.85
50	I-5 Exit 124 NB Off Ramp at Harvard Ave**				
51	Harvard Ave at Corey St **	NB L/R	0.05	C	0.90
52	Washington Ave at Madrone St **	Overall	0.59	B	0.90
53	Diamond Lake Blvd at Stephens St	Overall	0.55	C	0.90
54	Diamond Lake Blvd at Jackson St at Winchester St	Overall	0.62	C	0.90
55	Diamond Lake Blvd at Fulton St	SB L/T/R	0.16	C	0.95 (N/S) 0.90 (E/W)
56	Diamond Lake Blvd at Rifle Range St	Overall	0.39	A	0.90
57	Diamond Lake Blvd at Douglas Ave	NB L/R	0.04	B	0.90 (N/S) 0.85 (E/W)
58	**Washington Ave at Spruce St**	**NB L/T**	**0.90**	**F**	**0.90**
		WB L/T	-	A	0.90
59	Stephens St at Douglas Ave	Overall	0.60	B	0.90
60	Washington Ave at Pine St	Overall	0.66	C	0.90
61	Washington Ave at Stephens St	Overall	0.63	B	0.90
62	Douglas Ave at Jackson St	EB L/T/R	0.36	B	0.95, LOS E
63	Oak Ave at Spruce St **	SB L	0.06	C	0.90
64	Oak Ave at Pine St	Overall	0.54	B	0.90
65	Oak Ave at Stephens St	Overall	0.42	B	0.90
66	Washington Ave at Jackson St	WB L/T	0.19	A	0.95, LOS E
67	Douglas Ave at Kane St	NB L	0.18	C	0.95, LOS E
68	Douglas Ave at Ramp Rd	NB L	0.08	B	0.90, LOS E
69	Douglas Ave at Rifle Range St	SB L/R	0.10	A	0.90, LOS E
70	Oak Ave at Jackson St	EB T	0.17	A	0.95, LOS E
71	Pine St at Mosher Ave	EB T/R	0.30	C	0.95, LOS E
72	Stephens St at Mosher Ave	EB L/T	0.33	C	0.95, LOS E
73	I-5 Exit 123 SB Ramps at Portland Ave	WB L/T	0.04	A	0.95
74	I-5 Exit 123 NB Ramps at Portland Ave	NB T/R	0.02	A	0.95
75	Stephens St at S Gate Shopping Center	WB L/T	0.20	E	0.85, LOS E

Shaded rows exceed applicable mobility targets; Acronyms: EB = eastbound; WB = westbound; NB = northbound; and SB = southbound. L = left; T = through; and R = right.

* Intersection operations reported from Interchange Area Management Plan (IAMP) 127 (December 2014)

** Intersection operations reported from Draft IAMPs 124/125 (October 2013)

1. At intersections the results are reported for the worst operating movements on major and minor approaches that must stop or yield the right of travel to other traffic flows. For signalized intersections, the overall operations are reported.
2. The v/c ratios and LOS are based on the results of the macrosimulation analysis using Synchro, which does not account for the influence of adjacent intersection operations.
3. Mobility target is reported for the critical movement; Unsignalized intersections may have two different mobility targets for the major and minor approaches (Action 1F.1, Oregon Highway Plan, 1999)

Signalized Intersection Operations

There is one signalized intersection that fails to meet mobility targets, which is Garden Valley Boulevard at BLM Access/Garden Valley Shopping Center. This intersection was analyzed as part of the Interchange Area Management Plans (IAMPs) for I-5 Exits 124 and 125. The movements coming out of the Shopping Center and BLM are approaching capacity.

Unsignalized (STOP Controlled) Intersection Operations

Critical movements at unsignalized intersections are typically the minor-street left turns or, in the case of single-lane approaches, the minor street approaches. These movements are required to yield to all other movements at the intersection and thus are subject to the longest delays and have the least capacity. Left turns from the major street are also subject to delays, since motorists making these maneuvers must also yield to oncoming major-street traffic.

The intersection of Washington Street (OR 138) at Spruce Street is a two-way STOP controlled intersection. Washington Street (OR 138) is part of a couplet and mostly serves traffic traveling west. Spruce Street is a local street, however the OHP mobility target governs (it would fail the local target as well). The users experiencing the long delays at this intersection are northbound vehicles that must stop and wait for a gap in westbound traffic before continue through the intersection.

Several intersections are approaching the mobility targets and will likely become further congested in the future. The intersections to flag for further review in the future year 2040 analysis are:

- 13. Stewart Pkwy at Edenbower Blvd (overall)
- 20. Garden Valley Blvd at Stewart Pkwy (overall)
- 21. Stewart Pkwy at Valley View Dr (eastbound movements)
- 30. I-5 Exit 125 NB Ramps at Garden Valley Blvd at Mulholland Dr (overall)
- 33. Garden Valley Blvd at Stephens St (overall)
- 40. Harvard Ave at Lookingglass Rd (northbound movements)
- 46. Harvard Ave at Harrison St (northbound movements)
- 75. Stephens St at S Gate Shopping Center (westbound movements)

Appendix A summarizes the results of the traffic operations analysis and presents the v/c ratios and LOS performance by lane group for the studied intersections. It also summarizes the overall operational results at the signalized intersections and the individual movements.

System Queuing Analysis

In addition to the operational criteria that measure intersection performance, it is also important to examine queuing and where demand may exceed available storage. Queues that spill out of storage bays and into adjacent travel lanes impair intersection performance by reducing capacity and creating potential safety concerns. Queues may also extend from one intersection through another upstream intersection which also impairs performance. The 95^{th} percentile queue length (meaning 95 percent of all queues will be shorter) is used for this analysis.

Intersections that meet mobility targets and Roseburg's transportation network are able to successfully serve vehicles throughout the day. That said, users may still encounter areas of slowing that are considered acceptable by operational standards, but can influence how a driver perceives traffic congestion along their route. Areas that experience the most congestion are the main arterial corridors at intersections and in areas with increased accesses/driveways. These routes are Stewart Parkway, Garden Valley Boulevard, Edenbower Boulevard, Harvard Avenue and Stephens Street. These areas are described in more detail below and generally pertain to PM Peak Hour conditions.

Stewart Parkway is one of the few north-south routes that cross the South Umpqua River in the study area (the others are Stewart Park Drive and I-5). Because of this, vehicles traveling from northwest Roseburg to southwest and south have limited options, which causes vehicles to queue back at intersections with other arterial corridors (Garden Valley Boulevard, Edenbower Boulevard and Harvard Avenue).

Garden Valley Boulevard experiences the longest queues near Stewart Parkway, Garden Valley Shopping Center, the I-5 interchange ramp terminals and the west leg of the intersection with Stephens Street. In the westbound direction through these areas, congestion could be due to higher lane utilization in the right lane as most cars are vying to position themselves to enter the freeway or shopping center. In the eastbound direction, vehicles wanting to travel toward southeast Roseburg must go via the intersection with Stephens Street.

Edenbower Boulevard serves traffic entering and exiting the freeway at I-5 Exit 127. These volumes cause consistent queuing at the intersection with Stewart Parkway, and occasional queuing with Aviation Drive and Edenbower Boulevard.

Harvard Avenue is the most direct east-west route to and from downtown Roseburg and the primary route to Roseburg High School and I-5 Exit 124. Queuing is most prevalent along this corridor near these locations due to their close proximity to each other and importance as community features.

Stephens Street experiences the most queuing near its intersections with other arterials such as Stewart Parkway, Garden Valley Boulevard and OR 138. It is the primary north-south route into and out of downtown Roseburg and serves a significant amount of the freight traffic within and through Roseburg.

The recent improvements to the OR 138 corridor have improved traffic flow along its route through downtown.

Many two-way STOP-controlled streets intersecting the main corridors (e.g. Lookingglass Road, Chestnut Avenue and Winchester Street) will queue back a couple hundred feet during the peak hour, especially if there are multiple left-turning vehicles. Side street queuing increases during the peak commute hours (morning, lunch time and evening) during the weekdays, but is mostly likely not occurring continuously throughout the day.

For further details on specific movements that exceed available capacity and detailed simulation results, see Appendix A.

Pedestrian Network Evaluation

A robust pedestrian network provides a safe, convenient and accessible system of sidewalks, paths and crossings. The pedestrian experience is also linked to other modal systems. For example, crossing several lanes of traffic increases stress on the pedestrian, while the presence of bicycle lanes improves comfort by providing a buffer between the pedestrian and vehicles. Opportunities to improve transit and active transportation connectivity can also provide benefits to pedestrian mobility. This section reviews Roseburg's pedestrian network at a system-wide level.

Pedestrian facilities were evaluated for all arterials and collectors, as well as any roadways or pathways that provide critical routes or links within the study area. The assessment was done based on the qualitative multimodal application as outlined in the ODOT Analysis Procedures Manual (APM).

A qualitative multimodal analysis provides a comprehensive assessment of all modes, taking into account the impact of adjacent modes of travel. The pedestrian analysis conducted as part of this TSP uses available data from *Technical Memorandum #2 (Transportation System Inventory)*. The analysis uses a ranking system with four categories, from poor to excellent and is summarized in Table 2. These rankings take into account available facilities and many factors that influence the comfort of a pedestrian.

When rating each pedestrian corridor, the following factors were considered:

- Outside travel lane width
- Bicycle lane/shoulder width
- Presence of buffers (landscaped or other)
- Sidewalk/path presence
- Lighting
- Number of travel lanes
- Speed of motorized traffic
- Traffic control
- Crossing width
- Distance between crossings
- Median islands
- Number of accesses/points of vehicle interaction

The presence of sidewalks alone does not necessarily warrant a "good" rating as that sidewalk could need significant upgrades, maintenance, or not feel safe to the user. Most of Roseburg's existing pedestrian facilities could be classified a "fair" or "good". Though none of the segments are rated "excellent", there are several ways to improve existing sidewalks, like adding landscaping, street lighting or upgrading facilities to current standards. For example, Vine Street has sidewalk pavers, a bicycle lane that buffers vehicle traffic, good lighting and low roadway speeds; but is missing extra amenities such as designated mid-block crossings, pedestrian refuges and transit accessibility features.

Trails and Multi-Use Paths

The City also maintains a system of trails and multi-use paths, however the existing database does not provide enough detailed information to inform a qualitative analysis. General observations on the trail system and its connections to the greater transportation system are provided below.

Recent improvements have linked the existing trail system that runs adjacent to the South Umpqua River through Stewart Park, the Duck Pond, the Veterans Administration Campus, Gaddis Park and into the downtown corridor within central Roseburg all the way south to the Green District. A secondary connection was also just completed, providing access from Roseburg High School directly into the downtown corridor adjacent to Oak Avenue. This entire system links most neighborhoods and areas within the southern half of the UGB all the way north to Garden Valley Boulevard.

North of Garden Valley Boulevard there are no multi-use trails. Pedestrian and bicycle access is limited to the use of sidewalks and roadway bike lanes where they exist. Connectivity is limited, specifically to the Winchester area north of Roseburg and the Umpqua Community College Campus.

The system currently lacks lighting and other safety related amenities for the multi-use path located adjacent to the South Umpqua River. Lighting multi-use paths increases user comfort and potentially provides safety benefits.

The system is depicted graphically in the bicycle network evaluation (page 17).

Table 2. Pedestrian System Qualitative Assessment

Roadway Name	Assessment
Airport Rd	Fair
Alameda Ave	Poor
Aviation Dr	Good
Bellows St	Poor
Calkins Ave*	Fair
Cedar St (north of Chestnut Ave)	Good
Chestnut Ave	Good
Diamond Lake Blvd	Fair
Douglas Ave (east of Ramp Rd)	Poor
Douglas Ave (west of Ramp Rd)*	Good
Edenbower Blvd (north of Stewart Pkwy)	Good
Edenbower Blvd (between Renann St and Stewart Pkwy)	Good
Fairmount Ave*	Poor
Fulton St	Poor
Garden Valley Blvd (east of Stephens St)*	Good
Garden Valley Blvd (west of Stephens St)*	Fair
Harvard Ave*	Fair
Harvey Ave	Good
Highland Dr*	Fair
Hughwood Dr	Good
Jackson St (between Mosher Ave and Douglas Ave)	Good
Kane St	Fair
Keasey St	Good
Kline St	Good
Lane Ave (east of Stephens St)	Good
Lincoln St	Poor
Lookingglass Rd	Poor
Main St (between Lane Ave and Douglas Ave)	Good
Mosher Ave	Good
Oak Ave*	Good
Pine St	Good
Ramp St	Fair
Renann St	Good
Rifle Range St	Good
Stephens St (Old Highway 99)*	Fair
Stewart Pkwy	Good
Troost St	Good
Valley View Dr (between Kline St and Stewart Pkwy)	Poor
Vine St*	Good
Walnut St (north of Chestnut Ave)	Good
Washington Ave*	Good
Winchester St	Fair
* Identified as a critical route for pedestrians	

Looking east along Douglas Ave, east of Rifle Range St
Assessment: Poor (Image Source: Bing Maps 2015)

Looking west along Calkins Ave, west of Keasey St
Assessment: Fair (Image Source: Bing Maps 2015)

Looking south along Vine St at Roseland Ave
Assessment: Good (Image Source: Bing Maps 2015)

Transit System Operations

Similar to the pedestrian network analysis, the transit system assessment was completed based on the qualitative multimodal application that is outlined in the ODOT APM and uses available data from *Technical Memorandum #2 (Transportation System Inventory)*.

The ratings of each transit corridor are summarized in Table 3. Roadways with transit service are assigned a context-based subjective "Excellent/Good/Fair/Poor" rating based on the following factors:

- ***Frequency and on-time reliability:*** More frequent service and higher on-time schedule reliability are better than less frequent service and less reliable schedules.
- ***Schedule speed/travel times:*** Faster average peak hour schedule speeds and travel times are rated better than slower speeds and longer travel times.
- ***Transit stop amenities:*** The presence of shelters, benches, and lighting is rated better than stops with limited or no amenities. High-rated stops should have adequate boarding/maneuvering areas.
- ***Connecting pedestrian/bike network:*** Stops connected to a network of paths or sidewalk-equipped streets with improved crossings are better than those with no pedestrian facilities.

At best, transit frequency in Roseburg is hourly, which is considered "fair". Service every half hour would be considered "good". Increasing the frequency of transit service would also have the additional benefit of improving the pedestrian experience.

It is important to remember that every transit rider is either a pedestrian or cyclist, and thus a connected and accessible bicycle and pedestrian system is critical in supporting an active transit system. Whether walking or using a mobility device, all riders need to be able to get to their stops safely and comfortably. In some cases, transit is the primary means of transportation for some people, including youth, seniors and people with disabilities. In Roseburg, less than half of the transit stops have covered seating, though most have some form of wayfinding signage. Lower scoring is mostly due to transit schedules/frequency.

An example of Umpqua Transit's covered bus stop on Stephens St with wayfinding signage (Image Source: Google Maps 2015)

TABLE 3. TRANSIT SYSTEM QUALITATIVE ASSESSMENT

Roadway Name	Transit
Diamond Lake Blvd	Fair
Garden Valley Blvd (west of Stephens St)*	Fair
Harvard Ave*	Fair
Oak Ave*	Fair
Pine St	Poor
Stephens St (Old Highway 99)*	Fair
Stewart Pkwy	Poor
Washington Ave*	Fair

* Identified as a critical route for pedestrians

Recently (October 1, 2017) Greyhound bus service was discontinued in Roseburg. It should also be noted that Douglas County has decided to establish a Transit District and the TSP process is tracking its progress.

Bicycle Level of Traffic Stress Analysis

The City of Roseburg has gone through a number of planning efforts that either directly or indirectly address bicycle needs within the city.[1] As mentioned in *Technical Memorandum #2: Transportation System Inventory*, the current bicycle network in Roseburg links neighborhoods to local destinations through the use of multi-use paths and trails, as well as marked bicycle lanes on arterial and collector roads. This network is an important foundation for a continuous and connected bicycle system; which is underscored by the designation of Roseburg as a Bronze Status bicycle friendly community by the League of American Bicyclists.

That said, the presence of a bike lane does not necessarily translate to a comfortable experience for a bicyclist and the Bicycle Level of Traffic Stress (LTS) methodology can aide in identifying where the bicycle network can be improved.

The bicycle operations within the study area were analyzed using ODOT's methodology for Bicycle LTS for roadway segments. LTS measures the effect of traffic-based stress on bicycles by quantifying the perceived comfort levels a bicyclist experiences on a given facility. Some characteristics used to determine LTS are presence of a bicycle lane, width of facilities, posted speed, adjacent parking facilities and land use (rural or urban). Roseburg's network is mostly considered urban. Where roadway speeds exceed 40 mph and curb or sidewalk is not present, the rural standard was applied. The LTS methodology does not account for the steepness of the roadway.

LTS can be classified as Level 1, 2, 3 or 4, where Level 1 is low stress and Level 4 is high stress.

Figure 3 displays the LTS for each collector/arterial within the City of Roseburg. The corridors are segmented by determining factors such as speed, presence of bike lanes or number of traffic lanes. Background information for how the LTS was calculated is available in Appendix B.

[1] Roseburg Bike and Pedestrian Plan, 2009

LTS is greatly influenced by traffic speeds. LTS methodology will score a segment of roadway without a bike lane higher than one with if the traffic speeds on the shared facility are less than or equal to 25 mph and the dedicated bike lane facility has to travel adjacent to vehicles traveling at 35 mph.

Along Roseburg's most heavily traffic roadways, bicyclists are required to share the road or travel next to fast moving vehicles. Though the downtown network has low speeds, bicyclists may have to dodge car doors or vehicles with hindered sight distance. The study area roadways that were measured at a LTS 3 and 4, were due to lack of facilities/buffers and high vehicular speeds. The segments that are classified as LTS 1 have either separated bicycle facilities or low traffic speeds on low volume roadways. As previously mentioned, the methodology does not consider inclines. It should be noted that steep roadways such as SE Lane Avenue are considered to operate at LTS 1, but are likely an uncomfortable experience for cyclists.

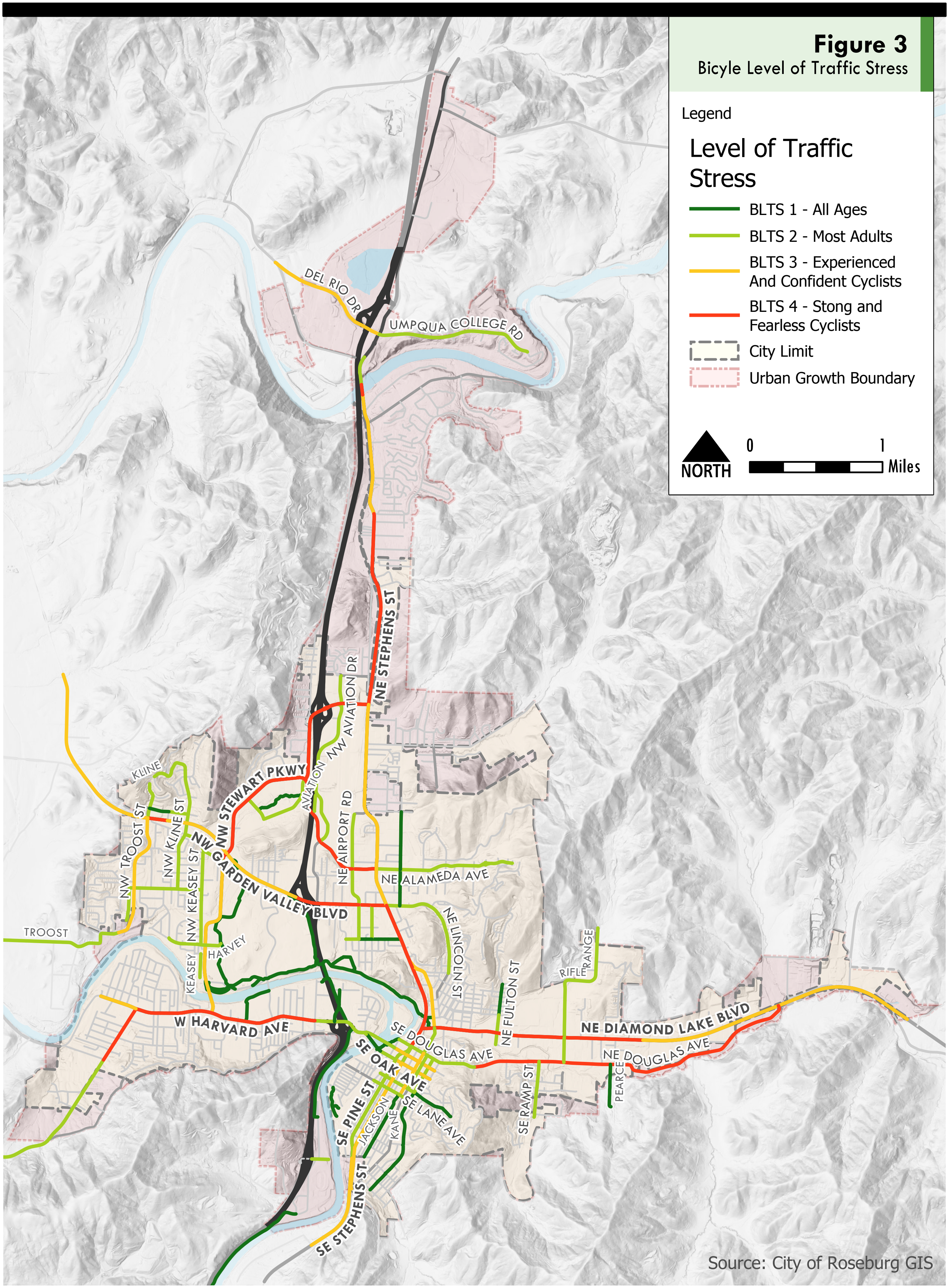


Figure 3
Bicyle Level of Traffic Stress

Freight Assessment

Truck Mobility

I-5 serves interstate commerce and is the primary freight route linking Roseburg and the Greater Douglas County area with destinations along the west coast. OR 138 is designated by ODOT as a "Reduction Review Route". This type of route requires review of any "hole in the air" capacity, meaning that potential projects need to consider the entire area (height, width and length) a truck and its load will occupy while traversing a section of roadway.

According to the current Roseburg TSP, "freight transportation movement is a major transportation issue in Roseburg". Important local freight routes include Garden Valley Boulevard, Stephens Street, Pine Street, and Diamond Lake Boulevard. In addition to these corridors, I-5 and the interchange ramps in the study area are important routes for serving freight.

As previously noted within this report, due to topography of the area and existing routes, I-5 is used by local residents more often than not as a local arterial to travel back and forth between one side of the river and the other. This is most notable between Exit 124 (Harvard Avenue Interchange) and Exit 125 (Garden Valley Boulevard Interchange), but is also evident for the entire corridor between Exits 119 and 129. Since areas north and south of Roseburg are home for many who work and shop in Roseburg, this puts additional local area traffic stress on this bottleneck section of I-5.

Geometric Deficiencies

There is an upcoming project in the Roseburg area that will include a detailed traffic analysis of recurring traffic flow bottlenecks on the I-5 mainline between Exits 129 and 119. The congestion limits the freeway system's function, capacity and performance to efficiently move traffic through the greater Roseburg area. Existing geometric concerns at the interchanges are summarized below.

Exit 129 (Winchester): The interchange was relocated to the north, expanded, and reconstructed in 2008-2009 and there are no observable geometric deficiencies or congestion issues with this new intersection now that it properly aligns with Umpqua College Road and the re-aligned Del Rio Road.

Exit 127 (North Roseburg): Recent improvements were made to the signalized intersections of Edenbower Boulevard at Aviation Drive and Edenbower Boulevard at Stephens Street improved the overall functionality of this interchange. From a local functionality standpoint, as traffic continues to increase on Edenbower, the westbound turn onto Edenbower from the northbound off ramp will continue to be a source of frustration and difficult turning movement until this becomes signalized.

Exit 125 (Garden Valley): During periods of peak traffic, congestion on the I-5 Exit 125 northbound off ramp often backs up onto I-5, creating a dangerous situation for all northbound I-5 traffic. This deceleration length is deficient and lacks sufficient storage for and queuing. There are also deficient acceleration lengths of the on ramps and spacing between ramps.

Exit 124 (Harvard): Similar to Exit 125, the Harvard Avenue Interchange has remained unchanged for many years primarily due to the physical constraints that Mt. Nebo, the South Umpqua River and Roseburg High School put on the interchange. In addition to the existing topography, the interchange ramps have deficient acceleration and deceleration lengths. Compounded with sight distance concerns, the interchange could create unsafe conditions on the mainline.

Exit 123 (Fairgrounds): The Douglas County Fairgrounds Interchange provides access to a handful of homes and the Douglas County Fairgrounds. This interchange, specifically the southbound off-ramp, has deficient deceleration lengths. This becomes a problem during large events at the Fairgrounds such as the Douglas County Fair, concerts, and racing events. During these events, traffic will back up onto I-5 and special "event congestion" signage and traffic control is required on I-5.

Rail Freight

The Central Oregon & Pacific Railroad (CORP) operates several trains that pass through Roseburg. The railroad route in the study area runs approximately parallel to I-5 and Stephens Street, about a half-mile east of the highway. There are at-grade railroad crossings at the following cross streets:

- Edenbower Boulevard
- Stewart Parkway
- Garden Valley Boulevard
- Chestnut Avenue
- Douglas Avenue
- Washington Avenue
- Oak Avenue
- Mosher Avenue
- Hooker Road

All of the crossings have some form of Train Activated Warning Device, however none have pedestrian gate arms. When trains pass through Roseburg, cross-traffic is required to stop. Depending on the time of day, this causes varying lengths of queued vehicles and causes delay for all modes that are required to wait for the train to pass. As of 2016 the CORP operates, at most, 36 trains a week through Roseburg.

The CORP switch yard was recently relocated from the Mill-Pine District of Roseburg, located directly adjacent to and the southwest of the Downtown Corridor, north of town to the Winchester area. Prior to this move; the loading, unloading, and stacking of trains would stop traffic in and around the Oak Avenue/Washington Avenue area multiple times a day. Parked trains often stopped traffic for up to 15 minutes at a time, sometimes backing up all the way to the I-5 Exit 124 interchange. This caused traffic congestion and delay on a daily basis. Since the move of the switchyard, current delays are limited to only a few minutes at a time.

While the relocation of the switchyard has greatly reduced rail related impacts and congestion in the central Roseburg area, it has created a congestion issue at the northern edge of the UGB. When trains are being stacked at the new switchyard location in Winchester, they often are backed up and parked over Highway 99 (North Stephens Street) and North Bank Road to the east of the switchyard; again, for up to 15 minutes at a time. While there are alternative routes for traffic to get around HWY 99 at this location (specifically by using Wilbur Road), there are no alternative routes to alleviate traffic on North Bank Road. North Bank Road provides access between Wilbur and Glide and is a secondary alternative to Diamond Lake Boulevard for access to the North Umpqua River, Diamond Lake, and Crater Lake. North Bank Road between Wilbur and Glide is also a rural residential area for residential homes and ranches.

The Douglas County Public Works Department has been looking for several years at providing an alternative route around the railroad tracks and switchyard to North Bank Road, but has yet to find an alternative alignment or funding source for this project.

Safety Analysis

A safety analysis was conducted to determine whether any significant, documented safety issues exist within the management area and to inform future measures or general strategies for improving overall safety. This analysis includes a review of crash records, crash rates, and ODOT Safety Priority Index System (SPIS) data. Supporting documentation for the safety analysis is found in Appendix C.

Crash History

The crash analysis included a review of crash history data supplied by the ODOT Crash Analysis and Reporting Unit for the period between January 1, 2011, and December 31, 2015, which were the five most recent full years for which crash data were available at the time of the analysis. A summary of collision types is presented in Exhibit 1, the city-wide data is summarized in Table 4 and breakdown of crashes at study area intersections and segments are presented in Table 4 and Table 5, respectively.

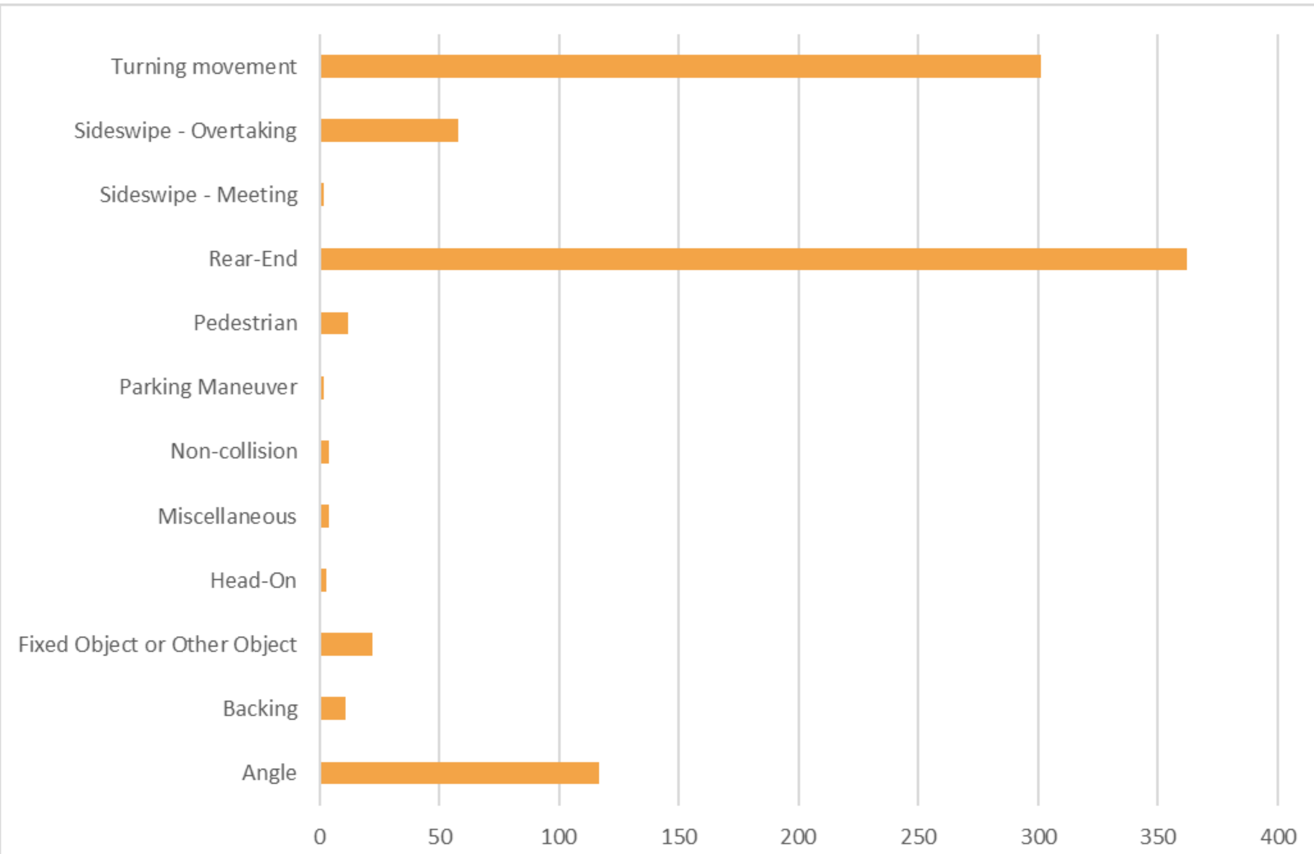
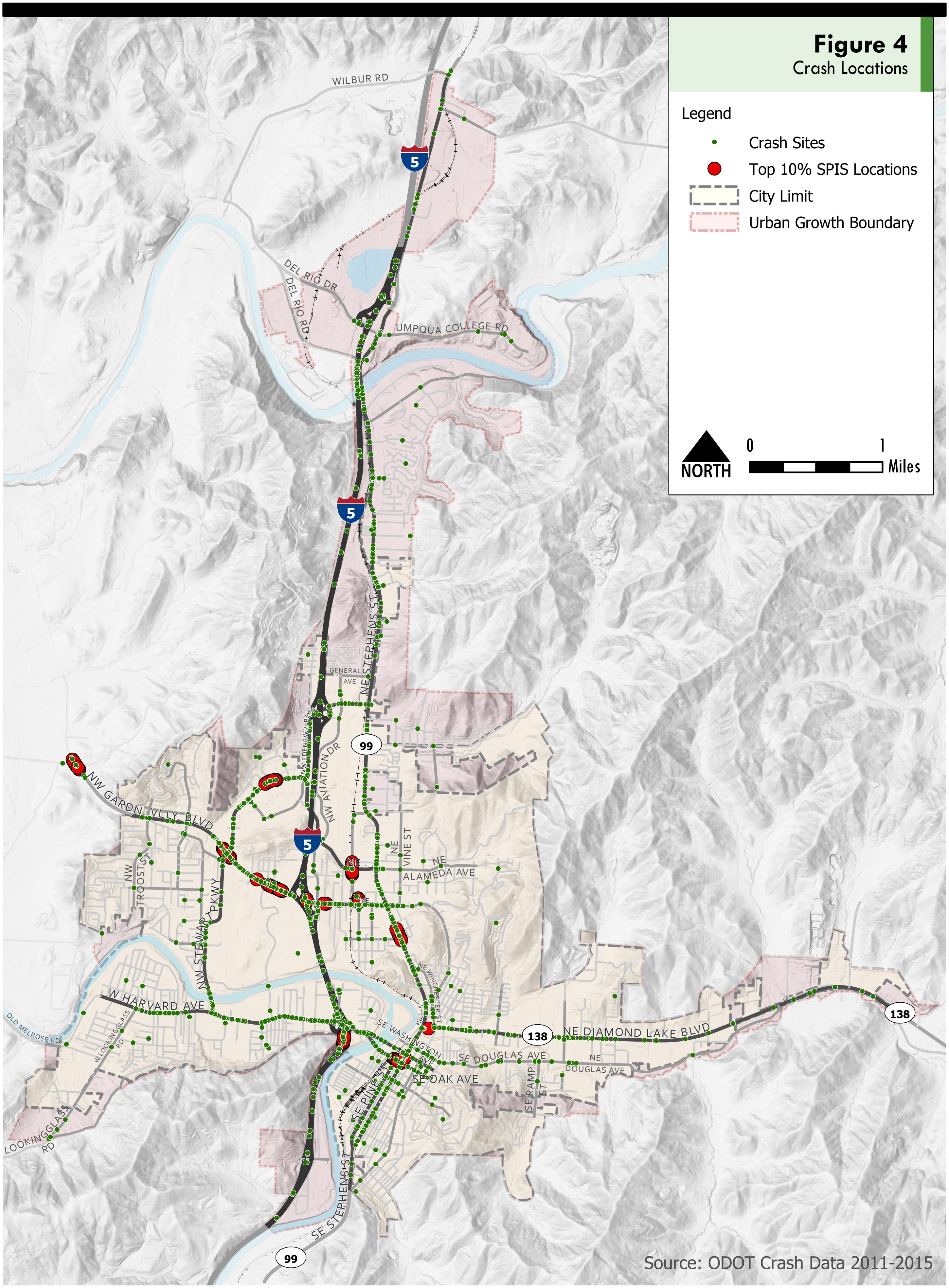


EXHIBIT 1. SUMMARY OF COLLISION TYPES

Intersection Analysis

There were 907 crashes during the five-year analysis period at project intersections, and 2,008 within the UGB during the same period. The two intersections with the highest number of crashes were Garden Valley Boulevard at Stewart Parkway (61 crashes) and Oak Avenue at Stephens Street (45 crashes). Of the reported study intersection crashes, 475 resulted in minor injury(s), 419 resulted in property damage only, and one resulted in a fatality or serious injury. The highest proportions of crashes were rear-end collisions.

Figure 4
Crash Locations



Source: ODOT Crash Data 2011-2015

TABLE 4. CRASH HISTORY AT STUDY AREA INTERSECTIONS (YEARS 2011-2015)

Location	Observed Crash Rate	Critical Crash Rate	Statewide 90th Percentile Crash Rate	Collision Type: Angle	Backing	Fixed Object or Other Object	Head-On	Miscellaneous	Non-collision	Parking Maneuver	Pedestrian	Rear-End	Sideswipe - Meeting	Sideswipe - Overtaking	Turning movement	Total	Severity: Fatalities	Injuries	Property Damage Only
1. OR 99 at Wilbur Rd	***0.39***	0.51	0.29	-	-	-	-	1	-	-	-	2	-	-	-	**3**	-	1	2
2. OR 99 at N Bank Rd	***0.38***	0.50	0.29	-	-	-	-	-	-	-	-	1	-	-	2	**3**	-	1	2
3. OR 99 at I-5 Exit 129 NB Ramps	0.00	0.50	0.51	-	-	-	-	-	-	-	-	-	-	-	-	**-**	-	-	-
4. I-5 Exit 129 SB Ramps at Del Rio Rd	***0.36***	0.45	0.29	-	-	2	-	-	-	-	-	2	-	-	-	**4**	1	1	2
5. OR 99 at Del Rio Rd at Umpqua College Rd	0.00	0.71	0.86	-	-	-	-	-	-	-	-	-	-	-	-	**-**	-	-	-
6. Stephens St at Kenneth Ford Dr	0.25	0.42	0.51	1	-	-	-	-	-	-	-	5	-	-	1	**7**	-	3	4
7. Edenbower Blvd at Broad St	0.14	0.34	0.29	-	-	-	-	-	-	-	-	3	-	-	1	**4**	-	3	1
8. I-5 Exit 127 SB Ramps at Edenbower Blvd	0.34	0.65	0.86	-	1	1	-	-	-	-	-	3	-	-	7	**12**	-	9	3
9. I-5 Exit 127 NB Ramps at Edenbower Blvd	0.39	0.66	0.86	1	-	-	-	-	-	-	-	8	-	-	4	**13**	-	5	8
10. Edenbower Blvd at Aviation Dr	0.57	0.66	0.86	2	-	-	-	-	-	-	-	14	-	-	3	**19**	-	12	7
11. Edenbower Blvd at Stephens St	0.35	0.64	0.86	1	-	-	-	-	-	-	-	8	-	-	5	**14**	-	7	7
12. Stephens St at Newton Creek Rd	0.42	0.67	0.86	-	-	-	-	-	-	-	-	6	-	-	7	**13**	1	11	1
13. Stewart Pkwy at Edenbower Blvd	0.68	0.62	0.86	-	-	1	2	-	1	-	-	15	-	7	7	**33**	-	17	16
14. Garden Valley Blvd at Melrose Rd	0.15	0.35	0.41	2	-	-	-	-	-	-	-	-	-	-	2	**4**	-	3	1
15. Garden Valley Blvd at Troost St	0.22	0.66	0.86	-	-	-	-	1	-	-	-	2	-	1	3	**7**	-	2	5
16. Garden Valley Blvd at Kline St	0.29	0.63	0.86	2	-	-	-	-	-	-	-	6	-	1	4	**13**	-	11	2
17. Garden Valley Blvd at Roseburg Valley Mall (Middle Entrance)	0.05	0.31	0.29	-	-	-	-	-	1	-	-	-	-	-	1	**2**	-	1	1
18. Stewart Pkwy at Roseburg Mall Entrance	0.59	0.63	0.86	1	-	1	-	-	-	-	1	2	1	-	21	**27**	-	14	13
19. Stewart Pkwy at Aviation Dr/Mullholland Dr	0.72	0.68	0.86	2	-	-	-	-	-	-	-	2	-	-	16	**20**	-	10	10
20. Garden Valley Blvd at Stewart Pkwy	0.75	0.58	0.86	4	-	-	-	-	-	-	-	36	-	5	16	**61**	-	33	28
21. Stewart Pkwy at Valley View Dr	***0.37***	0.34	0.29	-	-	1	-	-	-	-	-	1	-	1	8	**11**	-	3	8
22. Stewart Pkwy at Airport Rd	***1.20***	0.69	0.86	3	-	-	-	-	-	-	-	3	-	-	24	**30**	-	20	10
22.5 Stewart Pkwy at Stephens St	0.17	0.61	0.86	3	-	-	-	-	-	-	-	5	-	-	1	**9**	-	7	2
23. Vine St at Alameda Ave	0.23	0.49	0.41	2	-	-	-	-	-	-	-	-	-	-	-	**2**	-	1	1
24. Troost St at Calkins Rd	0.15	0.55	0.41	1	-	-	-	-	-	-	-	-	-	-	-	**1**	-	1	-
25. Keasey St at Calkins Rd	0.28	0.53	0.29	1	-	-	-	-	-	-	-	1	-	-	-	**2**	-	1	1
26. Garden Valley Blvd at Goetz St/Duck Pond St	0.48	0.61	0.86	3	-	-	-	-	-	-	-	19	-	-	4	**26**	-	18	8
27. Garden Valley Blvd at Centennial Dr/Estelle St	0.64	0.61	0.86	1	-	-	-	-	-	-	-	25	-	3	6	**35**	-	20	15
28. Garden Valley Blvd at Garden Valley Shopping Center	0.62	0.60	0.86	-	-	1	-	-	-	-	1	23	-	1	10	**36**	1	19	16
29. I-5 Exit 125 SB Ramps at Garden Valley Blvd	0.14	0.58	0.86	-	-	-	-	-	-	-	-	8	-	-	4	**12**	-	3	9
30. I-5 Exit 125 NB Ramps at Garden Valley Blvd/Mulholland Dr	0.48	0.59	0.86	1	-	-	-	-	-	-	-	14	-	6	12	**33**	-	14	19
31. Garden Valley Blvd at Airport Rd at Cedar S	0.54	0.62	0.86	2	-	-	-	-	-	-	2	9	-	-	12	**25**	-	13	12
32. Garden Valley Blvd at Walnut St	0.33	0.64	0.86	-	-	-	-	-	-	-	-	7	-	1	5	**13**	-	7	6
33. Garden Valley Blvd at Stephens St	0.45	0.58	0.86	1	1	1	-	-	-	-	-	20	-	1	11	**35**	-	23	12
34. Garden Valley Blvd at Rocky Ridge Dr	0.00	0.51	0.29	-	-	-	-	-	-	-	-	-	-	-	-	**-**	-	-	-
35. Stewart Pkwy at Harvey Ave	0.32	0.66	0.86	1	-	-	-	-	-	-	-	9	-	-	1	**11**	-	4	7
36. Chestnut Ave at Cedar St	0.22	0.64	0.41	1	-	-	-	-	-	-	-	-	-	-	-	**1**	-	1	-
37. Stephens St at Chestnut Ave	***0.49***	0.30	0.29	-	1	-	1	-	-	-	1	14	-	2	6	**25**	-	17	8
38. Stephens St at Winchester St	0.16	0.30	0.29	-	-	-	-	1	-	-	-	4	-	-	3	**8**	-	4	4

Location	Observed Crash Rate	Critical Crash Rate	Statewide 90th Percentile Crash Rate	Collision Type: Angle	Backing	Fixed Object or Other Object	Head-On	Miscellaneous	Non-collision	Parking Maneuver	Pedestrian	Rear-End	Sideswipe - Meeting	Sideswipe - Overtaking	Turning movement	Total	Severity: Fatalities	Injuries	Property Damage Only
39. Lincoln St at Malheur Ave	0.30	0.73	0.41	1	-	-	-	-	-	-	-	-	-	-	-	**1**	-	-	1
40. Harvard Ave at Lookingglass Rd	0.11	0.38	0.29	-	-	-	-	-	-	-	-	-	-	-	2	**2**	-	1	1
41. Harvard Ave at W Broccoli St	0.18	0.37	0.41	2	-	1	-	-	-	-	-	-	-	-	1	**4**	-	3	1
42. Harvard Ave at Stewart Pkwy	0.48	0.61	0.86	2	-	1	-	-	-	-	-	20	-	1	1	**25**	-	16	9
43. Harvard Ave at W Keady Ct.	0.24	0.658	0.86	-	-	1	-	-	-	-	-	3	-	1	4	**9**	-	3	6
44. Harvard Ave at Centennial Dr	0.18	0.39	0.51	-	-	-	-	-	-	-	-	4	-	-	3	**7**	-	5	2
45. Harvard Ave at Maple St	0.06	0.30	0.29	-	-	-	-	-	-	-	-	2	-	-	1	**3**	-	2	1
46. Harvard Ave at Harrison St	0.12	0.30	0.41	-	1	-	-	-	-	-	1	1	-	-	3	**6**	-	3	3
47. Harvard Ave at Umpqua St	0.34	0.62	0.86	1	1	-	-	-	-	-	2	6	-	1	6	**17**	-	10	7
48. I-5 Exit 124 SB Ramps at Harvard Ave	0.38	0.60	0.86	1	2	1	-	1	-	-	-	7	-	-	10	**22**	-	12	10
49. I-5 Exit 124 NB On-Ramps at Harvard Ave	0.07	0.30	0.41	-	-	-	-	-	-	-	-	1	-	2	1	**4**	-	2	2
50. I-5 Exit 124 NB Off Ramp at Harvard Ave	0.25	0.61	0.86	-	-	1	-	-	-	-	-	7	-	-	6	**14**	1	4	9
51. Harvard Ave at Corey St	0.04	0.30	0.29	-	-	-	-	-	-	-	-	2	-	-	-	**2**	-	1	1
52. Washington Ave at Madrone St	0.23	0.62	0.86	-	1	-	-	-	-	-	1	4	1	-	4	**11**	-	6	5
53. Diamond Lake Blvd at Stephens St	0.40	0.39	0.51	1	-	2	-	-	1	-	-	8	-	2	3	**17**	-	9	8
54. Diamond Lake Blvd at Jackson St at Winchester St	0.43	0.63	0.86	5	2	1	-	-	-	-	1	6	-	-	4	**19**	-	10	9
55. Diamond Lake Blvd at Fulton St	0.03	0.34	0.41	-	-	-	-	-	-	-	-	1	-	-	-	**1**	-	1	-
56. Diamond Lake Blvd at Rifle Range St	0.30	0.67	0.86	1	-	-	-	-	1	-	-	3	-	2	2	**9**	-	3	6
57. Diamond Lake Blvd at Douglas Ave	0.05	0.38	0.29	-	-	1	-	-	-	-	-	-	-	-	-	**1**	-	1	-
58. Washington Ave at Spruce St	***0.54***	0.35	0.41	7	-	-	-	-	-	-	-	2	-	3	3	**15**	-	10	5
59. Stephens St at Douglas Ave	0.00	0.63	0.86	-	-	-	-	-	-	-	-	-	-	-	-	**-**	-	-	-
60. Washington Ave at Pine St	0.46	0.65	0.86	8	-	2	-	-	-	-	-	1	-	3	3	**17**	-	5	12
61. Washington Ave at Stephens St	0.42	0.63	0.86	6	-	-	-	-	-	-	-	3	-	4	6	**19**	-	6	13
62. Douglas Ave at Jackson St	***0.43***	0.42	0.41	2	-	-	-	-	-	-	-	1	-	-	3	**6**	-	3	3
63. Oak Ave at Spruce St	0.15	0.37	0.29	-	-	-	-	-	-	-	-	-	-	1	2	**3**	-	-	3
64. Oak Ave at Pine St	***1.17***	0.68	0.86	24	-	-	-	-	-	-	1	1	-	2	4	**32**	-	18	14
65. Oak Ave at Stephens St	***1.50***	0.67	0.86	19	-	-	-	-	-	-	1	5	-	4	16	**45**	-	22	23
66. Washington Ave at Jackson St	0.14	0.53	0.41	-	-	-	-	-	-	1	-	-	-	-	-	**1**	-	-	1
67. Douglas Ave at Kane St	0.23	0.42	0.29	-	-	-	-	-	-	1	-	1	-	-	1	**3**	-	1	2
68. Douglas Ave at Ramp Rd	***0.31***	0.54	0.29	-	-	-	-	-	-	-	-	-	-	1	1	**2**	-	-	2
69. Douglas Ave at Rifle Range St	0.22	0.63	0.29	-	-	1	-	-	-	-	-	-	-	-	-	**1**	-	1	-
70. Oak Ave at Jackson St	***0.43***	0.54	0.41	1	-	1	-	-	-	-	-	-	-	-	1	**3**	-	-	3
71. Pine St at Mosher Ave	0.30	0.40	0.41	2	-	1	-	-	-	-	-	-	-	2	-	**5**	-	-	5
72. Stephens St at Mosher Ave	0.35	0.39	0.41	1	1	-	-	-	-	-	-	1	-	-	3	**6**	-	3	3
73. I-5 Exit 123 SB Ramps at Portland Ave	0.00	0.88	0.41	-	-	-	-	-	-	-	-	-	-	-	-	**-**	-	-	-
74. I-5 Exit 123 NB Ramps at Portland Ave	0.00	0.92	0.41	-	-	-	-	-	-	-	-	-	-	-	-	**-**	-	-	-
75. Stephens St at S Gate Shopping Center	0.04	0.36	0.41	-	-	-	-	-	-	-	-	-	-	-	1	**1**	-	1	-

Bold and Italicized indicates crash rate over statewide 90th percentile crash rate, shaded indicates crash rate over reference population critical crash rate.

Source: ODOT Transportation Development Division, Transportation Data Section, Crash Analysis and Reporting Unit 2011-2015

Segment Analysis

Crash rates can be calculated for both intersections and segments. The ODOT APM clarifies that segments should ideally be close to one mile in length. In the Roseburg urban area, obtaining one mile segments is difficult, however the majority of urban crashes are intersection related and captured in Table 4. Since short sections less than a half mile in length typically skew the crash rates, segment crash rates were only calculated along I-5 through the study area. See Table 5.

TABLE 5. CRASH HISTORY ALONG I-5 SEGMENTS

Highway	Beginning Mile Point	End Mile Point	ADT	Total Crashes	Fatalities and Serious Injury	Observed Rate
I-5	122	123	42,400	6	0	0.08
I-5	123	124	43,300	27	2	0.34
I-5	124	125	50,400	51	2	0.55
I-5	125	126	50,400	23	4	0.25
I-5	126	127	33,900	10	0	0.16
I-5	127	128	33,900	16	1	0.26
I-5	128	129	33,900	17	0	0.27
I-5	129	130	35,000	31	6	0.49
I-5	130	131	32,400	5	0	0.08

Source: ODOT crash report data (2011-2015)

Compared to published crash rates in ODOT Table II (Five-Year Comparison of State Highway Crash Rates) all of the segments along I-5 are below the 2015 rate of 0.77 crashes/MEV for urban city interstate freeways. If comparing against suburban area rates, I-5 from mile points 124-125 and 129-130 exceed the 2015 rate of 0.39 crashes/MEV.

2017 Oregon Interstate Highway Speed Limit Engineering Investigation

The Oregon Department of Transportation analyzed the segments of interstate system where the speeds of vehicles were currently posted 65 mph for cars and 55 mph for trucks to determine if truck speeds should be increased, including I-5 through Roseburg. Crash data was compiled for all study sections for years 2012 through 2014 and compared against the statewide averages for interstate highways. Speed data was collected and summarized for each section.

According to crash data, from 2012 to 2014, the rate of fatal and injury crashes that occurred between mileposts 122 and 127 was nearly double the statewide average. During that time period, 59 people were injured and three were killed. In October 2017, a reduction in the speed limit was recently approved for the I-5 mainline from mile post 123 to 127 due to safety concerns.

Network Screening

The Highway Safety Manual (HSM) Part B describes the critical crash rate method as a means of identifying locations that warrant further investigation. The critical crash rate is based upon average crash rates at comparable sites, traffic volume, and a confidence interval. Locations where the calculated crash rate exceeds the critical crash rate should be reviewed more closely to assess crash patterns.

Based on critical crash rates determined by the HSM Part B Network Screening methodology, 13 intersections had observed crash rates exceeding the calculated critical crash rate:

- 13. Stewart Pkwy at Edenbower Blvd
- 19. Stewart Pkwy at Aviation Dr/Mullholland Dr
- 20. Garden Valley Blvd at Stewart Pkwy
- 21. Stewart Pkwy at Valley View Dr
- 22. Stewart Pkwy at Airport Rd
- 27. Garden Valley Blvd at Centennial Dr/Estelle St
- 28. Garden Valley Blvd at Garden Valley Shopping Center
- 37. Stephens St at Chestnut Ave
- 53. Diamond Lake Blvd (OR 138) at Stephens St
- 58. Washington Ave at Spruce St
- 62. Douglas Ave at Jackson St
- 64. Oak Ave at Pine St
- 65. Oak Ave at Stephens St

These intersections account for 366 of the crashes (40%) recorded at study area intersections within the five-year analysis period.

Observed crash rates were also compared against the statewide 90th percentile urban crash rates. There were 12 intersections whose observed crash rates exceeded the statewide crash rates. Of those 12, seven are included in previous list of locations exceeding the critical crash rate. The other five are listed below:

- 1. OR 99 at Wilbur Road
- 2. OR 99 at North Bank Road
- 4. I-5 Exit 129 Southbound Ramps at Del Rio Road
- 68. Douglas Avenue at Ramp Road
- 70. Oak Avenue at Jackson Street

The following paragraphs provide further detail about crash patterns at each of the 13 locations that exceed the critical crash rates and summarize possible causes.

Stewart Parkway at Edenbower Boulevard had a crash rate of 0.68 crashes/MEV. There were 33 crashes over the five-year data period. The majority (15) of these collisions were rear end and are likely the result of drivers approaching the intersection at posted speed and encountering queues backing up from the intersection before anticipated. This intersection only exceeded the critical crash rate.

Stewart Parkway at Aviation Drive/Mullholland Drive had a crash rate of 0.72 crashes/MEV and a total of 20 crashes, the majority of which occurred as a result of turning vehicles (16). Turning-related collisions often occur when the signal phasing is permitted and the driver fails to yield to oncoming traffic. This intersection only exceeded the critical crash rate.

Garden Valley Boulevard at Stewart Parkway had a crash rate of 0.73 crashes/MEV. There were 61 crashes over the five-year data period, the highest of any study area intersection. This is one of the busiest intersections in Roseburg. Consistent with the types of collisions common at busy signalized intersections, over half were rear end (59%). This intersection only exceeded the critical crash rate.

Stewart Parkway at Valley View Drive had 11 collisions during the five-year data period with a crash rate of 0.37 crashes/MEV. The majority of these crashes were turning movement collisions (8). This intersection is closely spaced to the intersection of Stewart Parkway with Garden Valley Boulevard and is likely impacted by queuing upstream. This intersection exceeded the critical crash rate and the statewide 90th percentile crash rate.

Stewart Parkway at Airport Road had 30 crashes during the five-year data period with a crash rate of 1.20 crashes/MEV. The majority of these crashes were turning (24), likely caused by permitted phasing at the traffic signal. This intersection exceeded the critical crash rate and the statewide 90th percentile crash rate.

Garden Valley Blvd at Centennial Dr/Estelle St just exceeded the critical crash rate for this intersection type with a crash rate of 0.64 crashes/MEV. There were 35 crashes during the five-year study period. Similar to other signalized intersections, rear end collisions are the most common at this intersection. This intersection only exceeded the critical crash rate.

Garden Valley Blvd at Garden Valley Shopping Center just exceeded the critical crash rate for this intersection type with a crash rate of 0.62 crashes/MEV. There were 36 crashes during the five-year study period. Similar to other signalized intersections, rear end collisions are the most common at this intersection. This intersection only exceeded the critical crash rate.

Stephens Street at Chestnut Avenue had a crash rate of 0.49 crashes/MEV. There were 25 crashes during the analysis period. Nearly half (14) of the crashes were rear end collisions with turning movement being the next largest type (6). There was one pedestrian-related collisions at this location and the remainder were likely due to driver inattention. This intersection exceeded the critical crash rate and the statewide 90th percentile crash rate. This intersection has since become signalized.

Diamond Lake Boulevard (OR 138) at Stephens Street had a crash rate of 0.40 crashes/MEV. There were 17 crashes during the five-year study period. Eight of the crashes were rear end collisions. The remaining nine crashes varied among angle, object, sideswipe and turning movement. This location has a significant amount of freight traffic and the northern leg has a slight grade that could contribute to the crashes. This intersection is part of the new OR 138 improvement project and could see changes in crash patterns in the future. This intersection only exceeded the critical crash rate.

Washington Avenue at Spruce Street had 15 crashes during the five-year data period with a crash rate of 0.53 crashes/MEV. Seven crashes were angle collisions and the rest were split between rear end, side swipe and turning movement. This location sees northbound drivers rushing across a couple lanes of traffic or trying to enter before a large enough gap in traffic exists. This intersection is part of the new OR 138 improvement project and could see changes in crash patterns in the future. This intersection exceeded the critical crash rate and the statewide 90th percentile crash rate.

Douglas Avenue at Jackson Street had six crashes during the five-year data period with a crash rate of 0.43 crashes/MEV. Half (3) were turning movement related, two were angle collisions and there was one rear end collision. This is a lower volume study intersection compared to many of the others in this list, however drivers must pay attention to the high pedestrian activity in the area. This intersection exceeded the critical crash rate and the statewide 90th percentile crash rate.

Oak Avenue at Pine Street had 32 crashes during the five-year data period with a crash rate of 1.17 crashes/MEV, the third highest crash rate of the study area intersections. The majority (24) were angle collisions.

Many angle collisions are due to driver error (inattention, physically ill, slowing down). This intersection is part of the new OR 138 improvement project and could see changes in crash patterns in the future. This intersection exceeded the critical crash rate and the statewide 90th percentile crash rate.

Oak Avenue at Stephens Street had 45 crashes during the five-year data period with a crash rate of 1.50 crashes/MEV, the highest crash rate of the study area intersections and second highest number of crashes. The most common collision type at this intersection is angle collisions (19), and then turning movement (16). This intersection is part of the new OR 138 improvement project and could see changes in crash patterns in the future. This intersection exceeded the critical crash rate and the statewide 90th percentile crash rate.

OR 99 at Wilbur Road had a crash rate of 0.39 crashes/MEV. There were three crashes over the five-year data period. Two of these collisions were rear end. The traffic volume at this intersection is low compared to other similar intersection types in the study area. This intersection only exceeded the statewide 90th percentile crash rate.

OR 99 at Bank Road had a crash rate of 0.38 crashes/MEV and a total of three crashes, the majority of which occurred as a result of turning vehicles (2). Similar to OR 99 at Wilbur Road, this intersection sees low volumes of vehicles compared to others in the study area. This intersection only exceeded the statewide 90th percentile crash rate.

I-5 Exit 129 SB Ramps at Del Rio Road had a crash rate of 0.36 crashes/MEV. There were four crashes over the five-year data period. Two were rear-end collisions and the other two were fixed object. This intersection was the location of one fatal collision. This intersection only exceeded the statewide 90th percentile crash rate.

Douglas Avenue at Ramp Road had a crash rate of 0.31 crashes/MEV. There were two crashes over the five-year data period. One sideswipe and one turning movement. These types of collisions could be the result of mainline traffic traveling too fast for the roadway and the side street vehicle not yielding right of way; trees and landscaping may obscure sight distance. This intersection only exceeded the statewide 90th percentile crash rate.

Oak Avenue at Jackson Street had a crash rate of 0.43 crashes/MEV. There were three crashes over the five-year data period. One angle, one fixed object and one turning movement. These types of collisions are most likely due to driver inattention or failing to yield the right of way. This intersection only exceeded the statewide 90th percentile crash rate

Safety Priority Index System (SPIS)

The SPIS is a method used in Oregon to identify safety problem areas along state highways. Highways are evaluated in approximately one-tenth mile increments (often grouped into larger segments). Each year these segments are ranked by assigning a SPIS score based on the frequency and severity crashes observed, while taking traffic volume into account. When a segment is ranked in the top 10% of the index, a crash analysis is typically warranted and corrective actions are considered. These segments can be found in Table 6. There are three segments along I-5 and seven segments along OR 138 within the study area that are identified as being in the top 10% of the most recent SPIS rankings.

TABLE 6. TOP 10% ODOT SPIS SITE SUMMARY

Year	Highway	Beginning Mile Point	End Mile Point	ADT	Total Crashes	Fatal & Injury A[1] Crashes	City/ County	Cross Street
2014	I-5	120.32	120.49	40,100	5	3	Douglas	N/A
2014	OR 138	-0.96	-0.83	23,800	14	1	Roseburg	Bellows
2014	OR 138	-0.42	-0.22	10,433	47	1	Roseburg	Spruce
2014	OR 138	0	0.11	11,222	17	1	Roseburg	Jackson
2014	OR 138	0.28	0.40	14,800	5	2	Roseburg	Boston
2014	OR 138	0.33	0.43	14,411	5	2	Roseburg	Casper
2015	I-5	123.93	124.11	41,400	17	1	Douglas	N/A
2015	I-5	125.03	125.14	40,866	12	2	Roseburg	N/A
2015	OR 138	-0.41	-0.22	11,622	50	1	Roseburg	Spruce
2015	OR 138	0.01	0.1	9,700	12	1	Roseburg	Winchester

1. Incapacitating or serious Injury Source: ODOT SPIS Data (2014 and 2015 reports[2])

One segment on I-5, between mile point 125.03 and 125.14 on I-5 includes the intersection at NW Garden Valley Blvd and NW Mulholland Dr. Both the traffic signal and multiple accesses could be contributing to the high number of crashes along this section of I-5 (connection).

The other I-5 segments are on I-5 mainline and are not included in the study intersections of the city's TSP. A future planning study is expected to focus on the I-5 mainline through the study area.

For OR 138, the segments listed are within the improvement area of the OR 138 solutions project. It is recommended that this area is monitored in the future and compared to the current crash history to determine if the improvement project impacted the crash patterns and safety along the corridor.

[2] Only 2014 and 2015 data is available. August 2017 message from ODOT: "We have identified some irregularities with the 2016 SPIS reports and the OASIS program, and we have initiated an additional quality control evaluation. As such we have removed the 2016 reports from view."

Findings and Next Steps

Under existing conditions, Roseburg's transportation network operates below operational mobility targets for all but two intersections. The city continues to add bicycle facilities and improve pedestrian routes, and transit amenities better the user experience. All of this combined leads to an integrated transportation system that improves the more accessibility for all users, but still has room for growth.

When looking at the system as a whole, it is apparent that certain segments and intersections consistently experience increased delays for vehicular users, connectivity concerns for bicyclists and pedestrians, and fixed routes for freight and transit travel. This is not a result of poor intersection or roadway design, but an underlying network connectivity concern that has become more apparent as Roseburg has grown. To prepare Roseburg's transportation system for growth in the future, land use changes may be needed to compliment transportation improvements to reduce travel demand on impacted transportation facilities.

Roseburg's geography and lack of a parallel street system contributes to traffic patterns that place stress on high-volume corridors such as Stewart Parkway, Garden Valley Boulevard and Harvard Avenue, particularly near the I-5 interchanges. The information provided in this memorandum indicates that there are opportunities for improvement within the current transportation system.

As previously mentioned, Roseburg continues to improve its transportation system through roadway projects, sidewalk infill, creating bicycle routes and focused planning. As the TSP process continues, additional consideration will be given to opportunities to further advance transportation options for all modes:

- The majority of the study intersections currently meet their respective mobility standards with the exception of two intersections, one of which was included as part of the previous IAMP 124/125 planning effort. There are several movements at the signalized intersections that currently exceed the striped storage for the movement.
- Much of the congestion and operational concerns along roadways exist due to underlying network connectivity concerns; drivers do not have a choice but to travel certain corridors.
- Though many designated bicycle routes exist, the level of traffic stress for the cyclists is high and does not create a comfortable environment for novices.
- The gaps in shoulders and bicycle facilities limit the potential to attract new riders or encourage existing rider to commute or complete other trips by bike.
- Asses transit, bike, and pedestrian network and identify gaps; and identify corresponding projects to complete safe, comfortable, and convenient connections between destinations
- Transit amenities are in place at transit stops, but improvements to frequency would increase the attractiveness of using transit.
- The pedestrian network could be made more attractive along busy corridors (Garden Valley Boulevard and Stephens Street) through access management or improving comfort level.
- There are several intersections that currently exceed the 95th percentile crash rates.

Technical Memorandum #3: Appendix A

DATE: August 20, 2018

TO: City of Roseburg

FROM: Angela Rogge, PE, David Evans and Associates, Inc.
Dana Shuff, EIT, David Evans and Associates, Inc.

SUBJECT: Roseburg Transportation System Plan Update
Task 5.3 Current Transportation System Operation Analysis

This memorandum presents the available data and analysis output for the transportation system under existing conditions as it relates to vehicular, bicycle and pedestrian volumes. This appendix presents a summary of the technical analysis in graphical and tabular form; *Technical Memorandum #3* will summarize the outcomes of the analysis as a narrative.

The assessment of the transportation system's operational conditions includes development of existing traffic volumes, evaluation of vehicular operations and a summary of non-motorized (multi-modal) transportation movements, all in accordance with the approved methodology presented in *Technical Memorandum #1, Appendix A (Methodology and Assumptions Memorandum)*.

Vehicular operational analysis includes:

- PM peak hour turning movement volumes (Figure 1)
- Volume–to–capacity (v/c) ratio (Table 1)
- Level of Service (LOS) (Table 1)
- 95th percentile queues from Simtraffic[1] (Table 2)

Pedestrian and bicycle (multi-modal) movements for all traffic count locations (where provided by ODOT) are summarized in figures (Figure 2a, Figure 2b, Figure 3 and Figure 4). Summary includes:

- Volume
- Type
- Direction

Note: The bicycle and pedestrian data in this memorandum is limited. More detailed bicycle and pedestrian analysis and a safety analysis are provided in Technical Memorandum #3.

[1] Synchro/SimTraffic (version 9) software for analysis provides the v/c ratio and LOS output of an HCM analysis and considers the systematic interaction of the intersections with regard to queuing and delays

Vehicular Analysis

The Transportation System Plan (TSP) includes 76 locations for analysis. Of the 76 locations, 24 have been studied previously and did not require further post-processing. Since there have been a number of other plans done in the recent past, the 24 previously studied intersections have volumes and operations pulled directly from those plans to avoid having to do rework and create any potential conflicts.[2]

Volume Development

The existing PM peak hour volumes were determined from the existing weekday counts and adjusted to design hourly volumes following the methodologies outlined in the ODOT Transportation Planning and Analysis Unit's (TPAU) *Analysis Procedures Manual* (APM) *Volume 2* and described in detail in *Technical Memorandum #1, Appendix A (Methodology and Assumptions Memorandum).*

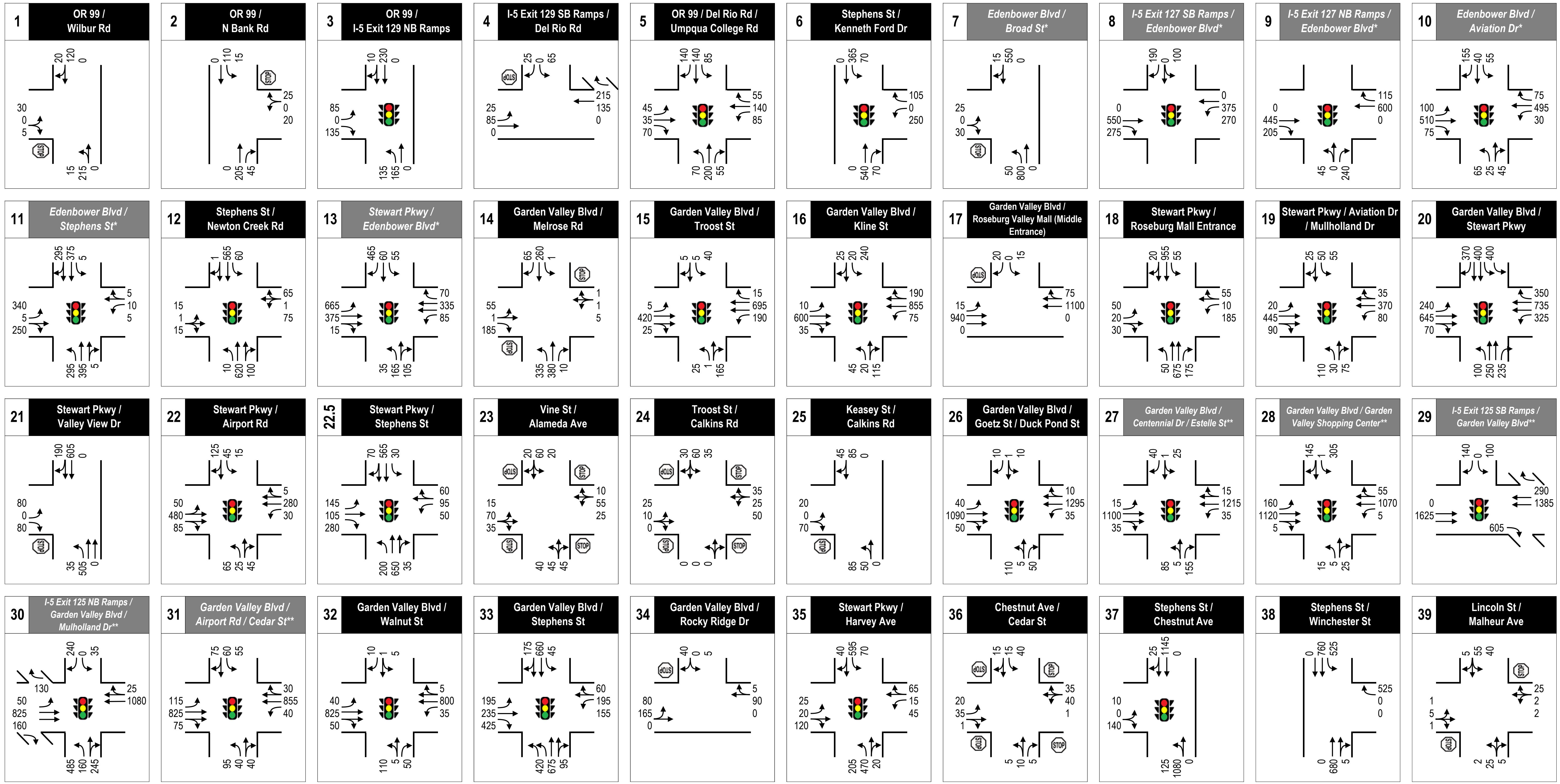
A high level summary of the volume development process is outlined as follows:

1. Determined system peak hour (4:30 PM – 5:30 PM)
2. Adjusted traffic data to baseline analysis year. The project base year is 2016 but several of the counts available were counted as early as 2013. Assumed an annual growth factor of 2.5% per year.
3. Applied seasonal adjustment factors to convert data from varying months to peak month equivalents.
4. Balanced volumes to manage imbalances between intersections.

PM Peak Hour Turning Movement Volumes

Existing traffic volume data was assembled from previous studies and turning movement traffic counts conducted at intersections throughout the city by ODOT. Figure 1a and Figure 1b summarizes the study area intersections, their traffic control, lane configurations and the balanced 2016 PM Peak Hour turning movement volumes.

[2] The original scope of work incorrectly identified the intersection of NW Garden Valley Blvd at NW Stewart Pkwy as a previously studied intersection. Data was not available for this intersection and thus volumes and operational output are not included in this memorandum; a general performance narrative will be included in *Technical Memorandum #3*.



Legend

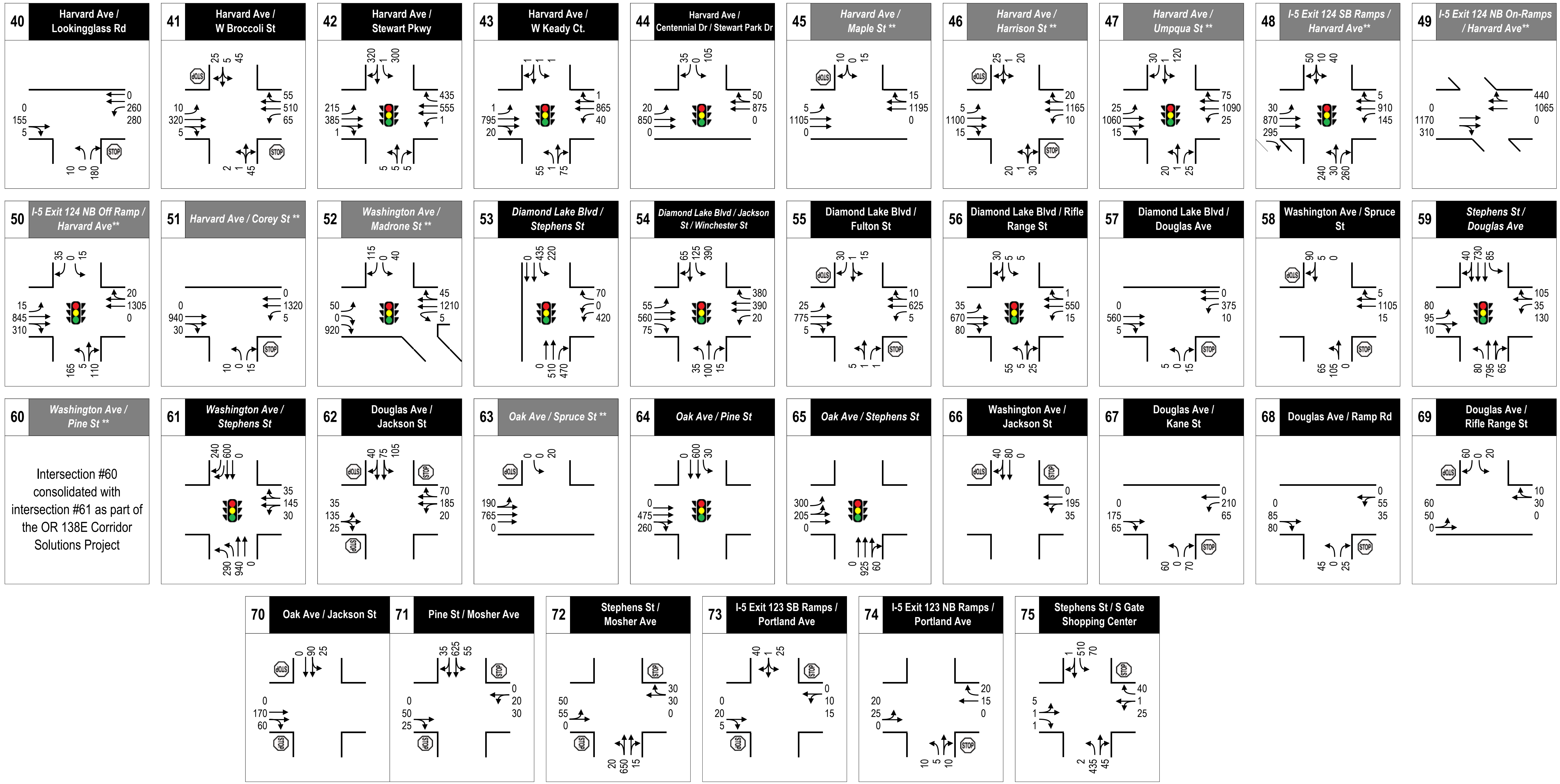
1 *Intersection *, ***	Intersection volumes developed from previous study or plan
*	IAMP 127 (December 2014)
**	IAMPs 124/125 (October 2013)
(signal)	Signalized intersection
(STOP)	STOP controlled intersection
(arrows)	Lane configuration

Roseburg TSP

Figure 1a

Existing (2016) PM Peak Hour Turning Movement Volumes

N



Legend

1 Intersection *, **	Intersection volumes developed from previous study or plan
*	IAMP 127 (December 2014)
**	IAMPs 124/125 (October 2013)

- Signalized intersection
- STOP controlled intersection
- Lane configuration

Roseburg TSP

Figure 1b

Existing (2016) PM Peak Hour Turning Movement Volumes

N

Intersection Delay and Capacity Analysis Results

Existing PM peak hour traffic operations were evaluated for the study area. Transportation engineers have established various methods for measuring traffic operations of roadways and intersections. Most jurisdictions use either volume-to-capacity (v/c) ratio or level of service (LOS) to establish performance criteria. Both the LOS and v/c ratio concepts require consideration of factors that include traffic demand, capacity of the intersection or roadway, delay, frequency of interruptions in traffic flow, relative freedom for traffic maneuvers, driving comfort, convenience, and operating cost.

> **Volume-to-Capacity (V/C) Ratio:** A comparison of traffic volume demand to intersection capacity. As the v/c ratio approaches 1.00, traffic becomes more congested and unstable, with longer delays.

> **Level of Service (LOS):** Level of service is a function of control delay, which includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.

Traffic Mobility Targets

Traffic mobility targets are thresholds set by a jurisdiction to help measure how an intersection functions.

City of Roseburg

The City's performance measure standards are as follows:

Outside of Downtown District Boundary:

- Volume-to-capacity (V/C) ratio:
  - Arterial = 0.85
  - Collector = 0.90
  - Local = 0.95
- Level of service (LOS) standards:
  - LOS D for signalized intersections
  - LOS E for unsignalized intersections

Within Downtown District Boundary:

- Volume-to-capacity (V/C) ratio: 0.95
- Level of service (LOS) standards: LOS E (signalized and unsignalized)

All of the study area intersections will be compared to the City's mobility targets unless otherwise noted below.

Douglas County

The mobility targets of Douglas County facilities vary by the classification of the route and its urban or rural nature. All of the County facilities studied as part of the TSP are considered urban because they function as routes to and from the city and surrounding area. The County's standards are as follows:

- V/C ratio:
  - Arterial = 0.85
  - Major Collector = 0.90
  - Minor Collector = 0.95

According to the Douglas County Comprehensive Plan, "where two different county route classifications intersect, the V/C ratio of the higher county classification shall be used for the intersection."

The intersections where Douglas County mobility targets apply are listed below:

- OR 99 at Wilbur Road
- OR 99 at North Bank Road
- Garden Valley Boulevard at Melrose Road

State

For State facilities, the Oregon Highway Plan (OHP) will be used in the assessment of intersection operations. Table 6 of the OHP provides V/C targets based on characteristics of the facility. The applicable OHP standard and the intersections they apply to are listed below:

- I-5 Exit 129 NB Ramps at OR 99 – V/C = 0.75
- I-5 Exit 129 SB Ramps at Del Rio Road – V/C = 0.95
- I-5 Exit 127 SB Ramps at Edenbower Boulevard – V/C = 0.90
- I-5 Exit 127 NB Ramps at Edenbower Boulevard – V/C = 0.90
- I-5 Exit 125 SB Ramps at Garden Valley Boulevard – V/C = 0.85
- I-5 Exit 125 NB Ramps at Garden Valley Boulevard at Mulholland Drive – V/C = 0.85
- I-5 Exit 124 SB Ramps at Harvard Avenue – V/C = 0.85
- I-5 Exit 124 NB On-Ramps at Harvard Avenue – V/C = 0.85
- I-5 Exit 124 NB Off Ramp at Harvard Avenue – V/C = 0.85
- Harvard Avenue (OR 138) at Corey Street – V/C = 0.90
- Washington Avenue (OR 138) at Madrone Street – V/C = 0.90
- Washington Avenue (OR 138) at Spruce Street – V/C = 0.90
- Stephens Street (OR 138) at Douglas Avenue – V/C = 0.90
- Washington Avenue (OR 138) at Pine Street (OR 138) – V/C = 0.90
- Washington Avenue (OR 138) at Stephens Street (OR 138) – V/C = 0.90
- Oak Avenue (OR 138) at Spruce Street – V/C = 0.90
- Oak Avenue (OR 138) at Pine Street (OR 138) – V/C = 0.90
- Oak Avenue (OR 138) at Stephens Street (OR 138) – V/C = 0.90
- Diamond Lake Boulevard at Stephens Street – V/C = 0.90
- Diamond Lake Boulevard at Jackson Street/Winchester Street – V/C = 0.90
- Diamond Lake Boulevard at Fulton Street – V/C = 0.90 (E/W), – V/C = 0.95 (N/S)
- Diamond Lake Boulevard at Rifle Range Street – V/C = 0.90
- Diamond Lake Boulevard at Douglas Avenue – V/C = 0.85 (E/W), – V/C = 0.90 (N/S)
- I-5 Exit 123 SB Ramps at Portland Avenue – V/C = 0.95
- I-5 Exit 123 NB Ramps at Portland Avenue – V/C = 0.95

It is to be noted that Old OR 99 (Stephens St) is no longer under state jurisdiction.

Table 1 summarizes the Existing (2016) PM peak hour v/c ratios and LOS performance by lane group for the area intersections. These findings reflect the current signal timing plans. Detailed analysis worksheets are attached.

TABLE 1. EXISTING (2016) PM PEAK HOUR TRAFFIC OPERATIONS

	Intersection	Jurisdiction	Critical Movement[1]	V/C[2]	LOS[2]	Mobility Target[3]
1	OR 99 at Wilbur Rd	Douglas County	EB L/R	0.06	B	0.85
2	OR 99 at N Bank Rd	Douglas County	WB L/R	0.07	B	0.85
3	OR 99 at I-5 Exit 129 NB Ramps	ODOT	Overall	0.30	B	0.75
4	I-5 Exit 129 SB Ramps at Del Rio Rd	ODOT	SB L	0.11	B	0.95
5	OR 99 at Del Rio Rd at Umpqua College Rd	City of Roseburg	Overall	0.44	B	0.85, LOS D
6	Stephens St at Kenneth Ford Dr	City of Roseburg	Overall	0.67	B	0.85, LOS D
7	Edenbower Blvd at Broad St*	City of Roseburg	EB L/R	0.15	C	0.85, LOS E
8	I-5 Exit 127 SB Ramps at Edenbower Blvd*	ODOT	Overall	0.57	B	0.85
9	I-5 Exit 127 NB Ramps at Edenbower Blvd*	ODOT	NB L/T	0.37	C	0.85
10	Edenbower Blvd at Aviation Dr*	City of Roseburg	Overall	0.54	B	0.85, LOS D
11	Edenbower Blvd at Stephens St*	City of Roseburg	Overall	0.66	C	0.85, LOS D
12	Stephens St at Newton Creek Rd	City of Roseburg	Overall	0.44	A	0.85, LOS D
13	Stewart Pkwy at Edenbower Blvd*	City of Roseburg	Overall	0.83	D	0.85, LOS D
14	Garden Valley Blvd at Melrose Rd	Douglas County	EB L/T	0.60	F	0.85
15	Garden Valley Blvd at Troost St	City of Roseburg	Overall	0.40	C	0.85, LOS D
16	Garden Valley Blvd at Kline St	City of Roseburg	Overall	0.62	C	0.85, LOS D
17	Garden Valley Blvd at Roseburg Valley Mall (Middle Entrance)	City of Roseburg	SB L/R	0.14	C	0.85, LOS E
18	Stewart Pkwy at Roseburg Mall Entrance	City of Roseburg	Overall	0.60	B	0.85, LOS D
19	Stewart Pkwy at Aviation Dr/Mullholland Dr	City of Roseburg	Overall	0.43	A	0.85, LOS D
20	Garden Valley Blvd at Stewart Pkwy	City of Roseburg	Overall	0.74	C	0.85, LOS D
21	Stewart Pkwy at Valley View Dr	City of Roseburg	EB L	0.46	E	0.85, LOS E
22	Stewart Pkwy at Airport Rd	City of Roseburg	Overall	0.40	B	0.85, LOS D
22.5	Stewart Pkwy at Stephens St	City of Roseburg	Overall	0.62	C	0.85, LOS D
23	Vine St at Alameda Ave	City of Roseburg	NB L/T/R	0.17	A	0.90, LOS E
24	Troost St at Calkins Rd	City of Roseburg	SB L/T/R	0.18	A	0.90, LOS E
25	Keasey St at Calkins Rd	City of Roseburg	EB L/R	0.12	A	0.90, LOS E
26	Garden Valley Blvd at Goetz St/Duck Pond St	City of Roseburg	Overall	0.60	B	0.85, LOS D
27	Garden Valley Blvd at Centennial Dr at Estelle St**	City of Roseburg	Overall	0.67	B	0.85, LOS D
28	**Garden Valley Blvd at Garden Valley Shopping Center****	City of Roseburg	**Overall**	**0.95**	**C**	**0.85, LOS D**
29	I-5 Exit 125 SB Ramps at Garden Valley Blvd**	ODOT	Overall	0.67	A	0.85
30	I-5 Exit 125 NB Ramps at Garden Valley Blvd at Mulholland Dr**	ODOT	Overall	0.80	C	0.85
31	Garden Valley Blvd at Airport Rd at Cedar St**	City of Roseburg	Overall	0.55	B	0.85, LOS D
32	Garden Valley Blvd at Walnut St	City of Roseburg	Overall	0.43	B	0.85, LOS D
33	Garden Valley Blvd at Stephens St	City of Roseburg	Overall	0.79	D	0.85, LOS D
34	Garden Valley Blvd at Rocky Ridge Dr	City of Roseburg	SB L/R	0.08	A	0.85, LOS E

TABLE 1. EXISTING (2016) PM PEAK HOUR TRAFFIC OPERATIONS

	Intersection	Jurisdiction	Critical Movement[1]	V/C[2]	LOS[2]	Mobility Target[3]
35	Stewart Pkwy at Harvey Ave	City of Roseburg	Overall	0.76	C	0.85, LOS D
36	Chestnut Ave at Cedar St	City of Roseburg	WB L/T/R	0.14	A	0.90, LOS E
37	Stephens St at Chestnut Ave	City of Roseburg	EB L/R	0.62	A	0.85, LOS E
38	Stephens St at Winchester St	City of Roseburg	SB L	0.66	C	0.85, LOS E
39	Lincoln St at Malheur Ave	City of Roseburg	WB L/T/R	0.04	A	0.90, LOS E
40	Harvard Ave at Lookingglass Rd	City of Roseburg	NB L	0.06	D	0.85, LOS E
41	Harvard Ave at W Broccoli St	City of Roseburg	SB L/T/R	0.31	C	0.85, LOS E
42	Harvard Ave at Stewart Pkwy	City of Roseburg	Overall	0.64	C	0.85, LOS D
43	Harvard Ave at W Keady Ct.	City of Roseburg	Overall	0.50	B	0.85, LOS D
44	Harvard Ave at Centennial Dr	City of Roseburg	Overall	0.57	A	0.85, LOS D
45	Harvard Ave at Maple St **	City of Roseburg	SB L/R	0.10	C	0.85, LOS E
46	Harvard Ave at Harrison St **	City of Roseburg	NB L/T/R	0.27	D	0.85, LOS E
47	Harvard Ave at Umpqua St **	City of Roseburg	Overall	0.63	B	0.85, LOS D
48	I-5 Exit 124 SB Ramps at Harvard Ave**	ODOT	Overall	0.73	C	0.85
49	I-5 Exit 124 NB On-Ramps at Harvard Ave**	ODOT	Overall	0.69	B	0.85
50	I-5 Exit 124 NB Off Ramp at Harvard Ave**	ODOT				
51	Harvard Ave at Corey St **	ODOT	NB L/R	0.05	C	0.90
52	Washington Ave at Madrone St **	ODOT	Overall	0.59	B	0.90
53	Diamond Lake Blvd at Stephens St	ODOT	Overall	0.55	C	0.90
54	Diamond Lake Blvd at Jackson St at Winchester St	ODOT	Overall	0.62	C	0.90
55	Diamond Lake Blvd at Fulton St	ODOT	SB L/T/R	0.16	C	0.95 (N/S) 0.90 (E/W)
56	Diamond Lake Blvd at Rifle Range St	ODOT	Overall	0.39	A	0.90
57	Diamond Lake Blvd at Douglas Ave	ODOT	NB L/R	0.04	B	0.90 (N/S) 0.85 (E/W)
58	**Washington Ave at Spruce St**	ODOT	**NB L/T** **WB L/T**	**>1.0** **--**	**F** **A**	**0.95, LOS E** **0.90**
59	Stephens St at Douglas Ave	ODOT	Overall	0.60	B	0.90
60	Washington Ave at Pine St	ODOT	Overall	0.66	C	0.90
61	Washington Ave at Stephens St	ODOT	Overall	0.63	B	0.90
62	Douglas Ave at Jackson St	City of Roseburg	EB L/T/R	0.36	B	0.95, LOS E
63	Oak Ave at Spruce St **	ODOT	SB L	0.06	C	0.90
64	Oak Ave at Pine St	ODOT	Overall	0.54	B	0.90
65	Oak Ave at Stephens St	ODOT	Overall	0.42	B	0.90
66	Washington Ave at Jackson St	City of Roseburg	WB L/T	0.19	A	0.95, LOS E
67	Douglas Ave at Kane St	City of Roseburg	NB L	0.18	C	0.95, LOS E
68	Douglas Ave at Ramp Rd	City of Roseburg	NB L	0.08	B	0.90, LOS E
69	Douglas Ave at Rifle Range St	City of Roseburg	SB L/R	0.10	A	0.90, LOS E
70	Oak Ave at Jackson St	City of Roseburg	EB T	0.17	A	0.95, LOS E
71	Pine St at Mosher Ave	City of Roseburg	EB T/R	0.30	C	0.95, LOS E

TABLE 1. EXISTING (2016) PM PEAK HOUR TRAFFIC OPERATIONS

	Intersection	Jurisdiction	Critical Movement[1]	V/C[2]	LOS[2]	Mobility Target[3]
72	Stephens St at Mosher Ave	City of Roseburg	EB L/T	0.33	C	0.95, LOS E
73	I-5 Exit 123 SB Ramps at Portland Ave	ODOT	WB L/T	0.04	A	0.95
74	I-5 Exit 123 NB Ramps at Portland Ave	ODOT	NB T/R	0.02	A	0.95
75	Stephens St at S Gate Shopping Center	City of Roseburg	WB L/T	0.20	E	0.85, LOS E

Shaded rows exceed applicable mobility targets; Acronyms: EB = eastbound; WB = westbound; NB = northbound; and SB = southbound. L = left; T = through; and R = right.

* Intersection operations reported from Interchange Area Management Plan (IAMP) 127 (December 2014)

** Intersection operations reported from IAMPs 124/125 (October 2013)

1. At intersections the results are reported for the worst operating movements on major and minor approaches that must stop or yield the right of travel to other traffic flows. For signalized intersections, the overall operations are reported.
2. The v/c ratios and LOS are based on the results of the macrosimulation analysis using Synchro, which does not account for the influence of adjacent intersection operations.
3. Mobility target is reported for the critical movement; Unsignalized intersections may have two different mobility targets for the major and minor approaches (Action 1F.1, Oregon Highway Plan, 1999)

Queuing Analysis

Evaluation of the transportation system included a 95th percentile queuing analysis -- meaning 95 percent of all queues will be shorter. Table 2 summarizes intersection movements where the 95th percentile queues either exceed available storage, extend beyond the nearest upstream intersection or exceed ¼-mile.

TABLE 2. EXISTING (2016) 95TH PERCENTILE QUEUES EXCEEDING AVAILABLE STORAGE

	Intersection	Approach & Movement	95th Percentile Queue (ft.)	Available Storage
6	Stephens St at Kenneth Ford Dr	NB R SB L	200 200	110 125
10	Edenbower Blvd at Aviation Dr*	EB L WB R	150 150	125 100
11	Edenbower Blvd at Stephens St*	EB L NB L SB R	275 200 175	125 150 150
13	Stewart Pkwy at Edenbower Blvd*	EB L WB L WB T WB R NB T/R SB R	350 125 175 100 275 175	325 100 125[1] 75 225[1] 150
15	Garden Valley Blvd at Troost St	WB L	250	150
16	Garden Valley Blvd at Kline St	WBL	175	150
19	Stewart Pkwy at Aviation Dr/Mullholland Dr	NB L	100	75
20	Garden Valley Blvd at Stewart Pkwy	WB R SB L SB R	300 250 275	150 200 150
22	Stewart Pkwy at Airport Rd	NB L SB T/R	100 100	80 90
22.5	Stewart Pkwy at Stephens St	WB L	125	85

		NB L	225	200
27	Garden Valley Blvd at Centennial Dr at Estelle St**	NB L/T	200	150
28	Garden Valley Blvd at Garden Valley Shopping Center**	SB L SB T/R	125 275	50 200
30	I-5 Exit 125 NB Ramps at Garden Valley Blvd at Mulholland Dr**	NB T/R	1,100	1,000
32	Garden Valley Blvd at Walnut St	NB L/T	150	100
33	Garden Valley Blvd at Stephens St	EB L WB L NB L	250 225 350	225 100 240
35	Stewart Pkwy at Harvey Ave	NB L SB L SB T/R	250 225 1,400	200 175 --
37	Stephens St at Chestnut Ave	NB L	125	100
38	Stephens St at Winchester St	SB L	250	170
42	Harvard Ave at Stewart Pkwy	EB L WB R	225 225	150 100
48	I-5 Exit 124 SB Ramps at Harvard Ave**	NB L/T NB R	275 200	150 150
54	Diamond Lake Blvd at Jackson St at Winchester St	SBL	400	300
61	Washington Ave at Stephens St	NBT SBT	325 275	315 265
62	Douglas Ave at Jackson St	WB L/T SB T/R	75 100	25 35
67	Douglas Ave at Kane St	NB R	75	60

* Intersection operations reported from IAMP 127 (December 2014)

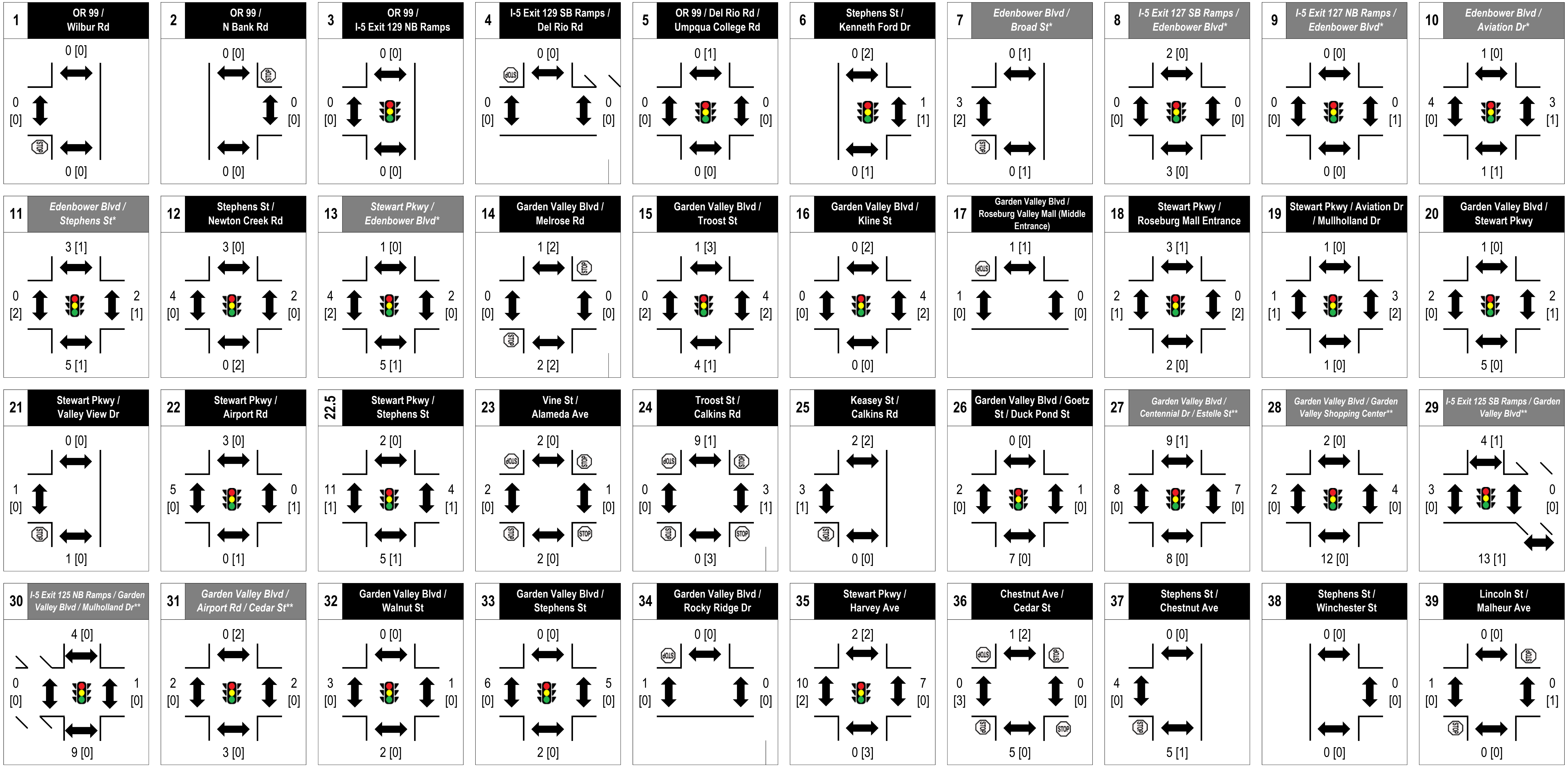
** Intersection operations reported from IAMPs 124/125 (October 2013)

1. Storage distance reflects spacing to the next public access point.

Pedestrian and Bicycle Assessment

This section summarizes the bicycle and pedestrian volumes at the study intersections during the weekday PM peak hour. It is important to clarify that the methodology for collecting peak hour bicyclists only considers cyclists using the sidewalk or crosswalk; cyclists traveling in the roadway alongside vehicles were not counted. Figure 2a and Figure 2b provide detailed directional volumes for the PM peak hour; the data was collected concurrently with the traffic volumes for most study area intersections. Two intersections did not have pedestrian or bicycle data: #45 (Harvard Avenue at Maple Street) and #53 (Diamond Lake Boulevard at Stephens Street).

Figure 3 and Figure 4 provide “heat maps” of the daily pedestrian and bicycle activity. The “heat maps” are intended to graphically depict where pedestrians and bicyclists are more likely to travel. These maps can help identify study area intersections and roadways that experience the most bicycle and pedestrian traffic relative to other facilities included as part of the TSP analysis.



Legend

1 Intersection *, **	Intersection volumes developed from previous study or plan
*	IAMP 127 (December 2014)
**	IAMPs 124/125 (October 2013)
(signal)	Signalized intersection
STOP	STOP controlled intersection
# [#]	PM Peak Pedestrian Volume [Bicycle Volume]

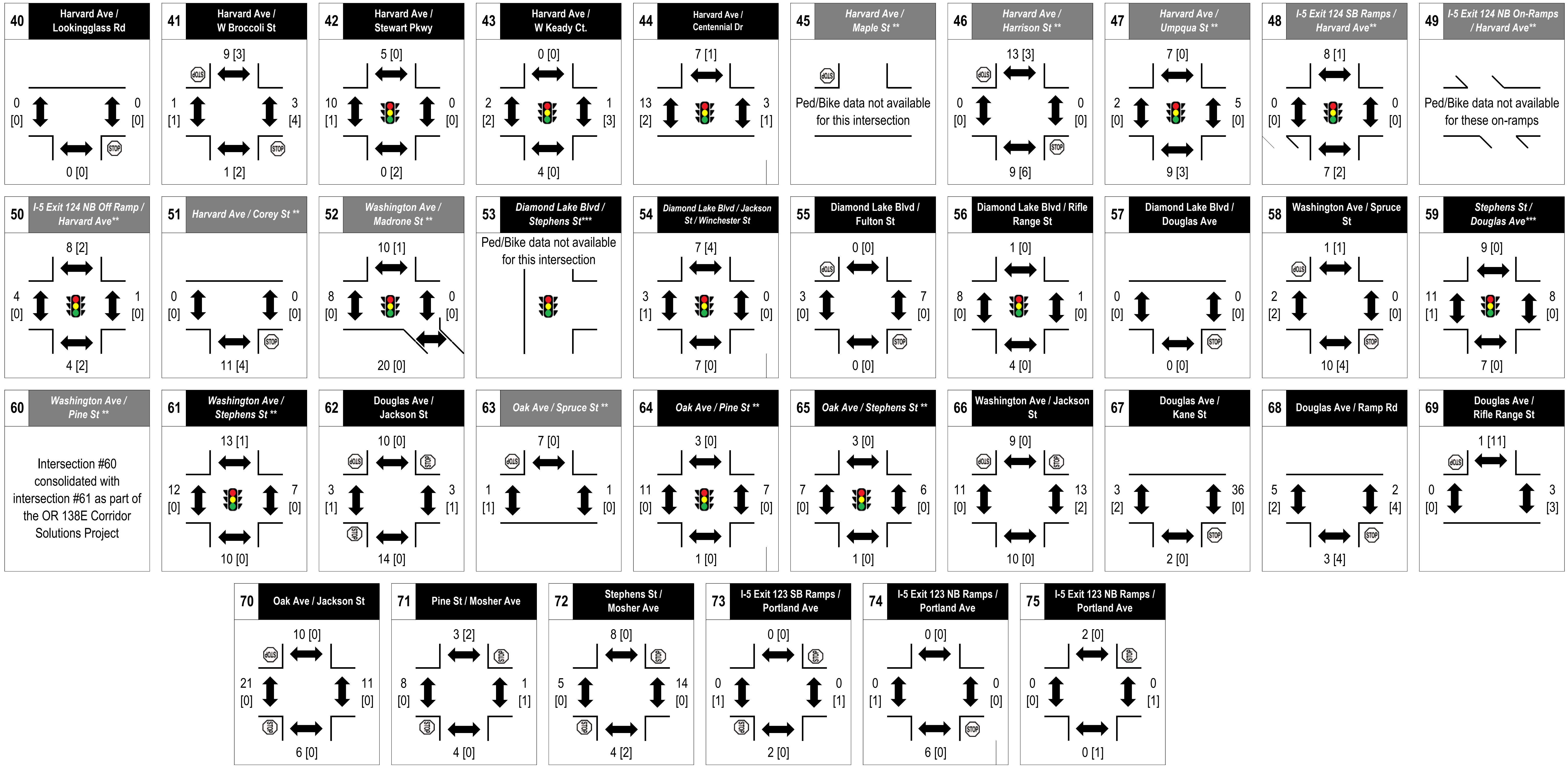
North Leg
West Leg
East Leg
South Leg

Roseburg TSP

Figure 2a

Existing (2016) PM Peak Hour Pedestrian and Bicycle Volumes

N



Legend

1 Intersection *, ** — Intersection volumes developed from previous study or plan

* IAMP 127 (December 2014)

** IAMPs 124/125 (October 2013)

Signalized intersection

STOP controlled intersection

[#] PM Peak Pedestrian Volume [Bicycle Volume]

North Leg, West Leg, East Leg, South Leg

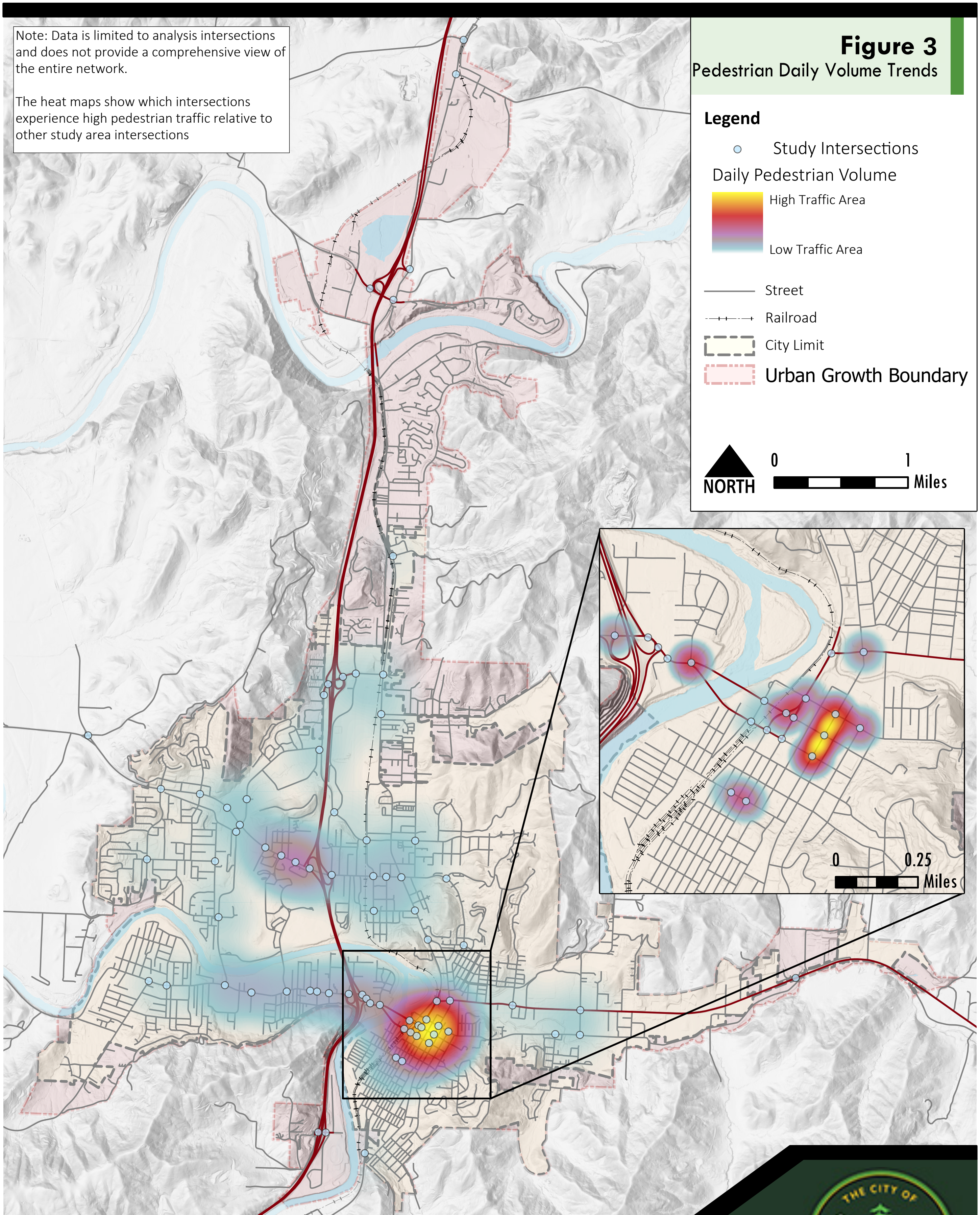
N

Roseburg TSP

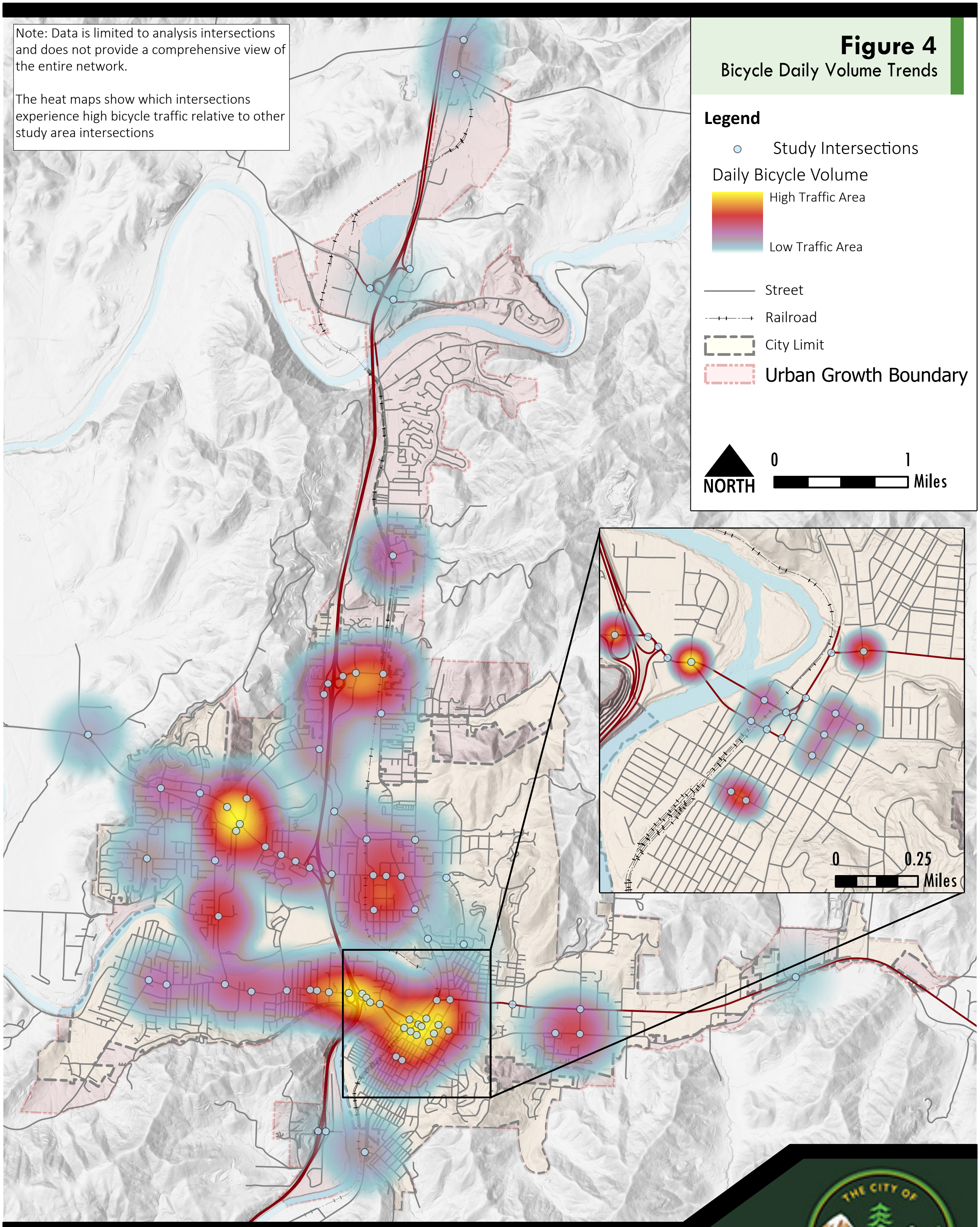
Figure 2b

Existing (2016) PM Peak Hour Pedestrian and Bicycle Volumes

Figure 3
Pedestrian Daily Volume Trends



City of Roseburg
Transportation System Plan



City of Roseburg

Transportation System Plan

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	30	5	15	215	120	20
Future Vol, veh/h	30	5	15	215	120	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	6	7	16
Mvmt Flow	34	6	17	242	135	22

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	421	146	157	0	-	0
Stage 1	146	-	-	-	-	-
Stage 2	275	-	-	-	-	-
Critical Hdwy	7.1	6.2	4.1	-	-	-
Critical Hdwy Stg 1	6.1	-	-	-	-	-
Critical Hdwy Stg 2	6.1	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	546	906	1435	-	-	-
Stage 1	861	-	-	-	-	-
Stage 2	736	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	540	906	1435	-	-	-
Mov Cap-2 Maneuver	540	-	-	-	-	-
Stage 1	849	-	-	-	-	-
Stage 2	726	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.7	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1435	-	573	-	-
HCM Lane V/C Ratio	0.012	-	0.069	-	-
HCM Control Delay (s)	7.5	0	11.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	25	205	45	15	110
Future Vol, veh/h	20	25	205	45	15	110
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	175	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	5	9	5	2	6	7
Mvmt Flow	21	27	218	48	16	117

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	367	218	0	0	218	0
Stage 1	218	-	-	-	-	-
Stage 2	149	-	-	-	-	-
Critical Hdwy	6.45	6.29	-	-	4.16	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.381	-	-	2.254	-
Pot Cap-1 Maneuver	627	805	-	-	1328	-
Stage 1	811	-	-	-	-	-
Stage 2	871	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	619	805	-	-	1328	-
Mov Cap-2 Maneuver	619	-	-	-	-	-
Stage 1	811	-	-	-	-	-
Stage 2	861	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.4	0	0.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	710	1328	-
HCM Lane V/C Ratio	-	-	0.067	0.012	-
HCM Control Delay (s)	-	-	10.4	7.7	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	85	135	135	165	230	10
Future Volume (vph)	85	135	135	165	230	10
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1511	1473	1630	1699	3091	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1511	1473	1630	1699	3091	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	89	141	141	172	240	10
RTOR Reduction (vph)	0	115	0	0	4	0
Lane Group Flow (vph)	89	26	141	172	246	0
Heavy Vehicles (%)	10%	1%	2%	3%	6%	29%
Turn Type	Prot	Prot	Prot	NA	NA	
Protected Phases	8	8	1	6	2	
Permitted Phases						
Actuated Green, G (s)	7.8	7.8	7.2	29.2	17.5	
Effective Green, g (s)	8.8	8.8	7.7	31.2	19.5	
Actuated g/C Ratio	0.18	0.18	0.16	0.65	0.41	
Clearance Time (s)	5.0	5.0	4.5	6.0	6.0	
Vehicle Extension (s)	2.5	2.5	2.5	4.8	4.8	
Lane Grp Cap (vph)	277	270	261	1104	1255	
v/s Ratio Prot	c0.06	0.02	c0.09	0.10	c0.08	
v/s Ratio Perm						
v/c Ratio	0.32	0.10	0.54	0.16	0.20	
Uniform Delay, d1	17.0	16.3	18.5	3.3	9.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	0.1	1.8	0.1	0.1	
Delay (s)	17.5	16.4	20.3	3.4	9.3	
Level of Service	B	B	C	A	A	
Approach Delay (s)	16.8			11.0	9.3	
Approach LOS	B			B	A	

Intersection Summary			
HCM 2000 Control Delay	12.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	48.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	33.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR	SWL	SWR
Lane Configurations								
Traffic Vol, veh/h	25	85	135	0	65	25	0	0
Future Vol, veh/h	25	85	135	0	65	25	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop	Stop	Stop
RT Channelized	-	None	-	-	-	None	-	-
Storage Length	470	-	-	600	0	375	-	-
Veh in Median Storage, #	-	0	0	-	0	-	-	-
Grade, %	-	0	0	-	0	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2
Mvmt Flow	29	100	159	0	76	29	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	159	0	-	0	318	159
Stage 1	-	-	-	-	159	-
Stage 2	-	-	-	-	159	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1420	-	-	0	675	886
Stage 1	-	-	-	0	870	-
Stage 2	-	-	-	0	870	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1420	-	-	-	661	886
Mov Cap-2 Maneuver	-	-	-	-	694	-
Stage 1	-	-	-	-	870	-
Stage 2	-	-	-	-	852	-

Approach	EB	WB	SB
HCM Control Delay, s	1.7	0	10.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1420	-	-	694	886
HCM Lane V/C Ratio	0.021	-	-	0.11	0.033
HCM Control Delay (s)	7.6	-	-	10.8	9.2
HCM Lane LOS	A	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	35	70	85	140	55	70	200	55	85	140	140
Future Volume (vph)	45	35	70	85	140	55	70	200	55	85	140	140
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1599	1750	1444	1568	1716	1458	1662	1716	1340	1583	1667	1403
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1599	1750	1444	1568	1716	1458	1662	1716	1340	1583	1667	1403
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	49	38	77	93	154	60	77	220	60	93	154	154
RTOR Reduction (vph)	0	0	66	0	0	49	0	0	38	0	0	71
Lane Group Flow (vph)	49	38	11	93	154	11	77	220	22	93	154	83
Heavy Vehicles (%)	4%	0%	3%	6%	2%	2%	0%	2%	11%	5%	5%	6%
Turn Type	Prot	NA	Prot	Prot	NA	Prot	Prot	NA	Prot	Prot	NA	pt+ov
Protected Phases	3	8	8	7	4	4	1	6	6	5	2	2 3
Permitted Phases												
Actuated Green, G (s)	4.7	8.0	8.0	7.3	10.6	10.6	6.3	21.4	21.4	7.3	22.4	33.1
Effective Green, g (s)	5.7	9.0	9.0	8.3	11.6	11.6	7.3	23.4	23.4	8.3	24.4	35.1
Actuated g/C Ratio	0.09	0.14	0.14	0.13	0.18	0.18	0.11	0.36	0.36	0.13	0.38	0.54
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.0	6.0	5.0	6.0	
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	4.8	4.8	2.5	4.8	
Lane Grp Cap (vph)	140	242	199	200	306	260	186	617	482	202	625	757
v/s Ratio Prot	0.03	0.02	0.01	c0.06	c0.09	0.01	0.05	c0.13	0.02	c0.06	0.09	0.06
v/s Ratio Perm												
v/c Ratio	0.35	0.16	0.05	0.47	0.50	0.04	0.41	0.36	0.04	0.46	0.25	0.11
Uniform Delay, d1	27.9	24.7	24.3	26.3	24.1	22.1	26.9	15.3	13.5	26.3	14.0	7.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	0.2	0.1	1.2	0.9	0.0	1.1	0.7	0.1	1.2	0.4	0.1
Delay (s)	29.0	24.9	24.4	27.5	25.0	22.1	27.9	16.0	13.6	27.5	14.4	7.4
Level of Service	C	C	C	C	C	C	C	B	B	C	B	A
Approach Delay (s)		25.9			25.2			18.2			14.8	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	41.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	250	105	540	70	70	365
Future Volume (vph)	250	105	540	70	70	365
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1630	1444	1733	1444	1568	1699
Flt Permitted	0.95	1.00	1.00	1.00	0.22	1.00
Satd. Flow (perm)	1630	1444	1733	1444	357	1699
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	260	109	562	73	73	380
RTOR Reduction (vph)	0	78	0	22	0	0
Lane Group Flow (vph)	260	31	563	51	73	380
Confl. Peds. (#/hr)				1	1	
Heavy Vehicles (%)	2%	3%	1%	3%	6%	3%
Turn Type	Prot	Prot	NA	Prot	pm+pt	NA
Protected Phases	8	8	2	2	1	6
Permitted Phases					6	
Actuated Green, G (s)	16.5	16.5	25.6	25.6	35.2	35.2
Effective Green, g (s)	17.5	17.5	26.6	26.6	36.2	36.2
Actuated g/C Ratio	0.28	0.28	0.43	0.43	0.59	0.59
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	3.0	3.0	2.0	3.0
Lane Grp Cap (vph)	462	409	747	622	319	996
v/s Ratio Prot	c0.16	0.02	c0.32	0.04	0.02	c0.22
v/s Ratio Perm					0.11	
v/c Ratio	0.56	0.08	0.75	0.08	0.23	0.38
Uniform Delay, d1	18.8	16.2	14.8	10.3	7.8	6.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.0	4.3	0.1	0.1	0.2
Delay (s)	19.8	16.2	19.1	10.4	8.0	7.0
Level of Service	B	B	B	B	A	A
Approach Delay (s)	18.7		18.1			7.2
Approach LOS	B		B			A

Intersection Summary			
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	61.7	Sum of lost time (s)	13.0
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	1	15	75	1	65	10	620	100	60	565	1
Future Volume (vph)	15	1	15	75	1	65	10	620	100	60	565	1
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5			4.5		4.0	4.5		4.0	4.5	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.93			0.94		1.00	0.98		1.00	1.00	
Flt Protected		0.98			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1597			1590		1662	3228		1662	3166	
Flt Permitted		0.85			0.82		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1394			1334		1662	3228		1662	3166	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	15	1	15	77	1	67	10	639	103	62	582	1
RTOR Reduction (vph)	0	12	0	0	47	0	0	15	0	0	0	0
Lane Group Flow (vph)	0	19	0	0	98	0	10	727	0	62	583	0
Heavy Vehicles (%)	0%	0%	0%	1%	0%	0%	0%	1%	0%	0%	5%	0%
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4								
Actuated Green, G (s)		8.7			8.7		0.7	22.6		4.1	26.0	
Effective Green, g (s)		8.7			8.7		0.7	22.6		4.1	26.0	
Actuated g/C Ratio		0.18			0.18		0.01	0.47		0.08	0.54	
Clearance Time (s)		4.5			4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)		2.5			2.5		2.5	4.3		2.5	4.3	
Lane Grp Cap (vph)		250			239		24	1507		140	1700	
v/s Ratio Prot							0.01	c0.23		c0.04	c0.18	
v/s Ratio Perm		0.01			c0.07							
v/c Ratio		0.07			0.41		0.42	0.48		0.44	0.34	
Uniform Delay, d1		16.5			17.6		23.6	8.9		21.1	6.4	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1			0.8		8.3	0.4		1.6	0.2	
Delay (s)		16.6			18.4		32.0	9.3		22.7	6.5	
Level of Service		B			B		C	A		C	A	
Approach Delay (s)		16.6			18.4			9.6			8.1	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	48.4	Sum of lost time (s)	13.0
Intersection Capacity Utilization	48.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	7.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	55	1	185	5	1	1	335	380	10	1	260	65
Future Vol, veh/h	55	1	185	5	1	1	335	380	10	1	260	65
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Free	-	-	None	-	-	Yield	-	-	Free
Storage Length	-	-	300	-	-	-	275	-	0	100	-	75
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	8	0	5	0	0	0	2	1	0	0	2	5
Mvmt Flow	57	1	191	5	1	1	345	392	10	1	268	67

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1354	1352	-	1353	1352	392	268	0	0	392	0	0
Stage 1	270	270	-	1082	1082	-	-	-	-	-	-	-
Stage 2	1084	1082	-	271	270	-	-	-	-	-	-	-
Critical Hdwy	7.18	6.5	-	7.1	6.5	6.2	4.12	-	-	4.1	-	-
Critical Hdwy Stg 1	6.18	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.18	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.572	4	-	3.5	4	3.3	2.218	-	-	2.2	-	-
Pot Cap-1 Maneuver	123	151	0	128	151	661	1296	-	-	1178	-	0
Stage 1	723	690	0	266	296	-	-	-	-	-	-	0
Stage 2	256	296	0	739	690	-	-	-	-	-	-	0
Platoon blocked, %								-	-		-	
Mov Cap-1 Maneuver	97	111	-	101	111	661	1296	-	-	1178	-	-
Mov Cap-2 Maneuver	97	111	-	101	111	-	-	-	-	-	-	-
Stage 1	531	689	-	195	217	-	-	-	-	-	-	-
Stage 2	187	217	-	737	689	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	86.1	37.8	4.1	0
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT
Capacity (veh/h)	1296	-	-	97	-	117	1178	-
HCM Lane V/C Ratio	0.266	-	-	0.595	-	0.062	0.001	-
HCM Control Delay (s)	8.8	-	-	86.1	0	37.8	8.1	-
HCM Lane LOS	A	-	-	F	A	E	A	-
HCM 95th %tile Q(veh)	1.1	-	-	2.8	-	0.2	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	420	25	190	695	15	25	1	165	40	5	5
Future Volume (vph)	5	420	25	190	695	15	25	1	165	40	5	5
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	6.0		4.5	6.0	6.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.97	
Satd. Flow (prot)	1662	2962		1662	3260	1488	1662	1474		1579	1566	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.74	1.00		0.31	0.57	
Satd. Flow (perm)	1662	2962		1662	3260	1488	1294	1474		516	921	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	5	438	26	198	724	16	26	1	172	42	5	5
RTOR Reduction (vph)	0	2	0	0	0	4	0	153	0	0	4	0
Lane Group Flow (vph)	5	462	0	198	724	12	26	20	0	26	22	0
Heavy Vehicles (%)	0%	12%	0%	0%	2%	0%	0%	0%	1%	0%	0%	0%
Turn Type	Prot	NA		Prot	NA	Prot	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6	6		8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	1.3	71.9		18.7	89.3	89.3	12.9	12.9		12.9	12.9	
Effective Green, g (s)	1.3	71.9		18.7	89.3	89.3	12.9	12.9		12.9	12.9	
Actuated g/C Ratio	0.01	0.61		0.16	0.76	0.76	0.11	0.11		0.11	0.11	
Clearance Time (s)	4.5	6.0		4.5	6.0	6.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	4.5		2.5	4.5	4.5	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	18	1804		263	2467	1126	141	161		56	100	
v/s Ratio Prot	0.00	0.16		c0.12	c0.22	0.01		0.01				
v/s Ratio Perm							0.02			c0.05	0.02	
v/c Ratio	0.28	0.26		0.75	0.29	0.01	0.18	0.12		0.46	0.22	
Uniform Delay, d1	57.9	10.7		47.4	4.5	3.5	47.8	47.4		49.3	47.9	
Progression Factor	1.00	1.00		0.92	1.67	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.0	0.3		9.6	0.3	0.0	0.5	0.3		4.4	0.8	
Delay (s)	63.9	11.0		53.4	7.8	3.5	48.2	47.7		53.7	48.7	
Level of Service	E	B		D	A	A	D	D		D	D	
Approach Delay (s)		11.6			17.3			47.8			51.2	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	118.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	55.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	600	35	75	855	190	45	20	115	240	20	25
Future Volume (vph)	10	600	35	75	855	190	45	20	115	240	20	25
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.97		1.00	0.87		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1409	3173		1662	3208		1662	1513		1662	1602	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1409	3173		1662	3208		1662	1513		1662	1602	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	11	638	37	80	910	202	48	21	122	255	21	27
RTOR Reduction (vph)	0	3	0	0	10	0	0	109	0	0	21	0
Lane Group Flow (vph)	11	672	0	80	1102	0	48	34	0	255	27	0
Heavy Vehicles (%)	18%	4%	3%	0%	1%	0%	0%	0%	1%	0%	0%	0%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	1.5	57.6		9.3	65.4		7.2	12.3		20.3	25.4	
Effective Green, g (s)	2.0	58.6		9.8	66.4		7.7	12.8		20.8	25.9	
Actuated g/C Ratio	0.02	0.50		0.08	0.56		0.07	0.11		0.18	0.22	
Clearance Time (s)	4.5	5.0		4.5	5.0		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	2.5	5.2		2.5	5.2		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	23	1575		138	1805		108	164		292	351	
v/s Ratio Prot	0.01	0.21		c0.05	c0.34		0.03	c0.02		c0.15	0.02	
v/s Ratio Perm												
v/c Ratio	0.48	0.43		0.58	0.61		0.44	0.21		0.87	0.08	
Uniform Delay, d1	57.5	19.0		52.1	17.2		53.1	48.0		47.3	36.6	
Progression Factor	1.22	0.82		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.8	0.8		4.8	1.5		2.1	0.5		23.6	0.1	
Delay (s)	81.0	16.5		56.9	18.7		55.2	48.4		70.9	36.6	
Level of Service	F	B		E	B		E	D		E	D	
Approach Delay (s)		17.5			21.3			50.1			65.5	
Approach LOS		B			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	28.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	118.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	940	1100	75	15	20
Future Vol, veh/h	15	940	1100	75	15	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	2	1	2	0	0
Mvmt Flow	16	1022	1196	82	16	22

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1277	0	-	0	1779	639
Stage 1	-	-	-	-	1236	-
Stage 2	-	-	-	-	543	-
Critical Hdwy	4.1	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	550	-	-	-	75	424
Stage 1	-	-	-	-	241	-
Stage 2	-	-	-	-	552	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	550	-	-	-	73	424
Mov Cap-2 Maneuver	-	-	-	-	179	-
Stage 1	-	-	-	-	241	-
Stage 2	-	-	-	-	536	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	20.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	550	-	-	-	267
HCM Lane V/C Ratio	0.03	-	-	-	0.142
HCM Control Delay (s)	11.7	-	-	-	20.7
HCM Lane LOS	B	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	20	30	185	10	55	50	675	175	55	955	20
Future Volume (vph)	50	20	30	185	10	55	50	675	175	55	955	20
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.91		1.00	0.87		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1662	1594		1662	1529		1662	3260	1488	1662	3282	
Flt Permitted	0.71	1.00		0.72	1.00		0.17	1.00	1.00	0.31	1.00	
Satd. Flow (perm)	1245	1594		1263	1529		298	3260	1488	541	3282	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	54	22	32	199	11	59	54	726	188	59	1027	22
RTOR Reduction (vph)	0	23	0	0	43	0	0	0	99	0	2	0
Lane Group Flow (vph)	54	31	0	199	27	0	54	726	89	59	1047	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	1%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Prot	pm+pt	NA	
Protected Phases		8			4		1	6	6	5	2	
Permitted Phases	8			4			6			2		
Actuated Green, G (s)	16.7	16.7		16.7	16.7		32.3	28.7	28.7	32.3	28.7	
Effective Green, g (s)	17.7	17.7		17.7	17.7		34.3	30.7	30.7	34.3	30.7	
Actuated g/C Ratio	0.27	0.27		0.27	0.27		0.53	0.47	0.47	0.53	0.47	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	6.0	6.0	5.0	6.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	4.8	4.8	2.5	4.8	
Lane Grp Cap (vph)	339	434		343	416		253	1539	702	364	1550	
v/s Ratio Prot		0.02			0.02		c0.02	0.22	0.06	0.01	c0.32	
v/s Ratio Perm	0.04			c0.16			0.10			0.07		
v/c Ratio	0.16	0.07		0.58	0.07		0.21	0.47	0.13	0.16	0.68	
Uniform Delay, d1	18.0	17.5		20.4	17.5		8.6	11.6	9.6	7.7	13.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.1		2.1	0.0		0.3	0.4	0.2	0.2	1.5	
Delay (s)	18.2	17.6		22.5	17.6		8.9	12.1	9.8	7.9	14.8	
Level of Service	B	B		C	B		A	B	A	A	B	
Approach Delay (s)		17.9			21.2			11.5			14.4	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	445	90	80	370	35	110	30	75	55	50	25
Future Volume (vph)	20	445	90	80	370	35	110	30	75	55	50	25
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	0.89		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1568	3214		1646	3178		1646	1540		1662	1663	
Flt Permitted	0.48	1.00		0.32	1.00		0.70	1.00		0.68	1.00	
Satd. Flow (perm)	792	3214		557	3178		1213	1540		1187	1663	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	24	524	106	94	435	41	129	35	88	65	59	29
RTOR Reduction (vph)	0	18	0	0	7	0	0	68	0	0	22	0
Lane Group Flow (vph)	24	612	0	94	469	0	129	55	0	65	66	0
Heavy Vehicles (%)	6%	1%	0%	1%	3%	6%	1%	0%	2%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	19.9	19.1		25.7	22.0		10.2	10.2		10.2	10.2	
Effective Green, g (s)	19.9	20.1		25.7	23.0		10.7	10.7		10.7	10.7	
Actuated g/C Ratio	0.43	0.43		0.55	0.49		0.23	0.23		0.23	0.23	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	352	1389		394	1571		279	354		273	382	
v/s Ratio Prot	0.00	c0.19		c0.02	0.15			0.04			0.04	
v/s Ratio Perm	0.03			0.11			c0.11			0.05		
v/c Ratio	0.07	0.44		0.24	0.30		0.46	0.16		0.24	0.17	
Uniform Delay, d1	7.7	9.3		5.2	7.0		15.4	14.3		14.6	14.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.2		0.2	0.1		0.9	0.2		0.3	0.2	
Delay (s)	7.8	9.4		5.5	7.0		16.3	14.4		14.9	14.5	
Level of Service	A	A		A	A		B	B		B	B	
Approach Delay (s)		9.4			6.8			15.4			14.7	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	9.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	46.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	44.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	240	645	70	325	735	350	100	250	235	400	400	370
Future Volume (vph)	240	645	70	325	735	350	100	250	235	400	400	370
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0	5.0	4.0	4.0	5.0	4.0	4.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1646	3215		1662	3260	1473	1614	3325	1488	3193	3325	1473
Flt Permitted	0.21	1.00		0.19	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	366	3215		325	3260	1473	1614	3325	1488	3193	3325	1473
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	247	665	72	335	758	361	103	258	242	412	412	381
RTOR Reduction (vph)	0	6	0	0	0	110	0	0	209	0	0	79
Lane Group Flow (vph)	247	731	0	335	758	251	103	258	33	412	412	302
Heavy Vehicles (%)	1%	2%	1%	0%	2%	1%	3%	0%	0%	1%	0%	1%
Turn Type	pm+pt	NA		pm+pt	NA	pt+ov	Prot	NA	Perm	Prot	NA	pt+ov
Protected Phases	5	2		1	6	6 7	3	8		7	4	4 5
Permitted Phases	2			6					8			
Actuated Green, G (s)	45.1	29.3		48.8	30.9	52.7	11.4	13.3	13.3	16.8	18.7	39.5
Effective Green, g (s)	47.1	30.3		49.8	31.9	52.7	11.9	14.3	13.3	17.3	19.7	39.5
Actuated g/C Ratio	0.49	0.31		0.52	0.33	0.55	0.12	0.15	0.14	0.18	0.20	0.41
Clearance Time (s)	5.0	5.0		4.5	5.0		4.5	5.0	5.0	4.5	5.0	
Vehicle Extension (s)	2.5	4.2		2.5	4.2		2.5	2.5	2.5	2.5	2.5	
Lane Grp Cap (vph)	402	1011		423	1079	806	199	493	205	573	680	604
v/s Ratio Prot	0.11	0.23		c0.15	0.23	0.17	0.06	0.08		c0.13	c0.12	0.21
v/s Ratio Perm	0.19			c0.26					0.02			
v/c Ratio	0.61	0.72		0.79	0.70	0.31	0.52	0.52	0.16	0.72	0.61	0.50
Uniform Delay, d1	16.2	29.3		17.3	28.1	11.9	39.5	37.9	36.6	37.2	34.8	21.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.4	2.8		9.5	2.3	0.3	1.7	0.8	0.3	4.0	1.3	0.5
Delay (s)	18.6	32.1		26.8	30.4	12.2	41.2	38.6	36.9	41.2	36.1	21.5
Level of Service	B	C		C	C	B	D	D	D	D	D	C
Approach Delay (s)		28.7			25.0			38.4			33.2	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	30.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	96.3	Sum of lost time (s)	19.0
Intersection Capacity Utilization	74.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	80	80	35	505	605	190
Future Vol, veh/h	80	80	35	505	605	190
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	250	0	350	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	1	0	0	2	0	1
Mvmt Flow	88	88	38	555	665	209

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1123	437	874	0	-	0
Stage 1	769	-	-	-	-	-
Stage 2	354	-	-	-	-	-
Critical Hdwy	6.82	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.82	-	-	-	-	-
Critical Hdwy Stg 2	5.82	-	-	-	-	-
Follow-up Hdwy	3.51	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	201	573	781	-	-	-
Stage 1	420	-	-	-	-	-
Stage 2	684	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	191	573	781	-	-	-
Mov Cap-2 Maneuver	191	-	-	-	-	-
Stage 1	420	-	-	-	-	-
Stage 2	651	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	25.7	0.6	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	781	-	191	573	-	-
HCM Lane V/C Ratio	0.049	-	0.46	0.153	-	-
HCM Control Delay (s)	9.8	-	39	12.4	-	-
HCM Lane LOS	A	-	E	B	-	-
HCM 95th %tile Q(veh)	0.2	-	2.2	0.5	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	480	85	30	280	5	65	25	45	15	45	125
Future Volume (vph)	50	480	85	30	280	5	65	25	45	15	45	125
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt		0.98		1.00	1.00		1.00	0.90		1.00	0.89	
Flt Protected		1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3238		1662	3252		1662	1560		1458	1537	
Flt Permitted		0.90		0.33	1.00		0.49	1.00		0.71	1.00	
Satd. Flow (perm)		2930		570	3252		864	1560		1083	1537	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	57	545	97	34	318	6	74	28	51	17	51	142
RTOR Reduction (vph)	0	14	0	0	1	0	0	35	0	0	107	0
Lane Group Flow (vph)	0	685	0	34	323	0	74	44	0	17	86	0
Heavy Vehicles (%)	0%	0%	1%	0%	2%	0%	0%	0%	2%	14%	2%	1%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		2			6		3	8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		20.1		20.1	20.1		18.3	14.6		12.5	11.7	
Effective Green, g (s)		21.1		21.1	21.1		19.3	15.1		13.5	12.2	
Actuated g/C Ratio		0.43		0.43	0.43		0.39	0.31		0.27	0.25	
Clearance Time (s)		5.0		5.0	5.0		4.5	4.5		4.5	4.5	
Vehicle Extension (s)		4.5		4.5	4.5		2.5	2.5		2.5	3.0	
Lane Grp Cap (vph)		1248		242	1386		404	475		305	378	
v/s Ratio Prot					0.10		c0.02	0.03		0.00	c0.06	
v/s Ratio Perm		c0.23		0.06			0.06			0.01		
v/c Ratio		0.55		0.14	0.23		0.18	0.09		0.06	0.23	
Uniform Delay, d1		10.6		8.7	9.0		9.8	12.3		13.2	14.9	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.7		0.5	0.1		0.2	0.1		0.1	0.3	
Delay (s)		11.4		9.1	9.2		9.9	12.4		13.3	15.2	
Level of Service		B		A	A		A	B		B	B	
Approach Delay (s)		11.4			9.2			11.2			15.0	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	11.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	49.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	105	280	50	95	60	200	650	35	30	565	70
Future Volume (vph)	145	105	280	50	95	60	200	650	35	30	565	70
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.94		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1646	1733	1488	1662	1630		1662	3258		1662	3209	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1646	1733	1488	1662	1630		1662	3258		1662	3209	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	153	111	295	53	100	63	211	684	37	32	595	74
RTOR Reduction (vph)	0	0	221	0	20	0	0	3	0	0	8	0
Lane Group Flow (vph)	153	111	74	53	143	0	211	718	0	32	661	0
Heavy Vehicles (%)	1%	1%	0%	0%	0%	3%	0%	1%	6%	0%	2%	1%
Turn Type	Prot	NA	Prot	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	3	8	8	7	4		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	13.6	22.5	22.5	6.7	15.6		16.1	40.7		4.3	28.9	
Effective Green, g (s)	14.6	23.5	23.5	7.7	16.6		17.1	41.7		5.3	29.9	
Actuated g/C Ratio	0.15	0.25	0.25	0.08	0.18		0.18	0.44		0.06	0.32	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5		2.5	4.3		2.5	4.3	
Lane Grp Cap (vph)	255	432	371	135	287		301	1442		93	1018	
v/s Ratio Prot	c0.09	0.06	0.05	0.03	c0.09		c0.13	0.22		0.02	c0.21	
v/s Ratio Perm												
v/c Ratio	0.60	0.26	0.20	0.39	0.50		0.70	0.50		0.34	0.65	
Uniform Delay, d1	37.1	28.3	27.9	41.0	35.0		36.2	18.8		42.8	27.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.2	0.2	0.2	1.4	1.0		6.7	0.4		1.6	1.7	
Delay (s)	40.2	28.6	28.1	42.4	36.0		42.8	19.2		44.4	29.4	
Level of Service	D	C	C	D	D		D	B		D	C	
Approach Delay (s)		31.5			37.6			24.5			30.0	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	94.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Intersection Delay, s/veh	8.3
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations																
Traffic Vol, veh/h	0	15	70	35	0	25	55	10	0	40	45	45	0	20	60	20
Future Vol, veh/h	0	15	70	35	0	25	55	10	0	40	45	45	0	20	60	20
Peak Hour Factor	0.92	0.93	0.93	0.93	0.92	0.93	0.93	0.93	0.92	0.93	0.93	0.93	0.92	0.93	0.93	0.93
Heavy Vehicles, %	2	0	3	3	2	0	4	0	2	3	0	5	2	0	0	0
Mvmt Flow	0	16	75	38	0	27	59	11	0	43	48	48	0	22	65	22
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.3	8.3	8.4	8.2
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	31%	12%	28%	20%
Vol Thru, %	35%	58%	61%	60%
Vol Right, %	35%	29%	11%	20%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	130	120	90	100
LT Vol	40	15	25	20
Through Vol	45	70	55	60
RT Vol	45	35	10	20
Lane Flow Rate	140	129	97	108
Geometry Grp	1	1	1	1
Degree of Util (X)	0.173	0.159	0.124	0.134
Departure Headway (Hd)	4.448	4.429	4.601	4.499
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	807	809	779	797
Service Time	2.476	2.457	2.632	2.529
HCM Lane V/C Ratio	0.173	0.159	0.125	0.136
HCM Control Delay	8.4	8.3	8.3	8.2
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.6	0.6	0.4	0.5

Intersection	
Intersection Delay, s/veh	8.1
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations																
Traffic Vol, veh/h	0	25	10	0	0	50	25	35	0	1	35	20	0	35	60	30
Future Vol, veh/h	0	25	10	0	0	50	25	35	0	1	35	20	0	35	60	30
Peak Hour Factor	0.92	0.84	0.84	0.84	0.92	0.84	0.84	0.84	0.92	0.84	0.84	0.84	0.92	0.84	0.84	0.84
Heavy Vehicles, %	2	0	0	0	2	0	5	3	2	0	0	5	2	3	2	0
Mvmt Flow	0	30	12	0	0	60	30	42	0	1	42	24	0	42	71	36
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8	8.2	7.6	8.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	71%	45%	28%
Vol Thru, %	62%	29%	23%	48%
Vol Right, %	36%	0%	32%	24%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	56	35	110	125
LT Vol	1	25	50	35
Through Vol	35	10	25	60
RT Vol	20	0	35	30
Lane Flow Rate	67	42	131	149
Geometry Grp	1	1	1	1
Degree of Util (X)	0.079	0.054	0.158	0.179
Departure Headway (Hd)	4.246	4.671	4.33	4.33
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	845	768	830	830
Service Time	2.265	2.691	2.347	2.346
HCM Lane V/C Ratio	0.079	0.055	0.158	0.18
HCM Control Delay	7.6	8	8.2	8.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.2	0.6	0.6

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	70	85	50	85	45
Future Vol, veh/h	20	70	85	50	85	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	5	0	0	0	0	0
Mvmt Flow	22	75	91	54	91	48

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	353	116	140	0	-	0
Stage 1	116	-	-	-	-	-
Stage 2	237	-	-	-	-	-
Critical Hdwy	7.15	6.2	4.1	-	-	-
Critical Hdwy Stg 1	6.15	-	-	-	-	-
Critical Hdwy Stg 2	6.15	-	-	-	-	-
Follow-up Hdwy	3.545	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	596	942	1456	-	-	-
Stage 1	881	-	-	-	-	-
Stage 2	760	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	567	942	1456	-	-	-
Mov Cap-2 Maneuver	567	-	-	-	-	-
Stage 1	825	-	-	-	-	-
Stage 2	711	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10	4.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1456	-	821	-	-
HCM Lane V/C Ratio	0.063	-	0.118	-	-
HCM Control Delay (s)	7.6	0	10	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.4	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	1090	50	35	1295	10	110	5	50	10	1	10
Future Volume (vph)	40	1090	50	35	1295	10	110	5	50	10	1	10
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	
Frt	1.00	0.99		1.00	1.00			1.00	0.85		0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.98	
Satd. Flow (prot)	1662	3106		1662	3257			1623	1488		1599	
Flt Permitted	0.95	1.00		0.95	1.00			0.72	1.00		0.87	
Satd. Flow (perm)	1662	3106		1662	3257			1225	1488		1433	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	41	1124	52	36	1335	10	113	5	52	10	1	10
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	44	0	8	0
Lane Group Flow (vph)	41	1174	0	36	1345	0	0	118	8	0	13	0
Heavy Vehicles (%)	0%	2%	100%	0%	2%	0%	3%	0%	0%	0%	0%	0%
Turn Type	Prot	NA		Prot	NA		Perm	NA	Prot	Perm	NA	
Protected Phases	5	2		1	6			8	8		4	
Permitted Phases							8			4		
Actuated Green, G (s)	5.1	71.2		5.1	71.2			15.7	15.7		15.7	
Effective Green, g (s)	5.1	71.7		5.1	71.7			16.2	16.2		16.2	
Actuated g/C Ratio	0.05	0.68		0.05	0.68			0.15	0.15		0.15	
Clearance Time (s)	4.0	4.5		4.0	4.5			4.5	4.5		4.5	
Vehicle Extension (s)	2.5	4.0		2.5	4.0			2.5	2.5		2.5	
Lane Grp Cap (vph)	80	2120		80	2224			189	229		221	
v/s Ratio Prot	c0.02	0.38		0.02	c0.41				0.01			
v/s Ratio Perm								c0.10			0.01	
v/c Ratio	0.51	0.55		0.45	0.60			0.62	0.04		0.06	
Uniform Delay, d1	48.7	8.5		48.6	9.0			41.6	37.8		37.9	
Progression Factor	1.00	1.00		1.07	1.21			1.00	1.00		1.00	
Incremental Delay, d2	4.1	1.0		2.6	1.1			5.5	0.0		0.1	
Delay (s)	52.8	9.5		54.3	12.0			47.0	37.8		38.0	
Level of Service	D	A		D	B			D	D		D	
Approach Delay (s)		11.0			13.1			44.2			38.0	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	14.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	825	50	35	800	5	110	5	50	5	1	10
Future Volume (vph)	40	825	50	35	800	5	110	5	50	5	1	10
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (prot)	1662	3232		1662	3257			1623	1488		1680	1488
Flt Permitted	0.31	1.00		0.28	1.00			0.73	1.00		0.84	1.00
Satd. Flow (perm)	540	3232		493	3257			1244	1488		1476	1488
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	42	859	52	36	833	5	115	5	52	5	1	10
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	45	0	0	9
Lane Group Flow (vph)	42	908	0	36	838	0	0	120	7	0	6	1
Heavy Vehicles (%)	0%	2%	2%	0%	2%	0%	3%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Prot	Perm	NA	Prot
Protected Phases	5	2		1	6			8	8		4	4
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	76.9	73.3		76.9	73.3			15.1	15.1		15.1	15.1
Effective Green, g (s)	77.9	73.8		77.9	73.8			15.1	15.1		15.1	15.1
Actuated g/C Ratio	0.74	0.70		0.74	0.70			0.14	0.14		0.14	0.14
Clearance Time (s)	4.5	4.5		4.5	4.5			4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.5	3.0		2.5	3.0			2.5	2.5		2.0	2.0
Lane Grp Cap (vph)	444	2271		411	2289			178	213		212	213
v/s Ratio Prot	c0.00	c0.28		0.00	0.26				0.01			0.00
v/s Ratio Perm	0.07			0.06				c0.10			0.00	
v/c Ratio	0.09	0.40		0.09	0.37			0.67	0.04		0.03	0.01
Uniform Delay, d1	3.8	6.4		3.8	6.2			42.6	38.7		38.6	38.5
Progression Factor	2.11	2.48		1.02	1.07			1.00	1.00		1.00	1.00
Incremental Delay, d2	0.1	0.5		0.0	0.0			8.8	0.0		0.0	0.0
Delay (s)	8.0	16.5		3.9	6.7			51.4	38.7		38.7	38.5
Level of Service	A	B		A	A			D	D		D	D
Approach Delay (s)		16.1			6.6			47.6			38.6	
Approach LOS		B			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	195	235	425	155	195	60	420	675	95	45	660	175
Future Volume (vph)	195	235	425	155	195	60	420	675	95	45	660	175
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	1750	1458	1646	1680		3162	3231		1662	3189	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1662	1750	1458	1646	1680		3162	3231		1662	3189	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	203	245	443	161	203	62	438	703	99	47	688	182
RTOR Reduction (vph)	0	0	84	0	11	0	0	10	0	0	21	0
Lane Group Flow (vph)	203	245	359	161	255	0	438	792	0	47	849	0
Heavy Vehicles (%)	0%	0%	2%	1%	0%	2%	2%	1%	1%	0%	1%	1%
Turn Type	Prot	NA	pt+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	3	8	8 1	7	4		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	17.0	20.8	41.2	13.9	17.7		15.9	45.5		6.8	36.4	
Effective Green, g (s)	17.5	21.3	41.7	14.4	18.2		16.4	46.0		7.3	36.9	
Actuated g/C Ratio	0.17	0.20	0.40	0.14	0.17		0.16	0.44		0.07	0.35	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	2.5	3.0		2.5	2.5		2.5	4.6		2.5	4.6	
Lane Grp Cap (vph)	277	355	579	225	291		493	1415		115	1120	
v/s Ratio Prot	c0.12	c0.14	0.25	0.10	c0.15		c0.14	0.25		0.03	c0.27	
v/s Ratio Perm												
v/c Ratio	0.73	0.69	0.62	0.72	0.88		0.89	0.56		0.41	0.76	
Uniform Delay, d1	41.5	38.8	25.3	43.3	42.3		43.4	22.0		46.8	30.1	
Progression Factor	1.31	0.82	0.66	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.6	5.4	2.0	9.7	24.2		17.4	1.6		1.7	4.8	
Delay (s)	63.1	37.3	18.7	53.0	66.5		60.8	23.6		48.5	34.9	
Level of Service	E	D	B	D	E		E	C		D	C	
Approach Delay (s)		33.9			61.4			36.7			35.6	
Approach LOS		C			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	38.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	80	165	90	5	5	40
Future Vol, veh/h	80	165	90	5	5	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	72	72	72	72	72	72
Heavy Vehicles, %	1	0	1	0	0	3
Mvmt Flow	111	229	125	7	7	56

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	132	0	-	0	579	128
Stage 1	-	-	-	-	128	-
Stage 2	-	-	-	-	451	-
Critical Hdwy	4.11	-	-	-	6.4	6.23
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.209	-	-	-	3.5	3.327
Pot Cap-1 Maneuver	1459	-	-	-	481	919
Stage 1	-	-	-	-	903	-
Stage 2	-	-	-	-	646	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1459	-	-	-	439	919
Mov Cap-2 Maneuver	-	-	-	-	439	-
Stage 1	-	-	-	-	903	-
Stage 2	-	-	-	-	590	-

Approach	EB	WB	SB
HCM Control Delay, s	2.5	0	9.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1459	-	-	-	819
HCM Lane V/C Ratio	0.076	-	-	-	0.076
HCM Control Delay (s)	7.7	0	-	-	9.8
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.2	-	-	-	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	20	120	45	15	65	205	470	20	70	595	40
Future Volume (vph)	25	20	120	45	15	65	205	470	20	70	595	40
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.87		1.00	0.88		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	1525		1662	1537		1630	1739		1662	1718	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1662	1525		1662	1537		1630	1739		1662	1718	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	28	23	136	51	17	74	233	534	23	80	676	45
RTOR Reduction (vph)	0	120	0	0	63	0	0	1	0	0	2	0
Lane Group Flow (vph)	28	39	0	51	28	0	233	556	0	80	719	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%	1%	0%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	2.8	9.7		4.8	11.7		16.0	46.2		7.8	38.0	
Effective Green, g (s)	2.8	10.2		4.8	12.2		16.0	46.7		7.8	38.5	
Actuated g/C Ratio	0.03	0.12		0.06	0.14		0.19	0.55		0.09	0.45	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	4.5		2.5	4.5	
Lane Grp Cap (vph)	54	181		93	219		305	949		151	773	
v/s Ratio Prot	0.02	c0.03		c0.03	0.02		c0.14	0.32		0.05	c0.42	
v/s Ratio Perm												
v/c Ratio	0.52	0.22		0.55	0.13		0.76	0.59		0.53	0.93	
Uniform Delay, d1	40.7	34.0		39.3	32.0		33.0	12.9		37.1	22.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.1	0.4		5.1	0.2		10.4	1.3		2.5	17.8	
Delay (s)	46.8	34.5		44.4	32.2		43.3	14.2		39.6	40.1	
Level of Service	D	C		D	C		D	B		D	D	
Approach Delay (s)		36.3			36.6			22.8			40.0	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	32.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	85.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Intersection Delay, s/veh	8.3
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations																
Traffic Vol, veh/h	0	20	35	1	0	1	40	35	0	5	10	5	0	40	15	15
Future Vol, veh/h	0	20	35	1	0	1	40	35	0	5	10	5	0	40	15	15
Peak Hour Factor	0.92	0.72	0.72	0.72	0.92	0.72	0.72	0.72	0.92	0.72	0.72	0.72	0.92	0.72	0.72	0.72
Heavy Vehicles, %	2	0	6	0	2	0	0	6	2	0	0	0	2	3	8	8
Mvmt Flow	0	28	49	1	0	1	56	49	0	7	14	7	0	56	21	21
Number of Lanes	0	1	1	0	0	0	1	0	0	0	1	0	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	2
HCM Control Delay	8.2	8.4	8.2	8.4
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	25%	100%	0%	1%	100%	0%
Vol Thru, %	50%	0%	97%	53%	0%	50%
Vol Right, %	25%	0%	3%	46%	0%	50%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	20	20	36	76	40	30
LT Vol	5	20	0	1	40	0
Through Vol	10	0	35	40	0	15
RT Vol	5	0	1	35	0	15
Lane Flow Rate	28	28	50	106	56	42
Geometry Grp	6	7	7	6	7	7
Degree of Util (X)	0.038	0.042	0.069	0.136	0.085	0.055
Departure Headway (Hd)	4.979	5.417	4.998	4.648	5.533	4.765
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	721	663	719	774	650	754
Service Time	2.996	3.13	2.711	2.66	3.247	2.479
HCM Lane V/C Ratio	0.039	0.042	0.07	0.137	0.086	0.056
HCM Control Delay	8.2	8.4	8.1	8.4	8.8	7.8
HCM Lane LOS	A	A	A	A	A	A
HCM 95th-tile Q	0.1	0.1	0.2	0.5	0.3	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	1	140	1	1	1	125	1080	0	0	1145	25
Future Volume (vph)	10	1	140	1	1	1	125	1080	0	0	1145	25
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0		4.0	4.0			4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95			0.95	
Frt		0.87			0.95		1.00	1.00			1.00	
Flt Protected		1.00			0.98		0.95	1.00			1.00	
Satd. Flow (prot)		1498			1612		1599	3260			3251	
Flt Permitted		0.98			0.94		0.12	1.00			1.00	
Satd. Flow (perm)		1475			1537		207	3260			3251	
Peak-hour factor, PHF	0.90	0.92	0.90	0.92	0.92	0.92	0.90	0.90	0.92	0.92	0.90	0.90
Adj. Flow (vph)	11	1	156	1	1	1	139	1200	0	0	1272	28
RTOR Reduction (vph)	0	133	0	0	1	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	35	0	0	2	0	139	1200	0	0	1299	0
Heavy Vehicles (%)	0%	2%	2%	2%	2%	2%	4%	2%	2%	2%	2%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4			6			2		
Actuated Green, G (s)		8.6			8.6		46.2	46.2			36.0	
Effective Green, g (s)		9.6			9.6		46.7	47.2			37.0	
Actuated g/C Ratio		0.15			0.15		0.72	0.73			0.57	
Clearance Time (s)		5.0			5.0		4.5	5.0			5.0	
Vehicle Extension (s)		2.5			2.5		2.5	3.0			2.2	
Lane Grp Cap (vph)		218			227		282	2374			1856	
v/s Ratio Prot							0.05	c0.37			c0.40	
v/s Ratio Perm		c0.02			0.00		0.31					
v/c Ratio		0.16			0.01		0.49	0.51			0.70	
Uniform Delay, d1		24.1			23.5		6.4	3.8			9.9	
Progression Factor		1.00			1.00		1.00	1.00			1.00	
Incremental Delay, d2		0.3			0.0		1.0	0.2			1.0	
Delay (s)		24.3			23.6		7.4	4.0			10.9	
Level of Service		C			C		A	A			B	
Approach Delay (s)		24.3			23.6			4.3			10.9	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	8.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	64.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	5	1	2	2	25	2	25	5	40	55	5
Future Vol, veh/h	1	5	1	2	2	25	2	25	5	40	55	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	72	72	72	72	72	72	72	72	72	72	72	72
Heavy Vehicles, %	0	20	0	0	0	0	0	4	0	3	0	0
Mvmt Flow	1	7	1	3	3	35	3	35	7	56	76	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	254	238	80	239	238	38	83	0	0	42	0	0
Stage 1	191	191	-	44	44	-	-	-	-	-	-	-
Stage 2	63	47	-	195	194	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.7	6.2	7.1	6.5	6.2	4.1	-	-	4.13	-	-
Critical Hdwy Stg 1	6.1	5.7	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.7	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.18	3.3	3.5	4	3.3	2.2	-	-	2.227	-	-
Pot Cap-1 Maneuver	703	633	986	719	666	1040	1527	-	-	1561	-	-
Stage 1	815	710	-	975	862	-	-	-	-	-	-	-
Stage 2	953	821	-	811	744	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	657	608	986	690	639	1040	1527	-	-	1561	-	-
Mov Cap-2 Maneuver	657	608	-	690	639	-	-	-	-	-	-	-
Stage 1	813	683	-	973	860	-	-	-	-	-	-	-
Stage 2	916	819	-	771	716	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.6	8.9	0.5	3
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1527	-	-	651	965	1561	-	-
HCM Lane V/C Ratio	0.002	-	-	0.015	0.042	0.036	-	-
HCM Control Delay (s)	7.4	0	-	10.6	8.9	7.4	0	-
HCM Lane LOS	A	A	-	B	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	3.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	155	5	280	260	10	180
Future Vol, veh/h	155	5	280	260	10	180
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Free	-	None	-	Free
Storage Length	-	-	225	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	1	33	3	1	40	3
Mvmt Flow	167	5	301	280	11	194

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	167	0	909	-
Stage 1	-	-	-	-	167	-
Stage 2	-	-	-	-	742	-
Critical Hdwy	-	-	4.145	-	7.2	-
Critical Hdwy Stg 1	-	-	-	-	6	-
Critical Hdwy Stg 2	-	-	-	-	6.4	-
Follow-up Hdwy	-	-	2.2285	-	3.88	-
Pot Cap-1 Maneuver	-	0	1403	-	236	0
Stage 1	-	0	-	-	768	0
Stage 2	-	0	-	-	360	0
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	1403	-	185	-
Mov Cap-2 Maneuver	-	-	-	-	185	-
Stage 1	-	-	-	-	768	-
Stage 2	-	-	-	-	283	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.3	25.7
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	WBL	WBT
Capacity (veh/h)	185	-	-	1403	-
HCM Lane V/C Ratio	0.058	-	-	0.215	-
HCM Control Delay (s)	25.7	0	-	8.3	-
HCM Lane LOS	D	A	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.8	-

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	320	5	65	510	55	2	1	45	45	5	25
Future Vol, veh/h	10	320	5	65	510	55	2	1	45	45	5	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	2	3	0	0	0	0	2	0	0
Mvmt Flow	11	348	5	71	554	60	2	1	49	49	5	27

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	614	0	0	353	0	0	793	1127	177	922	1101	307
Stage 1	-	-	-	-	-	-	372	372	-	726	726	-
Stage 2	-	-	-	-	-	-	421	755	-	196	375	-
Critical Hdwy	4.1	-	-	4.14	-	-	7.5	6.5	6.9	7.54	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.54	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.54	5.5	-
Follow-up Hdwy	2.2	-	-	2.22	-	-	3.5	4	3.3	3.52	4	3.3
Pot Cap-1 Maneuver	975	-	-	1202	-	-	283	206	842	225	214	695
Stage 1	-	-	-	-	-	-	626	622	-	382	433	-
Stage 2	-	-	-	-	-	-	586	420	-	787	621	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	975	-	-	1202	-	-	252	192	842	200	199	695
Mov Cap-2 Maneuver	-	-	-	-	-	-	252	192	-	200	199	-
Stage 1	-	-	-	-	-	-	619	615	-	378	407	-
Stage 2	-	-	-	-	-	-	523	395	-	732	614	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.8	10.4	24.8
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	721	975	-	-	1202	-	-	262
HCM Lane V/C Ratio	0.072	0.011	-	-	0.059	-	-	0.311
HCM Control Delay (s)	10.4	8.7	-	-	8.2	-	-	24.8
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.2	0	-	-	0.2	-	-	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	215	385	1	1	555	435	5	5	5	300	1	320
Future Volume (vph)	215	385	1	1	555	435	5	5	5	300	1	320
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.95		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98		0.95	1.00	
Satd. Flow (prot)	1662	3259		1662	3292	1473		1644		1662	1488	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.91		0.75	1.00	
Satd. Flow (perm)	1662	3259		1662	3292	1473		1524		1308	1488	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	226	405	1	1	584	458	5	5	5	316	1	337
RTOR Reduction (vph)	0	0	0	0	0	205	0	3	0	0	233	0
Lane Group Flow (vph)	226	406	0	1	584	253	0	12	0	316	105	0
Heavy Vehicles (%)	0%	2%	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%
Turn Type	Prot	NA		Prot	NA	Prot	Perm	NA		Perm	NA	
Protected Phases	1	6		5	2	2		4			4	
Permitted Phases							4			4		
Actuated Green, G (s)	18.5	49.3		0.9	31.7	31.7		28.0		28.0	28.0	
Effective Green, g (s)	18.5	50.8		0.9	33.2	33.2		28.5		28.5	28.5	
Actuated g/C Ratio	0.20	0.55		0.01	0.36	0.36		0.31		0.31	0.31	
Clearance Time (s)	4.0	5.5		4.0	5.5	5.5		4.5		4.5	4.5	
Vehicle Extension (s)	3.0	4.5		3.0	4.5	4.5		3.5		3.5	3.5	
Lane Grp Cap (vph)	333	1795		16	1185	530		471		404	459	
v/s Ratio Prot	c0.14	0.12		0.00	c0.18	0.17					0.07	
v/s Ratio Perm								0.01		c0.24		
v/c Ratio	0.68	0.23		0.06	0.49	0.48		0.02		0.78	0.23	
Uniform Delay, d1	34.1	10.6		45.2	23.0	22.8		22.2		29.0	23.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	5.4	0.1		1.6	0.6	1.2		0.0		9.8	0.3	
Delay (s)	39.5	10.7		46.9	23.5	24.0		22.2		38.8	24.0	
Level of Service	D	B		D	C	C		C		D	C	
Approach Delay (s)		21.0			23.7			22.2			31.1	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	92.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	795	20	40	865	1	55	1	75	1	1	1
Future Volume (vph)	1	795	20	40	865	1	55	1	75	1	1	1
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	0.85		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	3249		1614	3228		1662	1462		1662	1619	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1662	3249		1614	3228		1662	1462		1662	1619	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	1	914	23	46	994	1	63	1	86	1	1	1
RTOR Reduction (vph)	0	1	0	0	0	0	0	74	0	0	1	0
Lane Group Flow (vph)	1	936	0	46	995	0	63	13	0	1	1	0
Heavy Vehicles (%)	0%	2%	0%	3%	3%	0%	0%	0%	2%	0%	0%	0%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	0.6	32.2		3.2	34.8		5.0	8.2		0.6	3.8	
Effective Green, g (s)	0.6	33.2		3.2	35.8		5.0	8.7		0.6	4.3	
Actuated g/C Ratio	0.01	0.54		0.05	0.58		0.08	0.14		0.01	0.07	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	2.5	4.2		2.5	4.2		3.0	3.0		2.5	2.5	
Lane Grp Cap (vph)	16	1748		83	1872		134	206		16	112	
v/s Ratio Prot	0.00	0.29		c0.03	c0.31		c0.04	c0.01		0.00	0.00	
v/s Ratio Perm												
v/c Ratio	0.06	0.54		0.55	0.53		0.47	0.06		0.06	0.01	
Uniform Delay, d1	30.3	9.2		28.6	7.9		27.1	23.0		30.3	26.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	0.4		6.3	0.4		2.6	0.1		1.2	0.0	
Delay (s)	31.5	9.7		34.8	8.3		29.7	23.1		31.5	26.7	
Level of Service	C	A		C	A		C	C		C	C	
Approach Delay (s)		9.7			9.4			25.9			28.3	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	61.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	20	850	875	50	105	35
Future Volume (vph)	20	850	875	50	105	35
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.5	4.0	4.0		4.0	3.5
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1662	3260	3237		1630	1444
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1662	3260	3237		1630	1444
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	23	966	994	57	119	40
RTOR Reduction (vph)	0	0	3	0	0	38
Lane Group Flow (vph)	23	966	1048	0	119	2
Heavy Vehicles (%)	0%	2%	2%	0%	2%	3%
Turn Type	Prot	NA	NA		Prot	pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases						1
Actuated Green, G (s)	3.0	36.8	30.3		7.6	3.0
Effective Green, g (s)	3.0	37.3	30.8		8.1	3.0
Actuated g/C Ratio	0.05	0.63	0.52		0.14	0.05
Clearance Time (s)	3.5	4.5	4.5		4.5	3.5
Vehicle Extension (s)	1.0	2.0	2.0		1.0	1.0
Lane Grp Cap (vph)	84	2060	1689		223	73
v/s Ratio Prot	0.01	c0.30	c0.32		c0.07	0.00
v/s Ratio Perm						
v/c Ratio	0.27	0.47	0.62		0.53	0.03
Uniform Delay, d1	27.0	5.7	10.0		23.7	26.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.6	0.1	0.5		1.2	0.1
Delay (s)	27.6	5.7	10.5		24.9	26.7
Level of Service	C	A	B		C	C
Approach Delay (s)		6.2	10.5		25.4	
Approach LOS		A	B		C	

Intersection Summary			
HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	59.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	41.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	775	5	5	625	10	5	1	1	15	1	30
Future Vol, veh/h	25	775	5	5	625	10	5	1	1	15	1	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	4	0	0	4	0	0	0	0	8	0	0
Mvmt Flow	26	807	5	5	651	10	5	1	1	16	1	31

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	661	0	0	813	0	0	1198	1534	406	1123	1532	331
Stage 1	-	-	-	-	-	-	862	862	-	667	667	-
Stage 2	-	-	-	-	-	-	336	672	-	456	865	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.66	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.66	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.66	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.58	4	3.3
Pot Cap-1 Maneuver	937	-	-	823	-	-	144	118	600	153	118	671
Stage 1	-	-	-	-	-	-	320	375	-	401	460	-
Stage 2	-	-	-	-	-	-	657	458	-	538	374	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	937	-	-	823	-	-	133	114	600	148	114	671
Mov Cap-2 Maneuver	-	-	-	-	-	-	133	114	-	148	114	-
Stage 1	-	-	-	-	-	-	311	365	-	390	457	-
Stage 2	-	-	-	-	-	-	621	455	-	521	364	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.1	31	19.4
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	146	937	-	-	823	-	-	297
HCM Lane V/C Ratio	0.05	0.028	-	-	0.006	-	-	0.161
HCM Control Delay (s)	31	9	-	-	9.4	-	-	19.4
HCM Lane LOS	D	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	670	80	15	550	1	55	5	25	5	5	30
Future Volume (vph)	35	670	80	15	550	1	55	5	25	5	5	30
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	5.0	5.0		5.0	5.0		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00		1.00	0.87		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1471	3156		1539	3166		1614	1529		1330	1522	
Flt Permitted	0.42	1.00		0.34	1.00		0.73	1.00		0.74	1.00	
Satd. Flow (perm)	655	3156		550	3166		1244	1529		1031	1522	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	38	736	88	16	604	1	60	5	27	5	5	33
RTOR Reduction (vph)	0	9	0	0	0	0	0	23	0	0	28	0
Lane Group Flow (vph)	38	815	0	16	605	0	60	9	0	5	10	0
Heavy Vehicles (%)	13%	4%	1%	8%	5%	0%	3%	0%	0%	25%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	26.8	26.8		26.8	26.8		6.7	6.7		6.7	6.7	
Effective Green, g (s)	26.8	26.8		26.8	26.8		6.7	6.7		6.7	6.7	
Actuated g/C Ratio	0.62	0.62		0.62	0.62		0.16	0.16		0.16	0.16	
Clearance Time (s)	5.0	5.0		5.0	5.0		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	4.8	4.8		4.8	4.8		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	408	1966		342	1973		193	238		160	237	
v/s Ratio Prot		c0.26			0.19			0.01			0.01	
v/s Ratio Perm	0.06			0.03			c0.05			0.00		
v/c Ratio	0.09	0.41		0.05	0.31		0.31	0.04		0.03	0.04	
Uniform Delay, d1	3.2	4.1		3.1	3.8		16.1	15.4		15.4	15.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.3		0.1	0.2		0.7	0.0		0.1	0.1	
Delay (s)	3.4	4.4		3.3	3.9		16.8	15.5		15.5	15.5	
Level of Service	A	A		A	A		B	B		B	B	
Approach Delay (s)		4.3			3.9			16.3			15.5	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	5.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	43.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	560	5	10	375	5	15
Future Vol, veh/h	560	5	10	375	5	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	4	14	13	5	17	7
Mvmt Flow	609	5	11	408	5	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	614	0	837	307
Stage 1	-	-	-	-	611	-
Stage 2	-	-	-	-	226	-
Critical Hdwy	-	-	4.36	-	7.14	7.04
Critical Hdwy Stg 1	-	-	-	-	6.14	-
Critical Hdwy Stg 2	-	-	-	-	6.14	-
Follow-up Hdwy	-	-	2.33	-	3.67	3.37
Pot Cap-1 Maneuver	-	-	890	-	277	674
Stage 1	-	-	-	-	465	-
Stage 2	-	-	-	-	747	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	890	-	274	674
Mov Cap-2 Maneuver	-	-	-	-	374	-
Stage 1	-	-	-	-	465	-
Stage 2	-	-	-	-	738	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	11.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	561	-	-	890	-
HCM Lane V/C Ratio	0.039	-	-	0.012	-
HCM Control Delay (s)	11.7	-	-	9.1	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	11.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	15	1105	5	65	105	0	0	5	90
Future Vol, veh/h	0	0	0	15	1105	5	65	105	0	0	5	90
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	6	2	0	0	0	0	0	33	0
Mvmt Flow	0	0	0	16	1201	5	71	114	0	0	5	98

Major/Minor				Major2			Minor1			Minor2		
Conflicting Flow All				0	0	0	636	1239	-	-	1236	603
Stage 1				-	-	-	0	0	-	-	1236	-
Stage 2				-	-	-	636	1239	-	-	0	-
Critical Hdwy				4.22	-	-	7.5	6.5	-	-	7.16	6.9
Critical Hdwy Stg 1				-	-	-	-	-	-	-	6.16	-
Critical Hdwy Stg 2				-	-	-	6.5	5.5	-	-	-	-
Follow-up Hdwy				2.26	-	-	3.5	4	-	-	4.33	3.3
Pot Cap-1 Maneuver				-	-	-	367	177	0	0	137	447
Stage 1				-	-	-	-	-	0	0	193	-
Stage 2				-	-	-	437	250	0	0	-	-
Platoon blocked, %					-	-						
Mov Cap-1 Maneuver				-	-	-	278	177	-	-	137	447
Mov Cap-2 Maneuver				-	-	-	278	177	-	-	137	-
Stage 1				-	-	-	-	-	-	-	193	-
Stage 2				-	-	-	332	250	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s		86.4	17.1
HCM LOS		F	C

Minor Lane/Major Mvmt	NBLn1	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	206	-	-	-	399
HCM Lane V/C Ratio	0.897	-	-	-	0.259
HCM Control Delay (s)	86.4	-	-	-	17.1
HCM Lane LOS	F	-	-	-	C
HCM 95th %tile Q(veh)	7.1	-	-	-	1

Intersection	
Intersection Delay, s/veh	10.8
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	35	135	25	0	20	185	70	0	0	0	0
Future Vol, veh/h	0	35	135	25	0	20	185	70	0	0	0	0
Peak Hour Factor	0.92	0.86	0.86	0.86	0.92	0.86	0.86	0.86	0.92	0.86	0.86	0.86
Heavy Vehicles, %	2	6	1	0	2	9	2	0	2	0	0	0
Mvmt Flow	0	41	157	29	0	23	215	81	0	0	0	0
Number of Lanes	0	0	1	0	0	0	2	0	0	0	0	0

Approach	EB	WB
Opposing Approach	WB	EB
Opposing Lanes	2	1
Conflicting Approach Left	SB	
Conflicting Lanes Left	2	0
Conflicting Approach Right		SB
Conflicting Lanes Right	0	2
HCM Control Delay	11.9	10
HCM LOS	B	A

Lane	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	18%	18%	0%	74%	0%
Vol Thru, %	69%	82%	57%	26%	48%
Vol Right, %	13%	0%	43%	0%	52%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	195	113	163	143	78
LT Vol	35	20	0	105	0
Through Vol	135	93	93	38	38
RT Vol	25	0	70	0	40
Lane Flow Rate	227	131	189	166	90
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.357	0.208	0.274	0.287	0.14
Departure Headway (Hd)	5.661	5.732	5.218	6.24	5.586
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	630	620	682	570	646
Service Time	3.751	3.521	3.006	4.04	3.286
HCM Lane V/C Ratio	0.36	0.211	0.277	0.291	0.139
HCM Control Delay	11.9	10	10	11.6	9.2
HCM Lane LOS	B	A	A	B	A
HCM 95th-tile Q	1.6	0.8	1.1	1.2	0.5

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↰↑↱	
Traffic Vol, veh/h	0	105	75	40
Future Vol, veh/h	0	105	75	40
Peak Hour Factor	0.92	0.86	0.86	0.86
Heavy Vehicles, %	2	1	0	3
Mvmt Flow	0	122	87	47
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	
Opposing Lanes	0
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	10.8
HCM LOS	B

Intersection	
Intersection Delay, s/veh	8.6
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations																
Traffic Vol, veh/h	0	0	0	0	0	35	195	0	0	0	0	0	0	0	80	40
Future Vol, veh/h	0	0	0	0	0	35	195	0	0	0	0	0	0	0	80	40
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.70	0.92	0.70	0.92	0.92	0.70	0.70	0.92	0.70	0.70	0.92
Heavy Vehicles, %	2	2	2	2	2	0	2	0	2	2	0	0	2	0	1	2
Mvmt Flow	0	0	0	0	0	50	212	0	0	0	0	0	0	0	114	43
Number of Lanes	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0

Approach	WB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		WB
Conflicting Lanes Left	0	2
Conflicting Approach Right	SB	
Conflicting Lanes Right	2	0
HCM Control Delay	8.8	8.3
HCM LOS	A	A

Lane	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	35%	0%	0%	0%
Vol Thru, %	65%	100%	100%	40%
Vol Right, %	0%	0%	0%	60%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	100	130	53	67
LT Vol	35	0	0	0
Through Vol	65	130	53	27
RT Vol	0	0	0	40
Lane Flow Rate	121	141	76	82
Geometry Grp	7	7	7	7
Degree of Util (X)	0.17	0.193	0.109	0.108
Departure Headway (Hd)	5.068	4.927	5.172	4.768
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	709	731	696	755
Service Time	2.785	2.643	2.886	2.481
HCM Lane V/C Ratio	0.171	0.193	0.109	0.109
HCM Control Delay	8.8	8.8	8.5	8.1
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.6	0.7	0.4	0.4

Intersection	
Int Delay, s/veh	3.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	175	65	65	210	60	70
Future Vol, veh/h	175	65	65	210	60	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	60
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	1	3	0	3	0	2
Mvmt Flow	213	79	79	256	73	85

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	293	0	668	253
Stage 1	-	-	-	-	253	-
Stage 2	-	-	-	-	415	-
Critical Hdwy	-	-	4.1	-	6.4	6.22
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.318
Pot Cap-1 Maneuver	-	-	1280	-	426	786
Stage 1	-	-	-	-	794	-
Stage 2	-	-	-	-	671	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1280	-	400	786
Mov Cap-2 Maneuver	-	-	-	-	400	-
Stage 1	-	-	-	-	794	-
Stage 2	-	-	-	-	630	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.9	12.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	400	786	-	-	1280	-
HCM Lane V/C Ratio	0.183	0.109	-	-	0.062	-
HCM Control Delay (s)	16	10.1	-	-	8	-
HCM Lane LOS	C	B	-	-	A	-
HCM 95th %tile Q(veh)	0.7	0.4	-	-	0.2	-

Intersection	
Int Delay, s/veh	3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	85	80	35	55	45	25
Future Vol, veh/h	85	80	35	55	45	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	60	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	0	3	0	2	2	0
Mvmt Flow	102	96	42	66	54	30

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	199	0	302	151
Stage 1	-	-	-	-	151	-
Stage 2	-	-	-	-	151	-
Critical Hdwy	-	-	4.1	-	6.42	6.2
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.2	-	3.518	3.3
Pot Cap-1 Maneuver	-	-	1385	-	690	901
Stage 1	-	-	-	-	877	-
Stage 2	-	-	-	-	877	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1385	-	669	901
Mov Cap-2 Maneuver	-	-	-	-	669	-
Stage 1	-	-	-	-	877	-
Stage 2	-	-	-	-	850	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3	10.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	669	901	-	-	1385	-
HCM Lane V/C Ratio	0.081	0.033	-	-	0.03	-
HCM Control Delay (s)	10.9	9.1	-	-	7.7	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	60	50	30	10	20	60
Future Vol, veh/h	60	50	30	10	20	60
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	0	0	2
Mvmt Flow	67	56	34	11	22	67

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	45	0	-	0	230	39
Stage 1	-	-	-	-	39	-
Stage 2	-	-	-	-	191	-
Critical Hdwy	4.1	-	-	-	7.1	6.22
Critical Hdwy Stg 1	-	-	-	-	6.1	-
Critical Hdwy Stg 2	-	-	-	-	6.1	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.318
Pot Cap-1 Maneuver	1576	-	-	-	729	1033
Stage 1	-	-	-	-	981	-
Stage 2	-	-	-	-	815	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1576	-	-	-	705	1033
Mov Cap-2 Maneuver	-	-	-	-	705	-
Stage 1	-	-	-	-	938	-
Stage 2	-	-	-	-	779	-

Approach	EB	WB	SB
HCM Control Delay, s	4	0	9.3
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1576	-	-	-	925
HCM Lane V/C Ratio	0.043	-	-	-	0.097
HCM Control Delay (s)	7.4	0	-	-	9.3
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations			↑↱									
Traffic Vol, veh/h	0	0	170	60	0	0	0	0	0	0	0	0
Future Vol, veh/h	0	0	170	60	0	0	0	0	0	0	0	0
Peak Hour Factor	0.92	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.92	0.90	0.90	0.90
Heavy Vehicles, %	2	0	3	2	2	0	0	0	2	0	0	0
Mvmt Flow	0	0	189	67	0	0	0	0	0	0	0	0
Number of Lanes	0	0	2	0	0	0	0	0	0	0	0	0

Approach	EB
Opposing Approach	
Opposing Lanes	0
Conflicting Approach Left	SB
Conflicting Lanes Left	2
Conflicting Approach Right	
Conflicting Lanes Right	0
HCM Control Delay	8.3
HCM LOS	A

Lane	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	0%	45%	0%
Vol Thru, %	100%	49%	55%	100%
Vol Right, %	0%	51%	0%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	113	117	55	60
LT Vol	0	0	25	0
Through Vol	113	57	30	60
RT Vol	0	60	0	0
Lane Flow Rate	126	130	61	67
Geometry Grp	7	7	7	7
Degree of Util (X)	0.171	0.163	0.09	0.095
Departure Headway (Hd)	4.89	4.513	5.331	5.103
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	737	797	674	705
Service Time	2.602	2.224	3.047	2.818
HCM Lane V/C Ratio	0.171	0.163	0.091	0.095
HCM Control Delay	8.6	8.1	8.6	8.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.6	0.6	0.3	0.3

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↰↑	
Traffic Vol, veh/h	0	25	90	0
Future Vol, veh/h	0	25	90	0
Peak Hour Factor	0.92	0.90	0.90	0.90
Heavy Vehicles, %	2	0	0	0
Mvmt Flow	0	28	100	0
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	
Opposing Lanes	0
Conflicting Approach Left	
Conflicting Lanes Left	0
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	8.5
HCM LOS	A

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	50	25	30	20	0	0	0	0	55	625	35
Future Vol, veh/h	0	50	25	30	20	0	0	0	0	55	625	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	79	79	79	79	79	79	79	79	79
Heavy Vehicles, %	0	2	4	4	0	0	0	0	0	2	2	12
Mvmt Flow	0	63	32	38	25	0	0	0	0	70	791	44

Major/Minor	Minor2			Minor1						Major2		
Conflicting Flow All	-	953	418	566	975	-				0	0	0
Stage 1	-	953	-	0	0	-				-	-	-
Stage 2	-	0	-	566	975	-				-	-	-
Critical Hdwy	-	6.54	6.98	7.58	6.5	-				4.14	-	-
Critical Hdwy Stg 1	-	5.54	-	-	-	-				-	-	-
Critical Hdwy Stg 2	-	-	-	6.58	5.5	-				-	-	-
Follow-up Hdwy	-	4.02	3.34	3.54	4	-				2.22	-	-
Pot Cap-1 Maneuver	0	258	578	403	253	0				-	-	-
Stage 1	0	336	-	-	-	0				-	-	-
Stage 2	0	-	-	471	332	0				-	-	-
Platoon blocked, %											-	-
Mov Cap-1 Maneuver	-	258	578	309	253	-				-	-	-
Mov Cap-2 Maneuver	-	258	-	309	253	-				-	-	-
Stage 1	-	336	-	-	-	-				-	-	-
Stage 2	-	-	-	361	332	-				-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	21.2	21.3	
HCM LOS	C	C	

Minor Lane/Major Mvmt	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	316	284	-	-	-
HCM Lane V/C Ratio	0.3	0.223	-	-	-
HCM Control Delay (s)	21.2	21.3	-	-	-
HCM Lane LOS	C	C	-	-	-
HCM 95th %tile Q(veh)	1.2	0.8	-	-	-

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	55	0	0	30	30	20	650	15	0	0	0
Future Vol, veh/h	50	55	0	0	30	30	20	650	15	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	0	2	0	0	0	0	0	4	0	0	0	0
Mvmt Flow	57	63	0	0	34	34	23	747	17	0	0	0

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	437	810	-	-	802	382	0	0	0
Stage 1	0	0	-	-	802	-	-	-	-
Stage 2	437	810	-	-	0	-	-	-	-
Critical Hdwy	7.5	6.54	-	-	6.5	6.9	4.1	-	-
Critical Hdwy Stg 1	-	-	-	-	5.5	-	-	-	-
Critical Hdwy Stg 2	6.5	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.02	-	-	4	3.3	2.2	-	-
Pot Cap-1 Maneuver	508	312	0	0	320	622	-	-	-
Stage 1	-	-	0	0	399	-	-	-	-
Stage 2	574	391	0	0	-	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	440	312	-	-	320	622	-	-	-
Mov Cap-2 Maneuver	440	312	-	-	320	-	-	-	-
Stage 1	-	-	-	-	399	-	-	-	-
Stage 2	495	391	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	19.8	15.2	
HCM LOS	C	C	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1
Capacity (veh/h)	-	-	-	362	423
HCM Lane V/C Ratio	-	-	-	0.333	0.163
HCM Control Delay (s)	-	-	-	19.8	15.2
HCM Lane LOS	-	-	-	C	C
HCM 95th %tile Q(veh)	-	-	-	1.4	0.6

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	20	5	15	10	0	0	0	0	25	1	40
Future Vol, veh/h	0	20	5	15	10	0	0	0	0	25	1	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	76	76	76	76	76	76	76	76	76	76	76	76
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	26	7	20	13	0	0	0	0	33	1	53

Major/Minor	Minor2			Minor1						Major2		
Conflicting Flow All	-	93	28	110	120	-				0	0	0
Stage 1	-	93	-	0	0	-				-	-	-
Stage 2	-	0	-	110	120	-				-	-	-
Critical Hdwy	-	6.5	6.2	7.1	6.5	-				4.1	-	-
Critical Hdwy Stg 1	-	5.5	-	-	-	-				-	-	-
Critical Hdwy Stg 2	-	-	-	6.1	5.5	-				-	-	-
Follow-up Hdwy	-	4	3.3	3.5	4	-				2.2	-	-
Pot Cap-1 Maneuver	0	801	1053	873	774	0				-	-	-
Stage 1	0	822	-	-	-	0				-	-	-
Stage 2	0	-	-	900	800	0				-	-	-
Platoon blocked, %											-	-
Mov Cap-1 Maneuver	-	801	1053	846	774	-				-	-	-
Mov Cap-2 Maneuver	-	801	-	846	774	-				-	-	-
Stage 1	-	822	-	-	-	-				-	-	-
Stage 2	-	-	-	866	800	-				-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	9.5	9.6	
HCM LOS	A	A	

Minor Lane/Major Mvmt	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	841	816	-	-	-
HCM Lane V/C Ratio	0.039	0.04	-	-	-
HCM Control Delay (s)	9.5	9.6	-	-	-
HCM Lane LOS	A	A	-	-	-
HCM 95th %tile Q(veh)	0.1	0.1	-	-	-

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	25	0	0	15	20	10	5	10	0	0	0
Future Vol, veh/h	20	25	0	0	15	20	10	5	10	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	600	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	33	0	0	0	0
Mvmt Flow	21	26	0	0	16	21	11	5	11	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	16	0	-	-	-	0	84	84	26
Stage 1	-	-	-	-	-	-	68	68	-
Stage 2	-	-	-	-	-	-	16	16	-
Critical Hdwy	4.1	-	-	-	-	-	6.4	6.83	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	5.4	5.83	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.4	5.83	-
Follow-up Hdwy	2.2	-	-	-	-	-	3.5	4.297	3.3
Pot Cap-1 Maneuver	1615	-	0	0	-	-	923	751	1056
Stage 1	-	-	0	0	-	-	960	781	-
Stage 2	-	-	0	0	-	-	1012	824	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1615	-	-	-	-	-	911	0	1056
Mov Cap-2 Maneuver	-	-	-	-	-	-	911	0	-
Stage 1	-	-	-	-	-	-	948	0	-
Stage 2	-	-	-	-	-	-	1012	0	-

Approach	EB	WB	NB
HCM Control Delay, s	3.2	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR
Capacity (veh/h)	911	1056	1615	-	-	-
HCM Lane V/C Ratio	0.012	0.015	0.013	-	-	-
HCM Control Delay (s)	9	8.5	7.3	0	-	-
HCM Lane LOS	A	A	A	A	-	-
HCM 95th %tile Q(veh)	0	0	0	-	-	-

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	1	1	25	1	40	2	435	45	70	510	1
Future Vol, veh/h	5	1	1	25	1	40	2	435	45	70	510	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	220	-	-	220	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	100	0	4	0	0	0	7	5	0	4	0
Mvmt Flow	6	1	1	28	1	44	2	483	50	78	567	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1236	1261	567	1237	1236	508	568	0	0	533	0	0
Stage 1	723	723	-	513	513	-	-	-	-	-	-	-
Stage 2	513	538	-	724	723	-	-	-	-	-	-	-
Critical Hdwy	7.1	7.5	6.2	7.14	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	6.5	-	6.14	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	6.5	-	6.14	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.9	3.3	3.536	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	154	111	527	151	178	569	1014	-	-	1045	-	-
Stage 1	421	313	-	540	539	-	-	-	-	-	-	-
Stage 2	548	392	-	414	434	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	133	103	527	141	164	569	1014	-	-	1045	-	-
Mov Cap-2 Maneuver	133	103	-	141	164	-	-	-	-	-	-	-
Stage 1	420	290	-	539	538	-	-	-	-	-	-	-
Stage 2	503	391	-	381	402	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	31.8	21.7	0	1.1
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1014	-	-	142	142	569	1045	-	-
HCM Lane V/C Ratio	0.002	-	-	0.055	0.203	0.078	0.074	-	-
HCM Control Delay (s)	8.6	-	-	31.8	36.7	11.9	8.7	-	-
HCM Lane LOS	A	-	-	D	E	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.7	0.3	0.2	-	-

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	247	737	335	758	361	103	258	242	412	412	381
v/c Ratio	0.62	0.73	0.80	0.71	0.40	0.53	0.53	0.59	0.73	0.61	0.56
Control Delay	22.5	37.2	34.7	35.7	6.6	57.4	44.5	11.9	49.0	40.4	17.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.5	37.2	34.7	35.7	6.6	57.4	44.5	11.9	49.0	40.4	17.4
Queue Length 50th (ft)	69	193	109	195	30	56	74	0	114	117	107
Queue Length 95th (ft)	195	406	#366	423	134	156	148	73	245	210	228
Internal Link Dist (ft)		759		1264			254			565	
Turn Bay Length (ft)	400		500		150				200		150
Base Capacity (vph)	563	1459	559	1475	1031	285	827	538	916	1194	833
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.51	0.60	0.51	0.35	0.36	0.31	0.45	0.45	0.35	0.46

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	153	111	295	53	163	211	721	32	669
v/c Ratio	0.58	0.25	0.49	0.31	0.56	0.67	0.48	0.21	0.69
Control Delay	48.6	32.7	6.9	49.3	39.8	49.8	21.6	49.4	33.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.6	32.7	6.9	49.3	39.8	49.8	21.6	49.4	33.9
Queue Length 50th (ft)	82	54	0	29	75	112	157	18	174
Queue Length 95th (ft)	184	116	66	81	161	#269	300	57	312
Internal Link Dist (ft)		881			886		1456		2192
Turn Bay Length (ft)	215			85		200		200	
Base Capacity (vph)	401	550	673	405	514	405	1603	308	1347
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.20	0.44	0.13	0.32	0.52	0.45	0.10	0.50

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	203	245	443	161	266	438	802	47	870
v/c Ratio	0.73	0.69	0.67	0.72	0.88	0.89	0.55	0.36	0.76
Control Delay	68.8	42.2	16.5	60.8	70.7	64.1	24.7	52.7	35.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.8	42.2	16.5	60.8	70.7	64.1	24.7	52.7	35.5
Queue Length 50th (ft)	95	150	255	104	162	149	218	30	276
Queue Length 95th (ft)	223	163	25	172	#331	#231	297	66	#366
Internal Link Dist (ft)		482			476		460		1456
Turn Bay Length (ft)	225			100		240		200	
Base Capacity (vph)	348	371	661	266	307	512	1452	174	1142
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.66	0.67	0.61	0.87	0.86	0.55	0.27	0.76

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	226	406	1	584	458	15	316	338
v/c Ratio	0.66	0.22	0.01	0.54	0.65	0.03	0.76	0.48
Control Delay	45.1	11.3	52.0	28.5	14.1	20.4	42.0	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.1	11.3	52.0	28.5	14.1	20.4	42.0	5.6
Queue Length 50th (ft)	112	53	1	138	57	4	147	0
Queue Length 95th (ft)	247	122	7	255	209	21	339	67
Internal Link Dist (ft)		2246		1006		257		1164
Turn Bay Length (ft)	150		100		100			
Base Capacity (vph)	613	2379	316	1802	951	746	638	898
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.17	0.00	0.32	0.48	0.02	0.50	0.38

Intersection Summary

Intersection: 7: W Harvard Ave

Movement	SE	SE	NW	NW
Directions Served	T	TR	T	T
Maximum Queue (ft)	227	227	17	31
Average Queue (ft)	58	89	1	2
95th Queue (ft)	162	225	9	17
Link Distance (ft)	209	209	54	54
Upstream Blk Time (%)	0	1	0	0
Queuing Penalty (veh)	1	5	0	0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 10: OR 99 & Wilbur Rd

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	41	44
Average Queue (ft)	21	3
95th Queue (ft)	47	21
Link Distance (ft)	845	1342
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 20: OR 99 & N Bank Rd

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (ft)	61	40
Average Queue (ft)	27	5
95th Queue (ft)	56	24
Link Distance (ft)	954	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		250
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 30: OR 99 & I-5 Exit 129 NB Ramps

Movement	EB	EB	NB	NB	SB	SB
Directions Served	L	R	L	T	T	TR
Maximum Queue (ft)	75	11	131	90	92	105
Average Queue (ft)	43	0	60	29	41	34
95th Queue (ft)	72	8	104	75	83	82
Link Distance (ft)	54	54		1267	2118	
Upstream Blk Time (%)	5	0				
Queuing Penalty (veh)	6	0				
Storage Bay Dist (ft)			350			500
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 40: Del Rio Rd & I-5 Exit 129 SB Ramps

Movement	EB	SB	SB
Directions Served	L	L	R
Maximum Queue (ft)	35	66	54
Average Queue (ft)	4	30	19
95th Queue (ft)	23	56	44
Link Distance (ft)		1315	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	470		375
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 50: OR 99 & Del Rio Rd/Umpqua College Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	R	L	T	R
Maximum Queue (ft)	86	60	158	118	146	80	98	162	82	128	156	123
Average Queue (ft)	32	24	55	52	62	25	38	66	21	54	53	44
95th Queue (ft)	68	55	118	99	116	60	75	132	58	106	111	90
Link Distance (ft)		856			1556			1146			1267	1267
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	365		515	290		290	350		260	350		
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 53: NE Garden Valley Blvd & NE Vine St

Movement	EB	WB	SB
Directions Served	L	TR	LR
Maximum Queue (ft)	34	59	152
Average Queue (ft)	5	6	55
95th Queue (ft)	24	35	105
Link Distance (ft)		1241	1392
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	75		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 57: NE Chestnut Ave & Walnut St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	32	7	47	81
Average Queue (ft)	2	0	22	38
95th Queue (ft)	19	5	50	65
Link Distance (ft)	444	1047	444	1286
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 60: Stephens St & Kenneth Ford Dr

Movement	WB	WB	NB	NB	SB	SB
Directions Served	L	R	T	R	L	T
Maximum Queue (ft)	226	175	586	185	200	505
Average Queue (ft)	111	51	295	71	72	250
95th Queue (ft)	200	114	502	190	176	439
Link Distance (ft)	623		4143			528
Upstream Blk Time (%)						0
Queuing Penalty (veh)						0
Storage Bay Dist (ft)		175		110	125	
Storage Blk Time (%)	2	0	36	0	0	30
Queuing Penalty (veh)	3	0	25	0	1	21

Intersection: 66: I-5 Exit 124 SB Ramps

Movement	SB	NW	SW
Directions Served	T	>	L
Maximum Queue (ft)	119	311	13
Average Queue (ft)	34	85	0
95th Queue (ft)	90	243	7
Link Distance (ft)	164	645	150
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 70: NW Edenbower Boulevard & NW Broad Street

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	77	55
Average Queue (ft)	33	17
95th Queue (ft)	63	48
Link Distance (ft)	378	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		175
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 80: NW Edenbower Boulevard & SB Exit 127 Ramp

Movement	EB	EB	WB	WB	SB	SB
Directions Served	T	R	L	T	LT	R
Maximum Queue (ft)	312	211	166	94	148	122
Average Queue (ft)	129	20	62	23	73	53
95th Queue (ft)	244	110	123	66	129	93
Link Distance (ft)	402			581		544
Upstream Blk Time (%)	0					
Queuing Penalty (veh)	0					
Storage Bay Dist (ft)		200	285		375	
Storage Blk Time (%)	2	0				
Queuing Penalty (veh)	6	1				

Intersection: 90: NB Exit 127 Ramp & NW Edenbower Boulevard

Movement	NB	NB
Directions Served	LT	R
Maximum Queue (ft)	93	130
Average Queue (ft)	27	63
95th Queue (ft)	60	108
Link Distance (ft)	390	390
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 100: NW Aviation Drive & NW Edenbower Boulevard

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	155	296	58	134	586	175	133	114	86	167	180
Average Queue (ft)	46	129	2	26	189	32	47	43	36	28	82
95th Queue (ft)	99	242	42	93	480	115	98	90	70	76	150
Link Distance (ft)		479			991		594			516	
Upstream Blk Time (%)					0						
Queuing Penalty (veh)					1						
Storage Bay Dist (ft)	125		200	110		100		200	140		140
Storage Blk Time (%)	0	7		0	17					0	2
Queuing Penalty (veh)	1	13		0	18					1	2

Intersection: 110: Stephens St & NW Edenbower Boulevard

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	T	R
Maximum Queue (ft)	285	233	36	42	224	344	270	41	222	220	233
Average Queue (ft)	145	100	4	9	151	128	53	6	93	95	86
95th Queue (ft)	243	198	22	34	225	277	168	27	164	181	170
Link Distance (ft)		991	160	160		1522	1522		472	472	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	300				150			115			165
Storage Blk Time (%)	0	0			11	1			4	1	2
Queuing Penalty (veh)	1	0			22	4			0	4	3

Intersection: 116: I-5 Exit 129 NB Ramps

Movement	NB	NB
Directions Served	R	R
Maximum Queue (ft)	60	12
Average Queue (ft)	5	0
95th Queue (ft)	31	9
Link Distance (ft)	1106	1106
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 120: Stephens St & NE Newton Creek Rd

Movement	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	T	TR	L	T	TR
Maximum Queue (ft)	60	137	43	193	165	103	124	135
Average Queue (ft)	20	65	9	95	50	38	40	55
95th Queue (ft)	53	113	32	163	116	78	98	112
Link Distance (ft)	100	976		754	754		1522	1522
Upstream Blk Time (%)	0							
Queuing Penalty (veh)	0							
Storage Bay Dist (ft)			175			200		
Storage Blk Time (%)				0				
Queuing Penalty (veh)				0				

Intersection: 130: NW Edenbower Boulevard & NW Stewart Parkway

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	TR	L	T	R
Maximum Queue (ft)	675	1370	1369	156	154	180	137	163	266	99	103	162
Average Queue (ft)	674	1335	1304	67	88	97	49	30	136	48	39	76
95th Queue (ft)	680	1586	1621	122	144	159	117	87	229	93	84	139
Link Distance (ft)		1350	1350		723	723			826		2150	
Upstream Blk Time (%)		81	19									
Queuing Penalty (veh)		0	0									
Storage Bay Dist (ft)	600			100			75	115		150		150
Storage Blk Time (%)	78	2		4	8	19	1		14			0
Queuing Penalty (veh)	145	15		8	7	14	2		5			0

Intersection: 133: S/S & NW Garden Valley Blvd

Movement	EB	NB	SB
Directions Served	LT	LTR	LTR
Maximum Queue (ft)	58	34	58
Average Queue (ft)	4	6	18
95th Queue (ft)	28	26	50
Link Distance (ft)	721	120	558
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 140: NW Garden Valley Blvd & Melrose Rd/Darley Dr

Movement	EB	EB	WB	NB	SB
Directions Served	LT	R	LTR	L	T
Maximum Queue (ft)	101	43	33	108	3
Average Queue (ft)	39	1	4	45	0
95th Queue (ft)	83	31	21	89	2
Link Distance (ft)	1793		914		1160
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		300		275	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 150: NW Troost St & NW Garden Valley Blvd

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	TR	L	LTR
Maximum Queue (ft)	41	165	156	224	364	312	27	68	126	40	100
Average Queue (ft)	5	71	68	150	89	51	2	27	59	8	29
95th Queue (ft)	26	141	137	238	273	179	15	63	103	29	75
Link Distance (ft)		3637	3637		721	721			475		670
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	200			150			145	90		80	
Storage Blk Time (%)		0		14	0	0		0	1		2
Queuing Penalty (veh)		0		49	1	0		0	0		0

Intersection: 160: NW Kline St & NW Garden Valley Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	73	231	236	183	401	417	96	212	385	107
Average Queue (ft)	14	120	115	78	166	192	38	85	216	41
95th Queue (ft)	51	200	197	157	339	364	84	170	361	90
Link Distance (ft)		732	732		1175	1175		420	815	815
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	100			150			100			
Storage Blk Time (%)	0	14		0	10		1	8		
Queuing Penalty (veh)	0	1		1	7		1	4		

Intersection: 162: OR 99/OR 99 SB & OR 99 NB

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 170: NW Garden Valley Blvd & Roseburg Valley Mall Middle Dwy

Movement	EB	EB	SB
Directions Served	L	T	LR
Maximum Queue (ft)	44	72	66
Average Queue (ft)	8	6	29
95th Queue (ft)	32	55	62
Link Distance (ft)		1175	351
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	150		
Storage Blk Time (%)		0	
Queuing Penalty (veh)		0	

Intersection: 180: NW Stewart Pkwy & Roseburg Valley Mall Dwy/Walmart Dwy

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	TR
Maximum Queue (ft)	103	78	193	77	82	226	225	195	74	222	346
Average Queue (ft)	34	28	97	28	30	86	102	54	29	99	148
95th Queue (ft)	78	64	165	57	67	171	184	124	62	174	254
Link Distance (ft)	172	172	207	207		400	400			1361	1361
Upstream Blk Time (%)			0								
Queuing Penalty (veh)			0								
Storage Bay Dist (ft)					110			200	150		
Storage Blk Time (%)					0	3	0	0		1	
Queuing Penalty (veh)					0	2	1	0		1	

Intersection: 190: NW Mulholland Dr/Aviation Dr & NW Stewart Pkwy

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	34	157	190	65	107	115	118	93	68	62
Average Queue (ft)	8	59	70	23	33	51	46	29	24	21
95th Queue (ft)	27	127	135	53	80	98	85	65	54	49
Link Distance (ft)		701	701		1668	1668		706		679
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	150			125			75		100	
Storage Blk Time (%)		0			0		2	0		
Queuing Penalty (veh)		0			0		2	0		

Intersection: 200: NW Stewart Pkwy & NW Garden Valley Blvd

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	TR	L	L
Maximum Queue (ft)	438	536	490	558	793	787	225	208	248	253	254	313
Average Queue (ft)	328	304	236	390	427	441	203	97	180	224	152	164
95th Queue (ft)	525	663	477	625	781	749	272	173	256	275	234	257
Link Distance (ft)		752	752		1240	1240		235	235	235		563
Upstream Blk Time (%)		1	0					0	4	18		
Queuing Penalty (veh)		6	0					0	9	36		
Storage Bay Dist (ft)	400			500			150				200	
Storage Blk Time (%)	23	0		15	2	43	25				3	6
Queuing Penalty (veh)	62	0		64	5	129	106				7	12

Intersection: 200: NW Stewart Pkwy & NW Garden Valley Blvd

Movement	SB	SB	SB	B109
Directions Served	T	T	R	T
Maximum Queue (ft)	436	565	225	43
Average Queue (ft)	186	314	209	3
95th Queue (ft)	379	563	255	35
Link Distance (ft)	563	563		400
Upstream Blk Time (%)	0	1		
Queuing Penalty (veh)	0	4		
Storage Bay Dist (ft)			150	
Storage Blk Time (%)		5	41	
Queuing Penalty (veh)		19	75	

Intersection: 210: NW Stewart Pkwy & NW Valley View Dr

Movement	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	R	L	T	T	T	TR
Maximum Queue (ft)	231	149	64	133	348	5	10
Average Queue (ft)	76	24	19	3	86	0	0
95th Queue (ft)	188	114	55	52	251	4	5
Link Distance (ft)		788		472	472	235	235
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	250		350				
Storage Blk Time (%)	4			0			
Queuing Penalty (veh)	3			0			

Intersection: 220: NE Airport Rd & NW Stewart Pkwy

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	LT	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	169	171	65	96	114	99	100	84	131
Average Queue (ft)	66	61	18	28	34	37	33	12	53
95th Queue (ft)	138	125	52	71	85	76	76	52	95
Link Distance (ft)	1668	1668		882	882		606	553	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			200			80			90
Storage Blk Time (%)						1	1	0	1
Queuing Penalty (veh)						0	0	0	0

Intersection: 225: Stephens St & NW Stewart Pkwy/NE Alameda Ave

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	298	258	307	120	124	274	433	361	98	228	248
Average Queue (ft)	140	36	166	54	47	176	180	173	34	134	142
95th Queue (ft)	243	127	272	103	100	288	359	313	73	206	220
Link Distance (ft)		882	882		900		1423	1423		2229	2229
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	215			85		200			200		
Storage Blk Time (%)	4			6	3	13	3			1	
Queuing Penalty (veh)	1			3	2	54	7			0	

Intersection: 230: NE Vine St & NE Alameda Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	85	72	70	63
Average Queue (ft)	43	37	41	35
95th Queue (ft)	67	58	64	56
Link Distance (ft)	900	1015	1392	922
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 240: NW Troost St & NW Calkins Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	40	83	59	98
Average Queue (ft)	23	44	30	55
95th Queue (ft)	50	70	53	86
Link Distance (ft)	377	2632	943	888
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 250: NW Keasey St & NW Calkins Ave

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	66	49
Average Queue (ft)	38	10
95th Queue (ft)	61	38
Link Distance (ft)	2632	1207
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 260: Duck Pond St/NW Goetz St & NW Garden Valley Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	L	T	TR	L	T	TR	LT	R	LTR
Maximum Queue (ft)	121	254	278	127	332	366	202	114	55
Average Queue (ft)	31	70	84	34	147	158	98	48	14
95th Queue (ft)	82	190	212	92	298	318	182	97	42
Link Distance (ft)		1240	1240		618	618	306	306	333
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	150			100					
Storage Blk Time (%)	0	1		1	8				
Queuing Penalty (veh)	1	1		5	3				

Intersection: 270: Centennial Dr/NW Estelle St & NW Garden Valley Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	LT	R	LT	R
Maximum Queue (ft)	67	313	350	107	319	341	137	214	73	92
Average Queue (ft)	10	102	115	31	93	95	66	109	18	33
95th Queue (ft)	40	239	267	73	233	238	127	191	51	75
Link Distance (ft)		618	618		524	524	402	402	345	
Upstream Blk Time (%)						0				
Queuing Penalty (veh)						0				
Storage Bay Dist (ft)	100			100						100
Storage Blk Time (%)		7		0	5				0	1
Queuing Penalty (veh)		1		2	2				0	0

Intersection: 280: BLM Access/Garden Valley Shopping Ctr Dwy & NW Garden Valley Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	174	320	316	108	346	339	59	68	207	133
Average Queue (ft)	121	145	145	9	231	237	15	20	177	61
95th Queue (ft)	191	294	282	55	370	373	46	54	231	114
Link Distance (ft)		524	524		321	321	288	288	176	176
Upstream Blk Time (%)					2	3			29	
Queuing Penalty (veh)					19	21			0	
Storage Bay Dist (ft)	100			125						
Storage Blk Time (%)	24	8			21					
Queuing Penalty (veh)	135	13			1					

Intersection: 290: NW Garden Valley Blvd & I-5 Exit 125 SB Ramps

Movement	EB	EB	WB	WB	SB	SB
Directions Served	T	T	T	T	L	R
Maximum Queue (ft)	320	337	178	182	194	227
Average Queue (ft)	137	183	127	127	81	108
95th Queue (ft)	287	330	190	187	154	195
Link Distance (ft)	321	321	145	145	646	646
Upstream Blk Time (%)	0	1	5	5		
Queuing Penalty (veh)	3	6	36	34		
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 291: NW Garden Valley Blvd

Movement	EB	EB	WB	WB
Directions Served	T	TR	T	TR
Maximum Queue (ft)	6	94	188	215
Average Queue (ft)	0	2	30	34
95th Queue (ft)	4	31	126	146
Link Distance (ft)	145	145	686	686
Upstream Blk Time (%)		0		
Queuing Penalty (veh)		1		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 300: I-5 Exit 125 NB Ramps/NW Mulholland Dr & NW Garden Valley Blvd

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	T	TR	L	TR	L	R
Maximum Queue (ft)	98	146	144	518	561	632	634	144	220
Average Queue (ft)	40	109	102	265	294	598	554	31	104
95th Queue (ft)	88	148	147	471	501	679	792	85	184
Link Distance (ft)		98	98	1546	1546	592	592		926
Upstream Blk Time (%)	1	19	15			65	42		
Queuing Penalty (veh)	0	91	74			0	0		
Storage Bay Dist (ft)	100							85	
Storage Blk Time (%)	1	19						0	15
Queuing Penalty (veh)	2	9						0	5

Intersection: 301: NW Garden Valley Blvd & I-5 Exit 125 NB Ramps

Movement	EB	EB	WB	WB
Directions Served	T	TR	T	TR
Maximum Queue (ft)	338	324	42	69
Average Queue (ft)	100	96	3	7
95th Queue (ft)	261	258	25	39
Link Distance (ft)	686	686	98	98
Upstream Blk Time (%)			0	0
Queuing Penalty (veh)			0	0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 310: NE Cedar St/NE Airport Rd & NW Garden Valley Blvd/NE Garden Valley Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	214	347	345	111	284	290	166	174	119	196
Average Queue (ft)	101	125	135	42	119	136	77	60	49	89
95th Queue (ft)	175	266	286	85	224	245	128	128	99	160
Link Distance (ft)		1546	1546		442	442		1291		780
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	140			85			125		425	
Storage Blk Time (%)	3	5		3	15		2	2		
Queuing Penalty (veh)	14	5		13	6		2	2		

Intersection: 320: Walnut St & NE Garden Valley Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	LT	R	LT	R
Maximum Queue (ft)	79	274	271	71	183	182	172	224	39	55
Average Queue (ft)	19	87	84	18	52	60	88	53	5	12
95th Queue (ft)	55	203	199	48	130	133	149	134	23	43
Link Distance (ft)		442	442		452	452		1286	328	328
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	115			75			100			
Storage Blk Time (%)		3		0	3		11	1		
Queuing Penalty (veh)		1		0	1		5	1		

Intersection: 330: Stephens St & NE Garden Valley Blvd

Movement	EB	EB	EB	WB	WB	NB	NB	NB	NB	B55	B55	SB
Directions Served	L	T	R	L	TR	L	L	T	TR	T	T	L
Maximum Queue (ft)	299	425	367	175	474	390	522	424	380	76	35	275
Average Queue (ft)	168	193	180	172	384	335	375	196	177	6	2	46
95th Queue (ft)	298	358	315	185	508	436	532	354	311	44	25	177
Link Distance (ft)		452	452		464		456	456		865	865	
Upstream Blk Time (%)		0	0		5		5	0				
Queuing Penalty (veh)		2	1		15		28	1				
Storage Bay Dist (ft)	225			100		240			240			200
Storage Blk Time (%)	4	8		64	37	66	69	3	2			
Queuing Penalty (veh)	9	18		163	94	174	182	16	9			

Intersection: 330: Stephens St & NE Garden Valley Blvd

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	628	646
Average Queue (ft)	335	353
95th Queue (ft)	606	630
Link Distance (ft)	1423	1423
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)	33	
Queuing Penalty (veh)	10	

Intersection: 340: NE Garden Valley Blvd & NE Rocky Ridge Dr

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	56	73
Average Queue (ft)	8	27
95th Queue (ft)	36	57
Link Distance (ft)	1241	1263
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 350: NW Stewart Pkwy & NW Harvey Ave

Movement	EB	EB	WB	WB	NB	NB	SB	SB	B104
Directions Served	L	TR	L	TR	L	TR	L	TR	T
Maximum Queue (ft)	100	168	89	98	268	398	200	492	504
Average Queue (ft)	25	79	39	41	139	175	94	355	198
95th Queue (ft)	69	139	81	75	239	323	215	590	792
Link Distance (ft)		954		500		1427		442	1095
Upstream Blk Time (%)								22	9
Queuing Penalty (veh)								0	0
Storage Bay Dist (ft)	100		200		200		175		
Storage Blk Time (%)	0	5			2	5	0	35	
Queuing Penalty (veh)	0	1			10	10	0	25	

Intersection: 360: NE Cedar St & NE Chestnut Ave

Movement	EB	EB	WB	NB	SB	SB
Directions Served	L	TR	LTR	LTR	L	TR
Maximum Queue (ft)	28	38	71	31	48	81
Average Queue (ft)	14	17	33	15	25	26
95th Queue (ft)	36	37	58	39	49	60
Link Distance (ft)		466	444	438	1291	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	90					90
Storage Blk Time (%)						0
Queuing Penalty (veh)						0

Intersection: 370: Stephens St & NE Chestnut Ave

Movement	EB	NB	NB	SB	SB	B55
Directions Served	LR	L	T	T	TR	T
Maximum Queue (ft)	558	138	36	10	15	11
Average Queue (ft)	190	57	1	0	1	0
95th Queue (ft)	566	106	25	5	7	8
Link Distance (ft)	1047		1161	865	865	456
Upstream Blk Time (%)	1					
Queuing Penalty (veh)	1					
Storage Bay Dist (ft)		100				
Storage Blk Time (%)		2	0			
Queuing Penalty (veh)		9	0			

Intersection: 380: Stephens St & NE Winchester St

Movement	WB	NB	NB	SB	SB	SB
Directions Served	R	T	TR	L	T	T
Maximum Queue (ft)	228	4	77	244	354	70
Average Queue (ft)	24	0	7	131	21	2
95th Queue (ft)	129	3	45	237	157	51
Link Distance (ft)	546	1012	1012		1161	1161
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)				170		
Storage Blk Time (%)				5		
Queuing Penalty (veh)				22		

Intersection: 390: NE Lincoln St & NE Malheur Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	33	48	4	27
Average Queue (ft)	6	22	0	1
95th Queue (ft)	26	47	3	12
Link Distance (ft)	484	687	753	2389
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 400: Lookingglass Rd & W Harvard Ave

Movement	EB	WB	NB	NB
Directions Served	TR	L	L	R
Maximum Queue (ft)	20	93	62	24
Average Queue (ft)	1	30	11	1
95th Queue (ft)	10	76	41	12
Link Distance (ft)	696		827	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		225		50
Storage Blk Time (%)			1	0
Queuing Penalty (veh)			1	0

Intersection: 410: W Broccoli St & W Harvard Ave

Movement	EB	EB	WB	NB	SB
Directions Served	L	TR	L	LTR	LTR
Maximum Queue (ft)	33	4	67	55	95
Average Queue (ft)	4	0	17	30	40
95th Queue (ft)	20	3	50	50	76
Link Distance (ft)		691		505	415
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	150		150		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 420: W Harvard Ave & NW Stewart Pkwy

Movement	EB	EB	EB	WB	WB	WB	WB	NB	SB	SB	B106
Directions Served	L	T	TR	L	T	T	R	LTR	L	TR	T
Maximum Queue (ft)	223	316	182	46	770	921	175	96	1262	190	1149
Average Queue (ft)	148	86	70	2	292	593	173	26	1007	173	626
95th Queue (ft)	227	216	143	27	617	936	183	71	1548	240	1645
Link Distance (ft)		2263	2263		1021	1021		286	1168		1427
Upstream Blk Time (%)						0			42		2
Queuing Penalty (veh)						0			307		11
Storage Bay Dist (ft)	150			100			100			115	
Storage Blk Time (%)	13	0			29	11	59		61	4	
Queuing Penalty (veh)	24	0			0	60	152		186	20	

Intersection: 430: W Keady Ct & W Harvard Ave

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	20	164	177	77	153	211	91	91	26	25
Average Queue (ft)	1	61	72	30	46	81	36	40	1	3
95th Queue (ft)	10	131	143	64	113	172	72	75	10	17
Link Distance (ft)		1021	1021		1356	1356		503	246	246
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	150			150			105			
Storage Blk Time (%)		0			0		0	0		
Queuing Penalty (veh)		0			0		0	0		

Intersection: 440: W Harvard Ave & Stewart Park Dr

Movement	EB	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	T	TR	L	R
Maximum Queue (ft)	78	127	149	150	184	94	59
Average Queue (ft)	18	40	58	60	89	47	23
95th Queue (ft)	54	100	118	119	162	81	50
Link Distance (ft)		1356	1356	892	892	352	352
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	150						
Storage Blk Time (%)	0	0					
Queuing Penalty (veh)	0	0					

Intersection: 450: W Harvard Ave & W Maple St

Movement	EB	WB	SB
Directions Served	L	TR	LTR
Maximum Queue (ft)	30	14	72
Average Queue (ft)	2	0	23
95th Queue (ft)	15	10	55
Link Distance (ft)		211	380
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	150		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 460: W Harrison St & W Harvard Ave

Movement	EB	WB	NB	SB
Directions Served	L	L	LTR	LTR
Maximum Queue (ft)	23	31	131	121
Average Queue (ft)	2	4	43	43
95th Queue (ft)	15	20	105	98
Link Distance (ft)			418	366
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	75	150		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 470: W Umpqua St & W Harvard Ave

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	TR	L	T	TR	LTR	LTR
Maximum Queue (ft)	64	246	282	163	312	330	79	226
Average Queue (ft)	22	89	117	34	145	163	32	100
95th Queue (ft)	54	190	228	109	279	303	68	175
Link Distance (ft)		418	418		516	516	367	418
Upstream Blk Time (%)			0					
Queuing Penalty (veh)			0					
Storage Bay Dist (ft)	150			150				
Storage Blk Time (%)		1			5			
Queuing Penalty (veh)		0			1			

Intersection: 480: I-5 Exit 124 SB Ramps/W Bellows St & W Harvard Ave

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	L	T	T	L	T	TR	LT	R	LTR
Maximum Queue (ft)	125	177	195	224	336	318	179	150	129
Average Queue (ft)	36	134	145	112	169	185	137	107	52
95th Queue (ft)	92	188	192	200	290	293	191	173	100
Link Distance (ft)		143	143		379	379	150		316
Upstream Blk Time (%)	0	9	13		0	0	13	1	
Queuing Penalty (veh)	0	41	59		0	0	69	0	
Storage Bay Dist (ft)	150			150				140	
Storage Blk Time (%)	0	9		3	7		15	1	
Queuing Penalty (veh)	0	3		14	10		39	3	

Intersection: 481: W Harvard Ave

Movement	EB	EB	WB
Directions Served	T	TR	T
Maximum Queue (ft)	340	377	6
Average Queue (ft)	57	97	0
95th Queue (ft)	191	265	5
Link Distance (ft)	516	516	143
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 490: W Harvard Ave & I-5 Exit 124 NB On Ramp

Movement	EB	EB	WB
Directions Served	T	T	T
Maximum Queue (ft)	113	138	17
Average Queue (ft)	4	13	0
95th Queue (ft)	48	73	4
Link Distance (ft)	379	379	209
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 500: I-5 Exit 124 NB Ramps/Roseburg High School Dwy & W Harvard Ave

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	T	TR	L	TR	L	R
Maximum Queue (ft)	43	84	87	139	159	251	121	57	65
Average Queue (ft)	11	47	51	95	107	104	47	17	22
95th Queue (ft)	34	87	90	160	173	189	86	49	53
Link Distance (ft)		54	54	110	110	525		217	217
Upstream Blk Time (%)	2	6	6	8	11				
Queuing Penalty (veh)	0	27	28	52	71				
Storage Bay Dist (ft)	150						275		
Storage Blk Time (%)	2	6				0			
Queuing Penalty (veh)	8	1				0			

Intersection: 510: W Corey Ct & W Harvard Ave

Movement	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	TR	L	T	T	L	R
Maximum Queue (ft)	11	47	26	324	331	50	50
Average Queue (ft)	0	2	2	87	116	10	14
95th Queue (ft)	8	21	16	250	284	38	42
Link Distance (ft)	110	110		334	334	85	85
Upstream Blk Time (%)				0	0	0	
Queuing Penalty (veh)				1	3	0	
Storage Bay Dist (ft)			100				
Storage Blk Time (%)				3			
Queuing Penalty (veh)				0			

Intersection: 520: SE Oak Ave & W Harvard Ave/SE Washington Ave & W Madrone St

Movement	EB	EB	EB	WB	WB	SB	SB
Directions Served	L	R	R	LT	TR	L	R
Maximum Queue (ft)	113	125	167	267	271	88	134
Average Queue (ft)	45	43	65	86	117	38	56
95th Queue (ft)	96	107	147	202	246	77	107
Link Distance (ft)		334	334	1249	1249	291	291
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	100						
Storage Blk Time (%)	1	0					
Queuing Penalty (veh)	5	0					

Intersection: 530: Stephens & Diamond Lake Blvd

Movement	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	T	T	R	L	T	T
Maximum Queue (ft)	220	301	130	207	272	222	217	196	280
Average Queue (ft)	76	160	2	104	114	107	110	53	116
95th Queue (ft)	174	267	28	178	215	212	194	139	220
Link Distance (ft)	426	426		761	761			1413	1413
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			300			150	300		
Storage Blk Time (%)		0			3	3			
Queuing Penalty (veh)		0			14	8			

Intersection: 540: Jackson/Winchester & Diamond Lake Blvd

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	R	L	T	T	R	L	T	R	L
Maximum Queue (ft)	199	344	354	150	99	436	634	125	195	325	73	375
Average Queue (ft)	71	156	168	60	27	111	252	95	50	112	17	338
95th Queue (ft)	155	299	319	159	70	287	531	167	129	234	72	433
Link Distance (ft)		426	426			1322	1322			1035		
Upstream Blk Time (%)		0	0									
Queuing Penalty (veh)		0	0									
Storage Bay Dist (ft)	125			75	150			50	150		150	300
Storage Blk Time (%)	3	16	29	0		1	37	12	1	9		49
Queuing Penalty (veh)	9	9	22	0		0	142	23	1	5		93

Intersection: 540: Jackson/Winchester & Diamond Lake Blvd

Movement	SB
Directions Served	TR
Maximum Queue (ft)	1415
Average Queue (ft)	783
95th Queue (ft)	1714
Link Distance (ft)	1494
Upstream Blk Time (%)	12
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	0
Queuing Penalty (veh)	1

Intersection: 550: NE Fulton St & SE Diamond Lake Blvd

Movement	EB	WB	NB	SB
Directions Served	L	L	LTR	LTR
Maximum Queue (ft)	36	25	39	61
Average Queue (ft)	9	2	7	31
95th Queue (ft)	32	14	29	57
Link Distance (ft)			456	677
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	150	150		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 560: NE Rifle Range St & SE Diamond Lake Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	89	127	166	40	103	132	96	45	63	45
Average Queue (ft)	23	50	67	9	37	49	37	18	6	23
95th Queue (ft)	65	102	124	33	85	100	76	47	32	51
Link Distance (ft)		2636	2636		8741	8741		925	579	579
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	150			150			225			
Storage Blk Time (%)		0			0					
Queuing Penalty (veh)		0			0					

Intersection: 570: NE Douglas Ave & SE Diamond Lake Blvd

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (ft)	34	54
Average Queue (ft)	4	17
95th Queue (ft)	20	47
Link Distance (ft)		592
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	150	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 580: SE Spruce St & SE Washington Ave/SE Washington Ave (OR138)

Movement	WB	NB	SB
Directions Served	TR	LT	TR
Maximum Queue (ft)	7	237	108
Average Queue (ft)	0	104	51
95th Queue (ft)	5	200	93
Link Distance (ft)	492	358	313
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 590: Douglas & Stephens

Movement	EB	EB	WB	WB	NB	NB	NB	B113	B113	B113	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	T	T	T	L	T
Maximum Queue (ft)	116	146	181	124	116	124	140	33	183	274	160	231
Average Queue (ft)	50	62	84	57	62	109	121	3	61	153	70	111
95th Queue (ft)	98	113	155	103	117	140	136	23	158	276	129	184
Link Distance (ft)		460	485	485	54	54	54	210	210	210	761	761
Upstream Blk Time (%)					20	39	52		0	6		
Queuing Penalty (veh)					66	126	168		0	19		
Storage Bay Dist (ft)	150											
Storage Blk Time (%)		0										
Queuing Penalty (veh)		0										

Intersection: 590: Douglas & Stephens

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	231	235
Average Queue (ft)	126	109
95th Queue (ft)	204	197
Link Distance (ft)	761	761
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 600: Stephens

Movement	NB	NB	NB	SB	SB
Directions Served	T	T	T	R	R
Maximum Queue (ft)	88	105	250	12	11
Average Queue (ft)	14	15	140	0	0
95th Queue (ft)	54	62	277	9	8
Link Distance (ft)	229	229	229	86	86
Upstream Blk Time (%)			2		
Queuing Penalty (veh)			9		
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 610: Stephens & SE Washington Ave (OR138)

Movement	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB	B113	B113
Directions Served	LT	TR	L	L	T	T	T	T	R	R	T	T
Maximum Queue (ft)	135	130	102	111	68	132	266	285	85	98	36	66
Average Queue (ft)	63	58	70	72	21	91	148	158	7	25	2	4
95th Queue (ft)	110	110	106	112	56	121	251	269	45	79	20	35
Link Distance (ft)	460	460	86	86	86	86	210	210	210	210	54	54
Upstream Blk Time (%)			8	10	0	14	2	4			0	0
Queuing Penalty (veh)			26	32	0	42	5	8			1	1
Storage Bay Dist (ft)												
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 620: SE Jackson St & SE Douglas Ave

Movement	EB	WB	WB	SB	SB
Directions Served	LTR	LT	TR	LT	TR
Maximum Queue (ft)	105	73	84	148	66
Average Queue (ft)	54	34	42	55	42
95th Queue (ft)	88	59	69	99	76
Link Distance (ft)	485		385	1035	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		25			35
Storage Blk Time (%)		8	14	15	6
Queuing Penalty (veh)		14	16	12	8

Intersection: 630: SE Oak Ave & SE Spruce St

Movement	EB	EB	SB
Directions Served	T	T	L
Maximum Queue (ft)	58	127	54
Average Queue (ft)	6	13	18
95th Queue (ft)	41	65	49
Link Distance (ft)	242	242	358
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 640: OR 99 SB & SE Oak Ave/Oak (OR138 EB)

Movement	EB	EB	EB	SB	SB	SB
Directions Served	T	T	TR	L	T	T
Maximum Queue (ft)	165	228	241	113	241	241
Average Queue (ft)	36	151	160	26	118	133
95th Queue (ft)	107	222	246	69	224	241
Link Distance (ft)	211	211	211		367	367
Upstream Blk Time (%)	0	2	4			
Queuing Penalty (veh)	0	6	10			
Storage Bay Dist (ft)				125		
Storage Blk Time (%)				0	6	
Queuing Penalty (veh)				0	2	

Intersection: 650: Stephens St & Oak (OR138 EB)

Movement	EB	EB	EB	NB	NB	NB	B119
Directions Served	L	LT	T	T	T	TR	T
Maximum Queue (ft)	137	242	227	108	323	382	131
Average Queue (ft)	29	143	88	33	100	249	14
95th Queue (ft)	78	222	171	80	289	398	85
Link Distance (ft)	242	242	242	315	315	315	711
Upstream Blk Time (%)		0	0		0	6	
Queuing Penalty (veh)		1	0		1	16	
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 660: SE Jackson St & SE Washington Ave

Movement	WB	WB	SB	SB
Directions Served	LT	T	T	TR
Maximum Queue (ft)	81	54	44	59
Average Queue (ft)	43	29	31	30
95th Queue (ft)	64	54	48	53
Link Distance (ft)	377	377	319	319
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 670: SE Kane St & SE Douglas Ave

Movement	EB	WB	NB	NB
Directions Served	TR	L	L	R
Maximum Queue (ft)	5	50	59	76
Average Queue (ft)	0	16	32	33
95th Queue (ft)	4	45	56	56
Link Distance (ft)	385	248	290	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				60
Storage Blk Time (%)			0	0
Queuing Penalty (veh)			0	0

Intersection: 680: SE Ramp Rd & SE Douglas Ave

Movement	WB	NB	NB
Directions Served	LT	L	R
Maximum Queue (ft)	46	56	37
Average Queue (ft)	6	26	19
95th Queue (ft)	30	50	44
Link Distance (ft)	944		776
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		60	
Storage Blk Time (%)		0	0
Queuing Penalty (veh)		0	0

Intersection: 690: SE Douglas Ave & NE Rifle Range St

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	45	62
Average Queue (ft)	3	33
95th Queue (ft)	21	53
Link Distance (ft)	944	925
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 700: SE Jackson St & Oak (OR138 EB)/SE Oak Ave

Movement	EB	EB	SB	SB
Directions Served	T	TR	LT	T
Maximum Queue (ft)	78	99	48	45
Average Queue (ft)	35	49	33	23
95th Queue (ft)	66	78	46	50
Link Distance (ft)	480	480	359	359
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 710: OR 99 SB & SE Mosher Ave

Movement	EB	WB
Directions Served	TR	LT
Maximum Queue (ft)	91	69
Average Queue (ft)	39	30
95th Queue (ft)	73	57
Link Distance (ft)	254	261
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 720: OR 99 NB & SE Mosher Ave

Movement	EB	WB
Directions Served	LT	TR
Maximum Queue (ft)	78	64
Average Queue (ft)	42	33
95th Queue (ft)	67	59
Link Distance (ft)	261	381
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 730: I-5 Exit 123 SB Ramps & Heritage Way/SW Portland Ave

Movement	EB	WB
Directions Served	TR	LT
Maximum Queue (ft)	44	34
Average Queue (ft)	18	19
95th Queue (ft)	46	45
Link Distance (ft)	1158	262
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 740: I-5 Exit 123 NB Ramps & SW Portland Ave

Movement	EB	NB	NB
Directions Served	LT	L	TR
Maximum Queue (ft)	18	36	62
Average Queue (ft)	1	9	12
95th Queue (ft)	10	32	38
Link Distance (ft)	262		928
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		600	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 750: OR 99 & S Gate Shopping Center Dwy

Movement	EB	WB	WB	NB	NB	SB
Directions Served	LTR	LT	R	L	TR	L
Maximum Queue (ft)	62	78	51	12	9	67
Average Queue (ft)	8	23	25	1	0	25
95th Queue (ft)	33	59	49	8	5	60
Link Distance (ft)	104	241	241		892	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)				220		220
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 4438

Intersection: 200: NW Stewart Pkwy & NW Garden Valley Blvd

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	T	R	L
Maximum Queue (ft)	266	339	354	353	423	495	225	208	210	213	208	259
Average Queue (ft)	126	191	208	199	230	254	174	93	107	108	101	149
95th Queue (ft)	220	292	311	323	361	419	286	170	183	187	178	238
Link Distance (ft)		752	752		1240	1240		234	234	234	234	
Upstream Blk Time (%)								0	0	0	0	
Queuing Penalty (veh)								0	0	0	0	
Storage Bay Dist (ft)	400			500			150					200
Storage Blk Time (%)		0				24	6					2
Queuing Penalty (veh)		0				86	21					4

Intersection: 200: NW Stewart Pkwy & NW Garden Valley Blvd

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	313	298	387	225
Average Queue (ft)	162	158	185	171
95th Queue (ft)	261	252	344	256
Link Distance (ft)	563	563	563	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				150
Storage Blk Time (%)	4		3	15
Queuing Penalty (veh)	8		12	31

Intersection: 225: Stephens St & NW Stewart Pkwy/NE Alameda Ave

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	204	161	313	159	227	252	265	286	70	246	277
Average Queue (ft)	102	61	158	49	97	122	116	142	28	133	152
95th Queue (ft)	176	123	268	103	178	217	227	257	62	213	240
Link Distance (ft)		882	882		900		1423	1423		2229	2229
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	215			85		200			200		
Storage Blk Time (%)	0	0		3	15	2	1			1	
Queuing Penalty (veh)	0	0		5	8	7	3			0	

Intersection: 330: Stephens St & NE Garden Valley Blvd

Movement	EB	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	L	T	TR	L	T	TR
Maximum Queue (ft)	286	389	447	175	461	347	370	333	298	235	456	533
Average Queue (ft)	135	171	249	140	247	185	197	170	178	41	245	325
95th Queue (ft)	239	304	403	209	424	329	351	274	267	136	409	485
Link Distance (ft)		452	452		464		456	456			1423	1423
Upstream Blk Time (%)		0	0		2		0	0				
Queuing Penalty (veh)		2	2		5		2	0				
Storage Bay Dist (ft)	225			100		240			240	200		
Storage Blk Time (%)	1	5		25	42	12	14	1	1		12	
Queuing Penalty (veh)	2	9		64	65	26	29	6	4		6	

Intersection: 420: W Harvard Ave & NW Stewart Pkwy

Movement	EB	EB	EB	WB	WB	WB	WB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	LTR	L	TR
Maximum Queue (ft)	224	308	221	6	358	457	175	49	472	190
Average Queue (ft)	139	82	67	0	154	223	150	10	210	131
95th Queue (ft)	217	213	160	5	286	416	215	35	386	230
Link Distance (ft)		2263	2263		1021	1021		286	1168	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	150			100			100			115
Storage Blk Time (%)	10	0			19	13	26		26	4
Queuing Penalty (veh)	19	0			0	57	71		84	12

Intersection: 580: SE Spruce St & SE Washington Ave/SE Washington Ave (OR138)

Movement	NB	SB
Directions Served	LT	TR
Maximum Queue (ft)	161	104
Average Queue (ft)	80	45
95th Queue (ft)	137	77
Link Distance (ft)	358	313
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 648

APPENDIX B - BICYLCE LEVEL OF TRAFFIC STRESS

BTLS_	Segment	From	To	Category	Bike Lane Category Description	Parking	Direction	Speed	Width	LTS	Rural vpd	Rural Shoulder
1	Diamond Lake Boulevar	Stephens St	Rifle Range St	**3**	Mixed Traffic	No	2	35	2 Lane	**4**		
2		Rifle Range St	Phoenix Charter School	**3**	Mixed Traffic	No	2	45	2 Lane	**4**		
3		Phoenix Charter School	East UGB	**4**	Rural no bike lanes	No	2	55	2 Lane	**3**	>7000	4-<6
4	Edenbower Blvd	Renan St	Stewart Pkwy	**2**	Bike Lane without Adjacent Parking Lane	No	1	25	<=5.5'	**2**		
5		Stewart Pkwy	Stephens St	**2**	Bike Lane without Adjacent Parking Lane	No	1	40	5.5'-7'	**4**		
6	Garden Valley Blvd	Melrose Rd	Troost St	**4**	Rural no bike lanes	No	2	45	Unmarked	**3**	>7000	4-<6
7		Troost St	Newcastle St	**2**	Bike Lane without Adjacent Parking Lane	No	2	40	5.5'-7'	**4**		
8		Newcastle St	I-5 SB Ramp	**2**	Bike Lane without Adjacent Parking Lane	No	2	35	<=5.5'	**3**		
9		I-5 SB Ramp	Stephens St	**3**	Mixed Traffic	No	2	30	2 Lane	**4**		
10		Stephens St	Junker Ave	**2**	Bike Lane without Adjacent Parking Lane	No	1	25	<=5.5'	**2**		
11	Harvard Ave	Old Melrose Rd	Lookingglass Rd	**2**	Bike Lane without Adjacent Parking Lane	No	1	35	<=5.5'	**3**		
12		Lookingglass Rd	Stewart Park Dr	**3**	Mixed Traffic	No	2	35	2 Lane	**4**		
13		Stewart Park Dr	Umpqua St	**3**	Mixed Traffic	No	2	30	2 Lane	**4**		
14		Umpqua St	Madrone St	**2**	Bike Lane without Adjacent Parking Lane	No	2	30	<=5.5'	**2**		
15	Oak Ave	Madrone St	Oak Ave Bridge	**2**	Bike Lane without Adjacent Parking Lane	No	2	30	<=5.5'	**2**		
16		Oak Ave Bridge	Oak Ave Bridge	**2**	Bike Lane without Adjacent Parking Lane	No	2	30	>=7'	**1**		
17		Oak Ave Bridge	Pine St	**2**	Bike Lane without Adjacent Parking Lane	No	2	30	<=5.5'	**2**		
18		Pine St	Chadwick St	**3**	Mixed Traffic	Yes	2	25	2 Lane	**3**		
19	Pine St	Douglas Ave	Mosher Ave	**2**	Bike Lane without Adjacent Parking Lane	No	2	25	<=5.5'	**2**		
20		Mosher Ave	South UGB	**2**	Bike Lane without Adjacent Parking Lane	No	2	35	<=5.5'	**3**		
21	Stephens St (Old Highwa	North UGB	Del Rio Rd	**4**	Rural no bike lanes	No	1	35	1 Lane	**2**	1500-7000	4-<6
22		Del Rio Rd	Bridge	**2**	Bike Lane without Adjacent Parking Lane	No	1	35	>=7'	**2**		
23		Bridge	Bridge	**3**	Mixed Traffic	No	1	35	1 Lane	**4**		
24		Bridge	Taft Dr	**4**	Rural no bike lanes	No	1	45	1 Lane	**3**	1500-7000	2-<4
25		Taft Dr	Edenbower Blvd	**2**	Bike Lane without Adjacent Parking Lane	No	1	45	<=5.5'	**4**		
26		Edenbower Blvd	Garden Valley Blvd	**2**	Bike Lane without Adjacent Parking Lane	No	1	35	<=5.5'	**3**		
27		Garden Valley Blvd	Douglas Ave	**3**	Mixed Traffic	No	1	35	2 Lane	**4**		
78		Douglas Ave	Oak Ave	**2**	Bike Lane without Adjacent Parking Lane	No	1	25	<=5.5'	**2**		
79		Oak Ave	South	**3**	Mixed Traffic	Yes	2	25	2 Lane	**3**		
28	Stewart Pkwy	Edenbower Blvd	Valley View Dr	**2**	Bike Lane without Adjacent Parking Lane	No	2	40	<=5.5'	**4**		
29		Valley View Dr	Harvard Ave	**2**	Bike Lane without Adjacent Parking Lane	No	1	35	<=5.5'	**3**		
80		Edenbower Blvd	Stephens St	**2**	Bike Lane without Adjacent Parking Lane	No	2	40	<=5.5'	**4**		
30	Washington Ave	Madrone St	Spruce St	**2**	Bike Lane without Adjacent Parking Lane	No	2	30	<=5.5'	**2**		
31		Spruce St	Chadwick St	**3**	Mixed Traffic	Yes	2	25	2 Lane	**3**		
32	Alameda Ave			**2**	Bike Lane without Adjacent Parking Lane	No	1	25	<=5.5'	**2**		
33	Aviation Dr			**2**	Bike Lane without Adjacent Parking Lane	No	1	25	<=5.5'	**2**		
34	Kane St	Douglas Ave	Lane Ave	**3**	Mixed Traffic	Yes	1	25	1 Lane	**2**		
35		Lane Ave	Southern End	**3**	Mixed Traffic	No	1	25	Unmarked	**1**		
36	Lookingglass Road	Harvard Ave	Goedeck Ave	**2**	Bike Lane without Adjacent Parking Lane	No	1	40	5.5'-7'	**4**		
37		Goedeck Ave	UGB	**4**	Rural no bike lanes	No	1	50	>=7'	**2**	1500-7000	>=6
38	Pearce Rd			**3**	Mixed Traffic	No	1	25	Unmarked	**1**		
39	Ramp St			**3**	Mixed Traffic	No	1	25	1 Lane	**2**		
40	Troost St	North	Garden Valley Blvd	**3**	Mixed Traffic	No	1	25	1 Lane	**2**		
41		Garden Valley Blvd	Greenley St	**1**	Bike Lane with Adjacent Parking Lane	Yes	1	25	<=13'	**3**		
42		Greenley St	UGB	**3**	Mixed Traffic	No	1	25	1 Lane	**2**		
43	Vine St	Meadow Ave	Garden Valley Blvd	**2**	Bike Lane without Adjacent Parking Lane	No	1	25	5.5'-7'	**1**		
44	Winchester St			**2**	Bike Lane without Adjacent Parking Lane	No	1	35	<=5.5'	**3**		
45	Airport Rd			**2**	Bike Lane without Adjacent Parking Lane	No	1	25	<=5.5'	**2**		
46	Bellows St			**3**	Mixed Traffic	No	1	25	Unmarked	**1**		
47	Calkins Rd			**3**	Mixed Traffic	No	1	25	1 Lane	**2**		
48	Cedar St (north of Chestnut Ave)			**2**	Bike Lane without Adjacent Parking Lane	No	1	25	<=5.5'	**2**		
49	Chestnut Ave	West End	Cedar St	**3**	Mixed Traffic	No	1	25	1 Lane	**2**		
50		Cedar St	Stephens St	**2**	Bike Lane without Adjacent Parking Lane	No	1	25	5.5'-7'	**1**		
51	Del Rio Rd	West UGB	I-5 SB Ramp	**4**	Rural no bike lanes	No	1	45	<=5.5'	**3**	1500-7000	2-<4
52		West UGB	Stephens St	**2**	Bike Lane without Adjacent Parking Lane	No	2	35	<=5.5'	**3**		
53	Douglas Ave	Spruce St	Jackson St	**3**	Mixed Traffic	No	1	25	1 Lane	**2**		
54		Jackson St	Dos Gatos Ct	**1**	Bike Lane with Adjacent Parking Lane	Yes	1	25	1 Lane	**2**		
55		Dos Gatos Ct	Rifle Range St	**3**	Mixed Traffic	Yes	1	35	1 Lane	**4**		
56		Rifle Range St	OR 138	**3**	Mixed Traffic	No	1	35	1 Lane	**4**		
57	Fulton St	Fleser Ave	Commercial Ave	**3**	Mixed Traffic	No	1	25	1 Lane	**2**		
58		Commercial Ave	Northern Limit	**3**	Mixed Traffic	No	1	25	Unmarked	**1**		
59	Harvey Ave			**3**	Mixed Traffic	No	1	25	1 Lane	**2**		
60	Hughwood Dr	Troost St	Newcastle St	**3**	Mixed Traffic	No	1	25	Unmarked	**1**		
61		Newcastle St	Kline St	**2**	Bike Lane without Adjacent Parking Lane	No	1	25	<=5.5'	**2**		
62	Jackson St	Diamond Lake Blvd	Douglas Ave	**3**	Mixed Traffic	Yes	1	25	1 Lane	**2**		
63		Douglas Ave	Mosher Ave	**3**	Mixed Traffic	Yes	1	25	2 Lane	**3**		
64		Mosher Ave	South End	**3**	Mixed Traffic	Yes	1	25	Unmarked	**1**		
65	Keasey St			**2**	Bike Lane without Adjacent Parking Lane	No	1	25	<=5.5'	**2**		
66	Kline St			**3**	Mixed Traffic	No	1	25	1 Lane	**2**		
67	Lane Ave	Sheridan St	Kane St	**3**	Mixed Traffic	Yes	1	25	1 Lane	**2**		
68		Kane St	East End	**3**	Mixed Traffic	Yes	1	25	Unmarked	**1**		
69	Lincoln St	Junker Ave	Malheur Ave	**3**	Mixed Traffic	Yes	1	25	1 Lane	**2**		
70	Main St	Douglas Ave	Lane Ave	**3**	Mixed Traffic	Yes	1	25	1 Lane	**2**		
71	Mosher Ave	Sheridan St	Main St	**3**	Mixed Traffic	No	1	25	1 Lane	**2**		
72	Portland Ave			**3**	Mixed Traffic	No	1	25	1 Lane	**2**		
73	Renann St			**2**	Bike Lane without Adjacent Parking Lane	No	1	25	<=5.5'	**2**		
74	Rifle Range St			**3**	Mixed Traffic	No	1	25	1 Lane	**2**		
75	Umpqua College Rd			**4**	Rural no bike lanes	No	1	45	>=7'	**2**	1500-7000	>=6
76	Valley View Dr	Kline St	Stewart Pkwy	**3**	Mixed Traffic	No	1	25	1 Lane	**2**		
77	Walnut St	Garden Valley Blvd	Chestnut Ave	**3**	Mixed Traffic	Yes	1	25	1 Lane	**2**		
	ALL MULTIUSE PATHS HAVE LTS 1 PER METHODOLOGY											

Exhibit 14-3 Bike Lane with Adjacent Parking Lane Criteria

1 Lane per direction				≥2 lanes per direction	
Prevailing or Posted Speed	**≥ 15' bike lane + parking**	**14' – 14.5' bike lane + parking**	**≤ 13' bike lane + parking or Frequent blockage[1]**	**≥ 15' bike lane + parking**	**≤ 14.5' bike lane + parking or Frequent blockage[1]**
≤25 mph	LTS 1	LTS 2	LTS 3	LTS 2	LTS 3
30 mph	LTS 1	LTS 2	LTS 3	LTS 2	LTS 3
35 mph	LTS 2	LTS 3	LTS 3	LTS 3	LTS 3
≥40 mph	LTS 2	LTS 4	LTS 4	LTS 3	LTS 4

[1]Typically occurs in urban areas (i.e. delivery trucks, parking maneuvers, stopped buses).

Exhibit 14-4 Bike Lane without Adjacent Parking Lane Criteria

1 Lane per direction					≥2 lanes per direction	
Prevailing or Posted Speed	≥ 7' (Buffered bike lane)	5.5' – 7' Bike lane	≤ 5.5' Bike lane	Frequent bike lane blockage[1]	≥ 7' (Buffered bike lane)	<7' bike lane or frequent blockage[1]
≤30 mph	LTS 1	LTS 1	LTS 2	LTS 3	LTS 1	LTS 3
35 mph	LTS 2	LTS 3	LTS 3	LTS 3	LTS 2	LTS 3
≥40 mph	LTS 3	LTS 4	LTS 4	LTS 4	LTS 3	LTS 4

[1]Typically occurs in urban areas (i.e. delivery trucks, parking maneuvers, stopped buses).

Exhibit 14-5 Urban/Suburban Mixed Traffic Criteria

Prevailing Speed or Speed Limit (mph)	**Unmarked Centerline**	**1 lane per direction**	**2 lanes per direction**	**3+ lanes per direction**
≤ 25[1]	LTS 1	LTS 2	LTS 3	LTS 4
30	LTS 2	LTS 3	LTS 4	LTS 4
≥ 35	LTS 3	LTS 4	LTS 4	LTS 4

[1]Presesence of "sharrow" markings may reduce the LTS by a level for 25 mph or less sections depending on overall area context.

Exhibit 14-11 Rural Segment Criteria with posted speeds 45 mph or greater[1,2,3]

Daily Volume (vpd)	**Paved Shoulder Width**			
	0 – <2 ft	**2 - <4 ft**	**4 – <6 ft**	**≥ 6 ft**
<400	LTS 2	LTS 2	LTS 2	LTS 2
400 - 1500	LTS 3	LTS 2	LTS 2	LTS 2
1500 - 7000[4]	LTS 4	LTS 3	LTS 2	LTS 2
> 7000	LTS 4	LTS 4	LTS 3	LTS 3

[1] Based on p1-3 & Table 1-2 from the Oregon Bicycle and Pedestrian Design Guide, 2011.
[2]Adequate stopping sight distances on curves and grades assumed. A high frequency of sharper curves and short vertical transitions can increase the stress level especially on roadways with less than 6' shoulders. Engineering judgment will be needed to determine what impact this will have on the LTS level on a particular segment.
[3]Segments with flashing warning beacons announcing presence of bicyclists (typically done on narrower long bridges or tunnels) may, depending on judgment, reduce the LTS by one, but no less than LTS 2.
[4]Over 1500 AADT, the Oregon Bicycle and Pedestrian Design Guide indicates the need for shoulders.

APPENDIX C: HSM PART B CALCULATIONS

Crash rate exceeds critical crash rate

Crash rate exceeds Statewide 90th Percentile

ID	TEV	ADT	MEV	Crashes	Intersection	Intersection Type (Population)	Crash Rate	Reference Population Critical Crash Rate (95% CI)	Statewide 90th Percentile Crash Rate	Summary	
10	405	4212	8	3	OR 99 at Wilbur Rd	Urban 3ST	0.39	0.51	0.29	***0.39***	Exceeds
20	420	4368	8	3	OR 99 at Bank Rd	Urban 3ST	0.38	0.50	0.29	***0.38***	Exceeds
30	760	7904	14	0	I-5 Exit 129 NB Ramps at OR 99	Urban 3SG	0.00	0.50	0.51	0.00	
40	550	6050	11	4	I-5 Exit 129 SB Ramps at Del Rio Rd	Urban 3ST	0.36	0.45	0.29	***0.36***	Exceeds
50	1120	12320	22	0	OR 99 at Del Rio Rd/Umpqua College Rd	Urban 4SG	0.00	0.72	0.86	0.00	
60	1400	15400	28	7	Stephens St at Kenneth Ford Dr	Urban 3SG	0.25	0.42	0.51	0.25	
70	1470	16170	30	4	Edenbower Blvd at Broad St	Urban 3ST	0.14	0.34	0.29	0.14	
80	1760	19360	35	12	I-5 Exit 127 SB Ramps at Edenbower Blvd	Urban 4SG	0.34	0.66	0.86	0.34	
90	1650	18150	33	13	I-5 Exit 127 NB Ramps at Edenbower Blvd	Urban 4SG	0.39	0.67	0.86	0.39	
100	1670	18370	34	19	Edenbower Blvd at Aviation Dr	Urban 4SG	0.57	0.67	0.86	0.57	
110	1985	21835	40	14	Edenbower Blvd at Stephens St	Urban 4SG	0.35	0.65	0.86	0.35	
120	1528	16808	31	13	Stephens St at Newton Creek Rd	Urban 4SG	0.42	0.68	0.86	0.42	
130	2430	26730	49	33	Stewart Pkwy at Edenbower Blvd	Urban 4SG	0.68	0.63	0.86	0.68	Exceeds
140	1299	14289	26	4	Garden Valley Blvd at Melrose Rd	Urban 4ST	0.15	0.35	0.41	0.15	
150	1591	17501	32	7	Garden Valley Blvd at Troost St	Urban 4SG	0.22	0.68	0.86	0.22	
160	2230	24530	45	13	Garden Valley Blvd at Kline St	Urban 4SG	0.29	0.64	0.86	0.29	
170	2165	23815	43	2	Garden Valley Blvd at Roseburg Valley Mall (Middle Entrance)	Urban 3ST	0.05	0.31	0.29	0.05	
180	2280	25080	46	27	Stewart Pkwy at Roseburg Mall Entrance/Walmart Entrance	Urban 4SG	0.59	0.64	0.86	0.59	
190	1385	15235	28	20	Stewart Pkwy at Aviation Dr/Mullholland Dr	Urban 4SG	0.72	0.69	0.86	0.72	Exceeds
200	4140	45540	83	61	Garden Valley Blvd at Stewart Pkwy	Urban 4SG	0.73	0.59	0.86	0.73	Exceeds
210	1495	16445	30	11	Stewart Pkwy at Valley View Dr	Urban 3ST	0.37	0.34	0.29	***0.37***	Exceeds
220	1250	13750	25	30	Stewart Pkwy at Airport Rd	Urban 4SG	1.20	0.71	0.86	***1.20***	Exceeds
230	440	4840	9	2	Vine St at Alameda Ave	Urban 4ST	0.23	0.49	0.41	0.23	
240	326	3586	7	1	Troost St at Calkins Rd	Urban 4ST	0.15	0.55	0.41	0.15	
250	355	3905	7	2	Keasey St at Calkins Rd	Urban 3ST	0.28	0.53	0.29	0.28	
260	2706	29766	54	26	Garden Valley Blvd at Goetz Street/Duck Pond Street	Urban 4SG	0.48	0.62	0.86	0.48	
270	2726	29986	55	35	Garden Valley Blvd at Centennial Dr/Estelle St	Urban 4SG	0.64	0.62	0.86	0.64	Exceeds
280	2911	32021	58	36	Garden Valley Blvd at Garden Valley Shopping Center	Urban 4SG	0.62	0.62	0.86	0.62	
290	4145	45595	83	12	I-5 Exit 125 at SB Ramp at Garden Valley Blvd/Mulholland Dr	Urban 4SG	0.14	0.59	0.86	0.14	
300	3435	37785	69	33	I-5 Exit 125NB Ramp at Garden Valley Blvd/Mulholland Dr	Urban 4SG	0.48	0.60	0.86	0.48	
310	2305	25355	46	25	Garden Valley Blvd at Airport Rd/Cedar St	Urban 4SG	0.54	0.64	0.86	0.54	
320	1936	21296	39	13	Garden Valley Blvd at Walnut St	Urban 4SG	0.33	0.65	0.86	0.33	
330	3630	39930	73	35	Garden Valley Blvd at Stephens St	Urban 4SG	0.48	0.60	0.86	0.48	
340	385	4235	8	0	Garden Valley Blvd at Rocky Ridge Dr	Urban 3ST	0.00	0.51	0.29	0.00	
350	1690	18590	34	11	Stewart Pkwy at Harvey Ave	Urban 4SG	0.32	0.67	0.86	0.32	
360	222	2442	4	1	Chestnut Ave at Cedar St	Urban 4ST	0.22	0.64	0.41	0.22	
370	2525	27775	51	25	Stephens St at Chestnut Ave	Urban 3ST	0.49	0.30	0.29	***0.49***	Exceeds
380	2495	27445	50	8	Stephens St at Winchester St	Urban 3ST	0.16	0.30	0.29	0.16	
390	168	1848	3	1	Lincoln St at Malheur Ave	Urban 4ST	0.30	0.73	0.41	0.30	
400	890	9790	18	2	Harvard Ave at Lookingglass Rd	Urban 3ST	0.11	0.38	0.29	0.11	
410	1088	11968	22	4	Harvard Ave at Broccoli St	Urban 4ST	0.18	0.37	0.41	0.18	
420	2452	26972	49	25	Harvard Ave at Stewart Pkwy	Urban 4SG	0.51	0.63	0.86	0.51	
430	1856	20416	37	9	Harvard Ave at Keady Ct	Urban 4SG	0.24	0.66	0.86	0.24	
440	1935	21285	39	7	Harvard Ave at Centennial Dr	Urban 3SG	0.18	0.39	0.51	0.18	
450	2345	25795	47	3	Harvard Ave at Maple St	Urban 3ST	0.06	0.30	0.29	0.06	
460	2412	26532	48	6	Harvard Ave at Harrison St	Urban 4ST	0.12	0.30	0.41	0.12	
470	2487	27357	50	17	Harvard Ave at Umpqua St	Urban 4SG	0.34	0.63	0.86	0.34	

APPENDIX C: HSM PART B CALCULATIONS

Crash rate exceeds critical crash rate

Crash rate exceeds Statewide 90th Percentile

ID	TEV	ADT	MEV	Crashes	Intersection	Intersection Type (Population)	Crash Rate	Reference Population Critical Crash Rate (95% CI)	Statewide 90th Percentile Crash Rate	Summary	
480	2885	31735	58	22	I-5 Exit 124 SB Ramps at Harvard Ave	Urban 4SG	0.38	0.62	0.86	0.38	
490	2675	29425	54	4	I-5 Exit 124 NB Slip at Harvard Ave	Urban 4ST	0.07	0.30	0.41	0.07	
500	2825	31075	57	14	I-5 Exit 124 NB Ramps at Harvard Ave	Urban 4SG	0.25	0.62	0.86	0.25	
510	2320	25520	47	2	Harvard Ave at Corey St	Urban 3ST	0.04	0.30	0.29	0.04	
520	2385	26235	48	11	Washington Ave at Madrone St	Urban 4SG	0.23	0.63	0.86	0.23	
530	2125	23375	43	17	Diamond Lake Blvd at Stephens St	Urban 3SG	0.40	0.39	0.51	0.40	Exceeds
540	2210	24310	44	19	Diamond Lake Blvd at Jackson St/Winchester St	Urban 4SG	0.43	0.64	0.86	0.43	
550	1498	16478	30	1	Diamond Lake Blvd at Fulton St	Urban 4ST	0.03	0.34	0.41	0.03	
560	1476	16236	30	9	Diamond Lake Blvd at Rifle Range St	Urban 4SG	0.30	0.68	0.86	0.30	
570	970	10670	19	1	Diamond Lake Blvd at Douglas Ave	Urban 3ST	0.05	0.38	0.29	0.05	
580	1410	15510	28	15	Washington Ave at Spruce St	Urban 4ST	0.53	0.34	0.41	***0.53***	Exceeds
590	2250	24750	45	0	Stephens St at Douglas Ave	Urban 4SG	0.00	0.64	0.86	0.00	
600	1860	20460	37	17	Washington Ave at Pine St	Urban 4SG	0.46	0.66	0.86	0.46	
610	2280	25080	46	19	Washington Ave at Stephens St	Urban 4SG	0.42	0.64	0.86	0.42	
620	690	7590	14	6	Douglas Ave at Jackson St	Urban 4ST	0.43	0.42	0.41	***0.43***	Exceeds
630	975	10725	20	3	Oak Ave at Spruce St	Urban 3ST	0.15	0.37	0.29	0.15	
640	1365	15015	27	32	Oak Ave at Pine St	Urban 4SG	1.17	0.69	0.86	***1.17***	Exceeds
650	1490	16390	30	45	Oak Ave at Stephens St	Urban 4SG	1.50	0.68	0.86	***1.50***	Exceeds
660	350	3850	7	1	Washington Ave at Jackson St	Urban 4ST	0.14	0.53	0.41	0.14	
670	645	7095	13	3	Douglas Ave at Kane St	Urban 3ST	0.23	0.42	0.29	0.23	
680	325	3575	7	2	Douglas Ave at Ramp Rd	Urban 3ST	0.31	0.54	0.29	***0.31***	Exceeds
690	230	2530	5	1	Douglas Ave at Rifle Range St	Urban 3ST	0.22	0.63	0.29	0.22	
700	345	3795	7	3	Oak Ave at Jackson St	Urban 4ST	0.43	0.54	0.41	***0.43***	Exceeds
710	840	9240	17	5	Pine St at Mosher Ave	Urban 4ST	0.30	0.39	0.41	0.30	
720	850	9350	17	6	Stephens St at Mosher Ave	Urban 4ST	0.35	0.39	0.41	0.35	
730	116	1276	2	0	I-5 Exit 123 SB Ramps at Portland Ave	Urban 4ST	0.00	0.88	0.41	0.00	
740	105	1155	2	0	I-5 Exit 123 NB Ramps at Portland Ave	Urban 4ST	0.00	0.92	0.41	0.00	
750	1136	12496	23	1	Stephens St at S. Gate Shopping Center Entrance	Urban 4ST	0.04	0.36	0.41	0.04	

Population	Average Crash Rate Per population
Urban 3SG	0.249930866
Urban 4SG	0.462363985
Urban 3ST	0.188109122
Urban 4ST	0.190269582

Exhibit 4-1: Intersection Crash Rates per MEV by Land Type and Traffic Control

Intersection Types	90th %ile
Rural 3SG	0.464
Rural 3ST	0.475
Rural 4SG	0.579
Rural 4ST	1.08
Urban 3SG	0.509
Urban 3ST	0.293
Urban 4SG	0.86
Urban 4ST	0.408

City of Roseburg
Transportation System Plan Update

Final Technical Memorandum #4
(Task 6.4 – Future Transportation Operations)

Prepared for

City of Roseburg
900 SE Douglas Avenue
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Prepared by

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2100 SW River Parkway
Portland, Oregon

August 2018

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The Transportation System Tomorrow

The purpose of this section is to describe the future traffic forecast methodology and assumptions used for future forecasting and analysis of intersections and roadway segments for the City of Roseburg Transportation System Plan Update.

This memorandum provides an overview of the future transportation system operations and deficiencies for all modes within Roseburg's Urban Growth Boundary (UGB). The information included in this memorandum will be used in conjunction with *Technical Memorandums #1, 2 and 3* and input from the project team to determine the future transportation system needs for the Roseburg Transportation System Plan (TSP) update.

Roseburg TSP - A Comprehensive, Citywide Assessment

A TSP examines the City's multimodal transportation system as a whole, considers planning for street maintenance, connectivity, access, safety and the impact of future growth throughout the network. In order to review the system that is most likely to affect an average Roseburg citizen or visitor, and to efficiently use time and resources for analysis, TSPs generally focus on the higher-order, arterial and collector street system. Arterials and collectors, by definition, are meant to provide connections across a city and between neighborhoods and activity centers. As such, Roseburg's arterial and collector street intersections and corridors are the focus of the TSP Update.

Introduction

This memorandum summarizes the future baseline conditions of Roseburg's transportation system through the year 2040 planning horizon. Included is a summary of the forecast for Roseburg's population and employment, how future transportation needs are determined, future transportation demand, a description of what Roseburg's transportation system is expected to look like in 2040 and next steps. In addition to vehicular, pedestrian and bicycle performance deficiencies, this memorandum addresses missing links, geometric deficiencies and safety issues for each transportation modal element (e.g. transit, freight, rail and air).

Purpose

The purpose of this document is to provide the transportation data and analysis to assist the City of Roseburg in their decision-making process and enable them to prioritize the most critical transportation projects. The analysis process builds upon the existing conditions summary (*Technical Memorandum #3*), considers near-term transportation system investments in projects with approved funding. Assumed projects were compiled from fiscally-constrained projects listed in the City Capital Improvement Plan (CIP), State Transportation Improvement Program (STIP), 2006 Transportation System Plan (TSP) and adopted Interchange Area Management Plans (IAMPs).

Future Population and Employment

The amount of people living and working in Roseburg and the surrounding communities will impact the future of the transportation system. The assumptions that are made about land use also has an impact on transportation. For example, retail land uses generate more trips than residential. Balancing the locations of different land use types can reduce the need for residents to travel long distances, thus reducing stress on the transportation network.

The Oregon Department of Transportation (ODOT) Transportation Planning and Analysis Unit (TPAU) developed *Base Year 2010 and Future Year 2035 Scenario Travel Demand Forecasting Model Documentation* (see Appendix B) that summarizes the expected household and employment growth forecasts in the Roseburg Travel Demand Model Area. The population and employment growth forecasts are consistent with current land use zoning and State-approved population forecasts for the Roseburg urban area.

The Roseburg Travel Demand Model estimates the City of Roseburg and the surrounding communities are home to over 20,000 households and over 27,000 jobs. Many jobs are held by residents outside of Roseburg's UGB and vice versa. Within its boundary, the Roseburg Travel Demand Model (boundary shown in Figure 1, page 4) estimates that between 2017 and 2040, the number of jobs is expected to increase by 37 percent and the number of households is expected to increase by 41 percent (Table 1). This high rate of growth, in addition to increased tourism activity, will greatly increase traffic demand on Roseburg's transportation network through the year 2040 planning horizon.

TABLE 1. ROSEBURG TRAVEL DEMAND MODEL SUMMARY (2010-2040)

Description	2010	2017[1]	2035	2040[1]	Percent Change (2017-2040)
Household	19,651	22,486	29,778	31,803	41%
Employment	24,315	27,381	35,263	37,453	37%

Source: *Base Year 2010 and Future Year 2035 Scenario Travel Demand Forecasting Model Documentation, ODOT TPAU*
1. Year 2017 and year 2040 values were calculated using a linear growth equation

Employment Growth

The areas of highest employment growth are anticipated in commercial and industrial lands within the area bounded by Stewart Parkway (west and north), Stephens Street (east) and Harvard Avenue (south). Employment growth is also expected in east Roseburg along the Diamond Lake Corridor; the Roseburg City Council has voted to work toward creating a new urban renewal area which could encourage development along the corridor.

Housing Growth

Significant housing growth is expected in several Roseburg subareas (currently zoned for residential development):

- Northwest Roseburg off of Troost Street and south of Edenbower Boulevard
- Southwest Roseburg near Lookingglass Road
- Ramp Canyon south of Douglas Avenue

- Charter Oaks
- Riversdale (Del Rio Road)
- Green (Outside UGB)
- Melrose (Outside UGB)
- Winston (Outside UGB)

Future Travel Demand

With the level of forecasted household and employment growth, Roseburg is expected to see significantly more traffic during the future PM peak hour. Significant increases in vehicle trip ends are expected within areas of higher residential and commercial growth, as shown in Appendix B.

The long-range regional travel forecasts are consistent with current land use zoning and funded transportation projects within the Roseburg UGB.

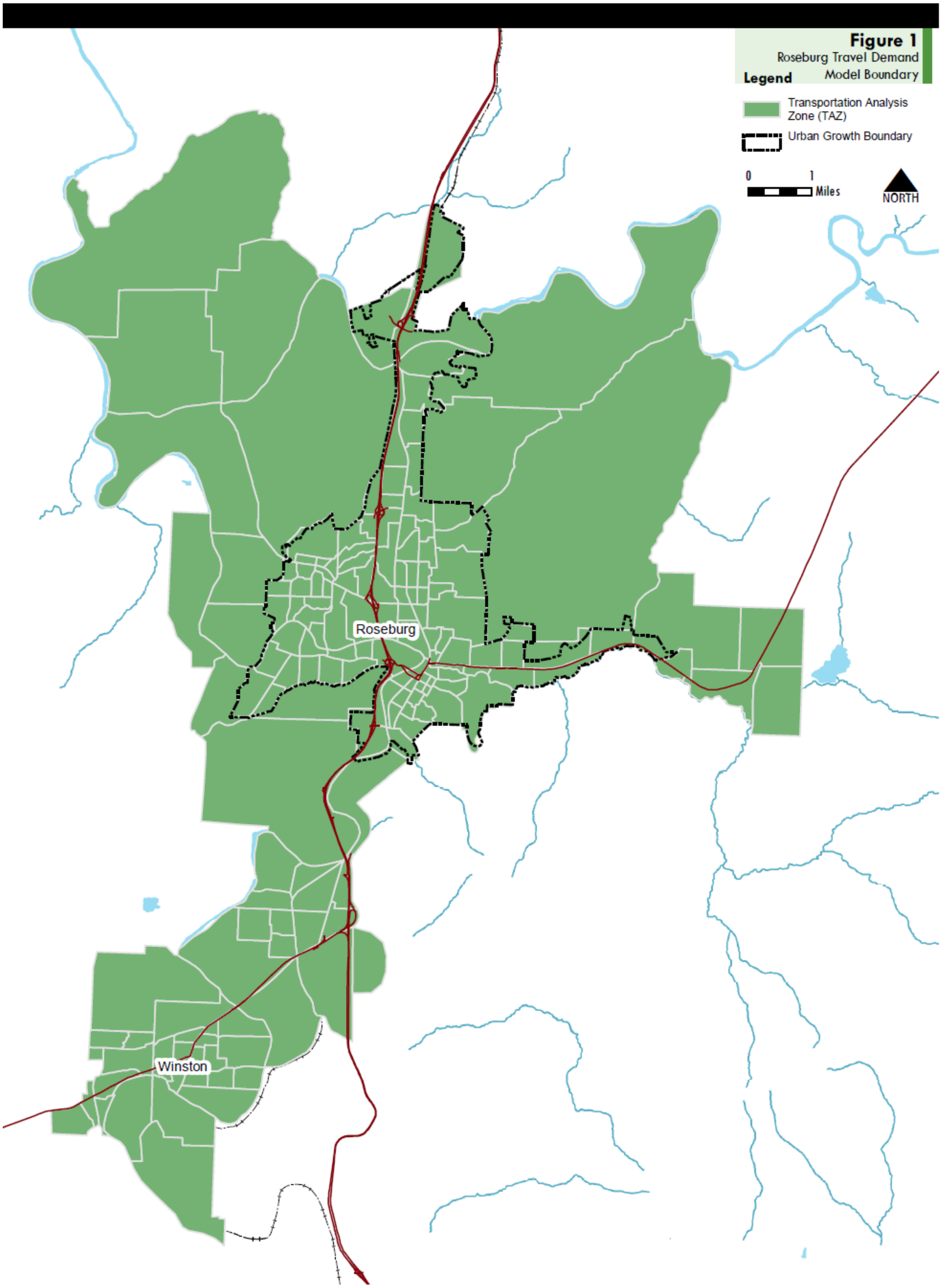
Future Vehicular Traffic Volume Development

Future baseline traffic volume forecasts for year 2040 were developed using the 2010 and 2035 Roseburg travel demand forecasting models in combination with the 2016 existing traffic data. The planning horizon for the TSP extends to 2040; thus, year 2035 model volumes were extrapolated to 2040.

Travel demand models are tools used to help predict the patterns of future commuters, school traffic, and recreational traffic. The model relies on socioeconomic data (e.g., households and employment) to determine the travel demand, and system attributes (e.g., roadway capacity, speeds, and distances) to represent the transportation supply. The long-range regional growth forecasts are consistent with current land use zoning. The detailed model assumptions are described in detail in Appendix B in a memorandum developed by TPAU.

The volumes were post-processed following the methodologies outlined in the TPAU *Analysis Procedures Manual* (APM) *Volume 2* and National Cooperative Highway Research Program (NCHRP) *Report 765* guidelines. The methodologies used are described in detail in *Technical Memorandum #1, Appendix A (Methodology and Assumptions Memorandum).*

FIGURE 1. ROSEBURG TRAVEL DEMAND MODEL



Future Estimates of Walking, Biking and Transit

While there is great interest in developing forecasting models for bicycles and pedestrians, the traditional travel demand methodology used for estimating motor vehicle activity does not easily apply to bicycle and pedestrian travel for a number of reasons, including:

- Data on walking and biking is typically too limited or inaccurate to develop accurate models.
- The nature of bicycle and pedestrian travel and decision-making is not easily understood and the cost to analyze and develop walk and bike models is prohibitive.

As such, the future needs for walking, biking and transit in Roseburg are determined by reviewing areas of future growth in the City, how well the City is served by existing facilities and how planned/funded projects might improve future systems. Key Roseburg destinations (such as schools, parks, transit stops, shopping and employment) will likely attract future walking and biking trips.

Future Travel Conditions

Street and Highway System

Future Roadway Network

The network used in the forecasts for the Roseburg TSP is a future network that includes roadway projects and safety improvements that are expected to occur by year 2040 on study area roadways. These projects have known funding sources or are programmed to be funded within the next 20 years:

- **Stewart Parkway Widening** – Widen to four lanes between Harvey Avenue and Garden Valley Parkway, straighten S-curves, build new bridge over South Umpqua River, and install new sidewalks and new bike lanes (CIP).
    - Phase I (under construction – expected to finish by the time the TSP update is complete): Garden Valley Boulevard to Harvey Avenue
- **Edenbower Boulevard/Stewart Parkway Intersection Improvements** – Dual eastbound left-turns at (CIP/IAMP 127) (Expected to be constructed by the time the TSP update is complete)
- **I-5: Exit 124 Signal Upgrades & Bellows Street Realignment** – Replace signal poles and hardware at the northbound and southbound ramp terminals. Add turn lanes and realign Bellows St. and the southbound off-ramp (2018-2021 STIP)
- **North Bank Road Reconstruction –** Replacement of two culverts, Full Depth Reclamation, excavation and embankment, aggregate subbase and base, paving & installation of guardrail (2018-2021 STIP)
- **Douglas County Warning Sign Upgrades –** Install curve signs, chevrons and flashing beacon on North Bank Road. Install Curve signs and chevrons on Glenbrook Loop/Riddle Bypass Rd/Sixth Ave., Tiller Trail Highway and Garden Valley Rd. (2018-2021 STIP)

The City has identified additional projects as part of their CIP that would help fill previously identified gaps in the transportation system. These planned projects do not yet have a secured funding source, but will be considered during the solutions development phase of the TSP update. The second phase of the Stewart Parkway Widening (Harvey Avenue to Harvard Avenue) is an example of such a project. For reference, the City's current CIP is included as an appendix to this memorandum.

Operational Criteria

The City's mobility performance targets are discussed in Technical Memorandum #3. V/C and LOS thresholds are the key technical and policy benchmarks for measuring street/vehicle performance, used to help identify future improvements and to manage growth. Appendix A provides detailed descriptions of the operational criteria and mobility targets.

Future Driving Conditions

If there are additional peak hour trips on the system without planned improvements, the result will be increased delay, higher v/c ratios and worse LOS ratings at the study area roadways and intersections. In addition to the peak hour commuting trips, the region is expected to experience more tourism traffic, as well as increased congestion in neighboring communities.

Year 2040 average daily traffic volumes (ADT) were estimated from the peak hour traffic volumes. Figure 2 summarizes the 2040 forecasted ADT along the study area roadways. As shown in the figure, sections of Garden Valley Boulevard, Stephens Street and Harvard Avenue are expected to serve the highest number of traffic volumes. How well a roadway functions and operates is influenced by a number of factors: speed, traffic volumes, percentage of trucks, roadway grade, traffic signals, number of accesses/driveways and number of lanes. When looking at the future traffic demand on Roseburg roadways, how well these high-volume roadways are going to operate will be influenced by traffic signal timing, number of accesses, speed and number of lanes.

Figure 3 reports a summary of the anticipated future (year 2040) vehicular traffic operational results for each analysis intersection. Level of service is indicated by color of intersection marker, with the v/c indicated in text. If an intersection marker is outlined in bold, it exceeds the applicable mobility target.

Analysis of the future 2040 PM peak hour indicates that of the 76 study intersections, 15 are forecasted to exceed applicable mobility targets. Table 2 (Page 9) below provides a detailed summary of the existing operations for each study area intersection. The intersections exceeding mobility targets are shaded in grey.

FIGURE 2. FUTURE (2040) BASELINE TRAFFIC VOLUMES

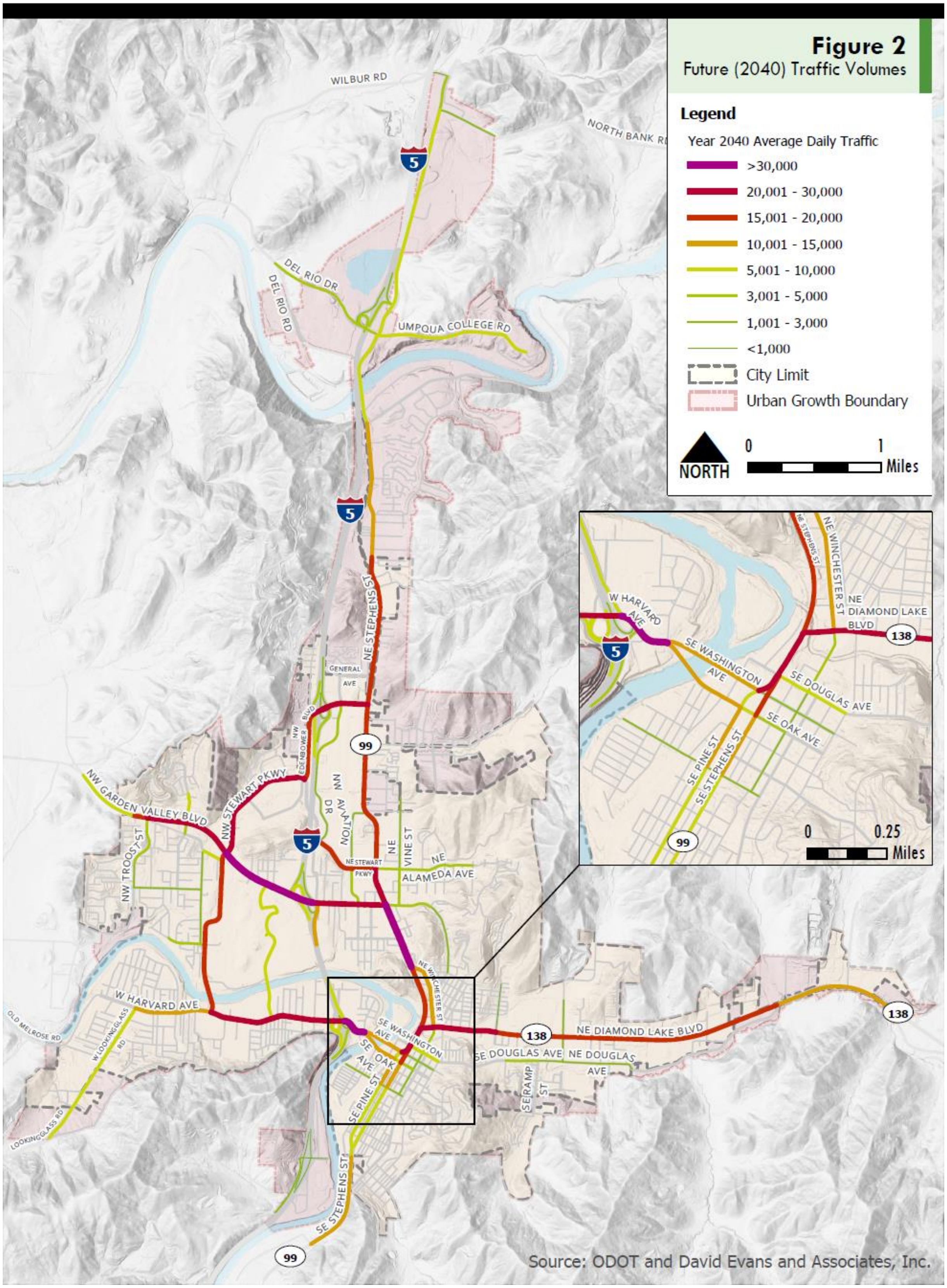


FIGURE 3. FUTURE (2040) BASELINE PM PEAK HOUR VEHICULAR OPERATIONS

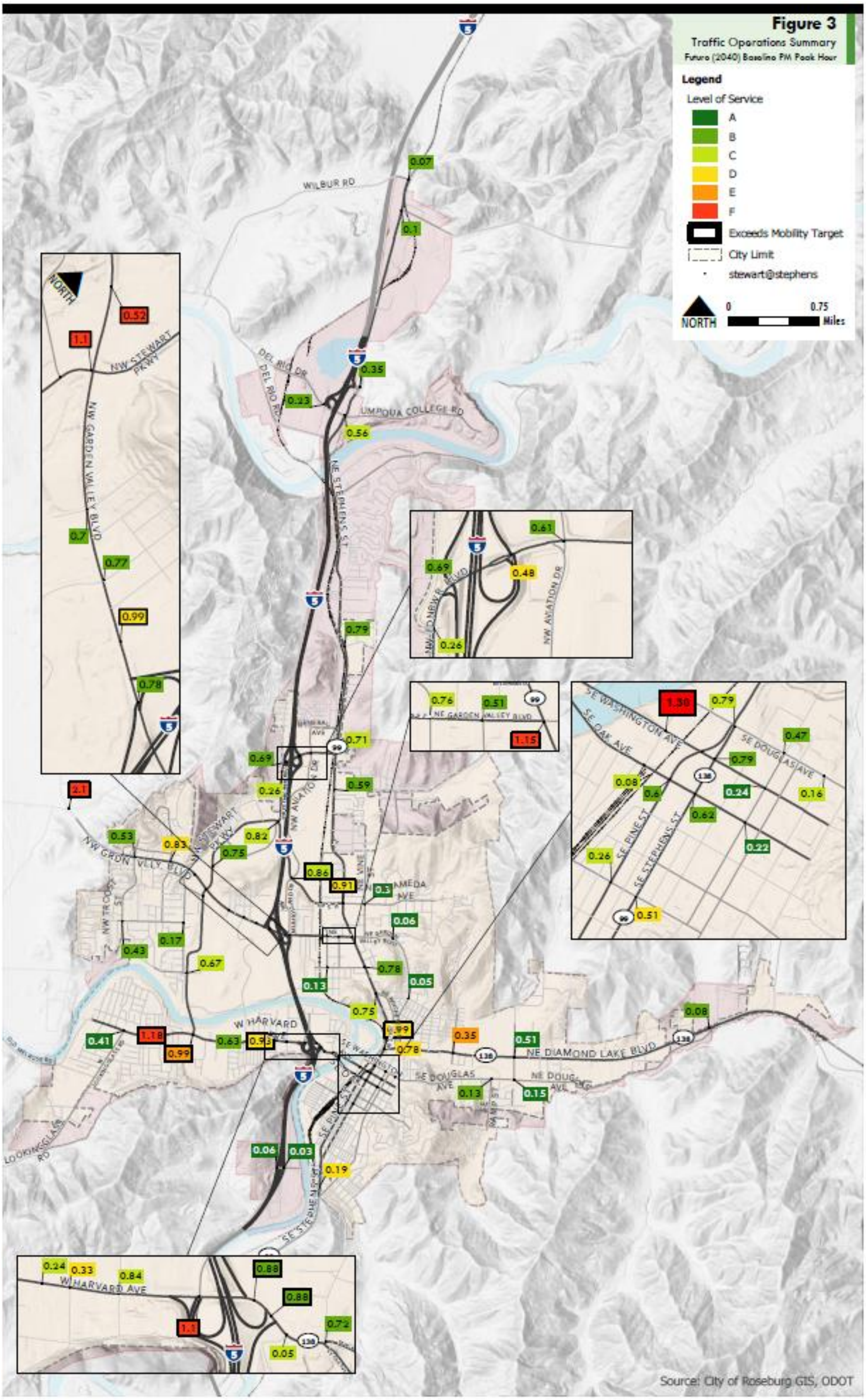


TABLE 2. FUTURE (2040) BASELINE PM PEAK HOUR TRAFFIC OPERATIONS

	Intersection	Traffic Signal	Critical Movement[1]	V/C[2]	LOS[2]	Mobility Target[3]
1	OR 99 at Wilbur Rd		EB L/R	0.07	B	0.85
2	OR 99 at N Bank Rd		WB L/R	0.10	B	0.85
3	OR 99 at I-5 Exit 129 NB Ramps	✓	Overall	0.35	B	0.75
4	I-5 Exit 129 SB Ramps at Del Rio Rd		SB L	0.23	B	0.95
5	OR 99 at Del Rio Rd at Umpqua College Rd	✓	Overall	0.56	C	0.85, LOS D
6	Stephens St at Kenneth Ford Dr	✓	Overall	0.79	B	0.85, LOS D
7	Edenbower Blvd at Broad St*		EB L/R	0.26	C	0.85, LOS E
8	I-5 Exit 127 SB Ramps at Edenbower Blvd*		Overall	0.69	B	0.85
9	I-5 Exit 127 NB Ramps at Edenbower Blvd*		NB R	0.48	D	0.85
10	Edenbower Blvd at Aviation Dr*	✓	Overall	0.61	B	0.85, LOS D
11	Edenbower Blvd at Stephens St*	✓	Overall	0.71	C	0.85, LOS D
12	Stephens St at Newton Creek Rd	✓	Overall	0.59	B	0.85, LOS D
13	Stewart Pkwy at Edenbower Blvd*	✓	Overall	0.82	C	0.85, LOS D
14	**Garden Valley Blvd at Melrose Rd**		**EB L/T**	**>2.0**	**F**	**0.85**
15	Garden Valley Blvd at Troost St	✓	Overall	0.53	B	0.85, LOS D
16	Garden Valley Blvd at Kline St	✓	Overall	0.83	D	0.85, LOS D
17	**Garden Valley Blvd at Roseburg Valley Mall (Middle Entrance)**		**SB L/R**	**0.52**	**F**	**0.85, LOS E**
18	Stewart Pkwy at Roseburg Mall Entrance	✓	Overall	0.75	B	0.85, LOS D
19	**Stewart Pkwy at Aviation Dr/Mullholland Dr**	✓	**Overall**	**0.86**	**C**	**0.85, LOS D**
20	**Garden Valley Blvd at Stewart Pkwy**	✓	**Overall**	**1.09**	**E**	**0.85, LOS D**
21	**Stewart Pkwy at Valley View Dr**		**EB L**	**1.27**	**F**	**0.85, LOS E**
22	Stewart Pkwy at Airport Rd	✓	Overall	0.59	B	0.85, LOS D
22.5	**Stewart Pkwy at Stephens St**	✓	**Overall**	**0.91**	**D**	**0.85, LOS D**
23	Vine St at Alameda Ave		EB L/T/R	0.30	A	0.90, LOS E
24	Troost St at Calkins Rd		WB L/T/R	0.43	B	0.90, LOS E
25	Keasey St at Calkins Rd		EB L/R	0.17	B	0.90, LOS E
26	Garden Valley Blvd at Goetz St/Duck Pond St	✓	Overall	0.72	B	0.85, LOS D
27	Garden Valley Blvd at Centennial Dr at Estelle St**	✓	Overall	0.77	B	0.85, LOS D
28	**Garden Valley Blvd at Garden Valley Shopping Center****	✓	**Overall**	**0.99**	**D**	**0.85, LOS D**
29	I-5 Exit 125 SB Ramps at Garden Valley Blvd**	✓	Overall	0.78	B	0.85
30	**I-5 Exit 125 NB Ramps at Garden Valley Blvd at Mulholland Dr****	✓	**Overall**	**0.99**	**D**	**0.85**
31	Garden Valley Blvd at Airport Rd at Cedar St**	✓	Overall	0.76	C	0.85, LOS D
32	Garden Valley Blvd at Walnut St	✓	Overall	0.54	A	0.85, LOS D
33	**Garden Valley Blvd at Stephens St**	✓	**Overall**	**1.10**	**F**	**0.85, LOS D**
34	Garden Valley Blvd at Rocky Ridge Dr		EB L/T	0.06	A	0.85, LOS E
35	Stewart Pkwy at Harvey Ave	✓	Overall	0.66	C	0.85, LOS D
36	Chestnut Ave at Cedar St		WB L/T/R	0.13	A	0.90, LOS E
37	Stephens St at Chestnut Ave	✓	Overall	0.78	B	0.85, LOS E
38	Stephens St at Winchester St		SB L	0.75	C	0.85, LOS E
39	Lincoln St at Malheur Ave		WB L/T/R	0.05	A	0.90, LOS E
40	Harvard Ave at Lookingglass Rd		WB L	0.41	A	0.85, LOS E
41	**Harvard Ave at W Broccoli St**		**SB L/T/R**	**1.18**	**F**	**0.85, LOS E**
42	Harvard Ave at Stewart Pkwy	✓	Overall	0.81	C	0.85, LOS D
43	Harvard Ave at W Keady Ct.	✓	Overall	0.63	B	0.85, LOS D

TABLE 2. FUTURE (2040) BASELINE PM PEAK HOUR TRAFFIC OPERATIONS

	Intersection	Traffic Signal	Critical Movement[1]	V/C[2]	LOS[2]	Mobility Target[3]
44	**Harvard Ave at Centennial Dr**	✓	**Overall**	**0.93**	**D**	**0.85, LOS D**
45	Harvard Ave at Maple St **		SB L/R	0.24	C	0.85, LOS E
46	Harvard Ave at Harrison St **		NB L/T/R	0.33	D	0.85, LOS E
47	Harvard Ave at Umpqua St **	✓	Overall	0.84	C	0.85, LOS D
48	**I-5 Exit 124 SB Ramps at Harvard Ave****	✓	**Overall**	**1.10**	**F**	**0.85**
49	**I-5 Exit 124 NB On-Ramps at Harvard Ave****		**Overall**	**0.88**	**B**	**0.85**
50	**I-5 Exit 124 NB Off Ramp at Harvard Ave****	✓				
51	Harvard Ave at Corey St **		NB L/R	0.05	C	0.90
52	Washington Ave at Madrone St **	✓	Overall	0.72	B	0.90
53	**Diamond Lake Blvd at Stephens St**	✓	**Overall**	**0.99**	**D**	**0.90**
54	Diamond Lake Blvd at Jackson St at Winchester St	✓	Overall	0.78	D	0.90
55	Diamond Lake Blvd at Fulton St		SB L/T/R EB L	0.35 0.04	E A	0.95 (N/S) 0.90 (E/W)
56	Diamond Lake Blvd at Rifle Range St	✓	Overall	0.51	A	0.90
57	Diamond Lake Blvd at Douglas Ave		NB L/R WB L	0.08 0.02	B B	0.90 (N/S) 0.85 (E/W)
58	**Washington Ave at Spruce St**		**NB L/T** WB L/T	**1.30** -	**F** A	**0.90** 0.90
59	Stephens St at Douglas Ave	✓	Overall	0.79	C	0.90
60	Washington Ave at Pine St[4]	✓	Overall	-	-	0.90
61	Washington Ave at Stephens St	✓	Overall	0.79	B	0.90
62	Douglas Ave at Jackson St		EB L/T/R	0.47	B	0.95, LOS E
63	Oak Ave at Spruce St **		SB L	0.08	C	0.90
64	Oak Ave at Pine St	✓	Overall	0.60	B	0.90
65	Oak Ave at Stephens St	✓	Overall	0.62	B	0.90
66	Washington Ave at Jackson St		WB T	0.24	A	0.95, LOS E
67	Douglas Ave at Kane St		NB L	0.16	C	0.95, LOS E
68	Douglas Ave at Ramp Rd		NB L	0.13	B	0.90, LOS E
69	Douglas Ave at Rifle Range St		SB L/R	0.15	A	0.90, LOS E
70	Oak Ave at Jackson St		EB T	0.22	A	0.95, LOS E
71	Pine St at Mosher Ave		EB T/R	0.26	C	0.95, LOS E
72	Stephens St at Mosher Ave		EB L/T	0.51	D	0.95, LOS E
73	I-5 Exit 123 SB Ramps at Portland Ave		WB T/R	0.06	A	0.95
74	I-5 Exit 123 NB Ramps at Portland Ave		EB L/T	0.03	A	0.95
75	Stephens St at S Gate Shopping Center		WB L/T	0.19	D	0.85, LOS E

Shaded rows exceed applicable mobility targets; Acronyms: EB = eastbound; WB = westbound; NB = northbound; and SB = southbound. L = left; T = through; and R = right.

* Intersection operations reported from Interchange Area Management Plan (IAMP) 127 (December 2014) for year 2035

** Intersection operations reported from IAMPs 124/125 (October 2013) for year 2035

1. At unsignalized intersections the results are reported for the worst operating movements on major and minor approaches that must stop or yield the right of travel to other traffic flows. For signalized intersections, the overall operations are reported.
2. The v/c ratios and LOS are based on the results of the macrosimulation analysis using Synchro, which does not account for the influence of adjacent intersection operations.
3. Unsignalized intersections may have unique mobility targets for the major and minor approaches.
4. Intersection consolidated with Washington Avenue at Stephens Street as part of the OR 138E Corridor Solutions Project.

Due to the topography, river, current land uses and the railroad, Roseburg's primary arterial system (Garden Valley Boulevard, Stewart Parkway, Harvard Avenue and Stephens Street) has been limited in its ability to expand and further connect areas of the city. As identified in *Technical Memorandum #3,* the operational concerns at high-demand roadways and intersections such as Garden Valley Boulevard at Stewart Parkway and Garden Valley Boulevard at Stephens Street is due to the lack of alternate routes; Garden Valley Boulevard and its intersections accommodate more traffic than it can handle.

Signalized Intersection Operations

Under the No Build scenario, traffic operations are expected to continue to worsen in the future. There are ten signalized intersections expected to exceed mobility targets under the 2040 future no build conditions. This is eight more than under the 2016 existing condition. The ten signalized intersections are listed below:

> **Stewart Parkway at Aviation Drive/Mullholland Drive –** This intersection operates at a v/c of 0.86 and LOS C, which exceeds the City's dual standard of v/c no worse than 0.85 and LOS D or better. The eastbound traffic on Stewart Parkway is approaching capacity.
>
> **Garden Valley Boulevard at Stewart Parkway** – This intersection operates at a v/c of 1.09 and LOS E, which exceeds the City's dual standard of v/c no worse than 0.85 and LOS D or better. Similar to existing conditions, the left-turn movements exceed their capacity. Traffic turning off Garden Valley Boulevard will continue to experience delays without additions turn lanes.
>
> **Stewart Pkwy at Stephens St** – This intersection operates at a v/c of 0.91 and LOS D, which exceeds the City's dual standard of v/c no worse than 0.85 and LOS D or better. The northbound and eastbound left-turns are approaching their available capacity.
>
> **Garden Valley Boulevard at Garden Valley Shopping Center**** – This intersection operates at a v/c of 0.99 and LOS D, which exceeds the City's dual standard of v/c no worse than 0.85 and LOS D or better.
>
> **I-5 Exit 125 Northbound Ramps at Garden Valley Boulevard at Mulholland Drive**** – This intersection operates at a v/c of 0.99, exceeding the OHP mobility target of 0.85. High volumes from the off-ramp must compete for green time with the equally high volumes traveling east and west along Garden Valley Boulevard.
>
> **Garden Valley Boulevard at Stephens Street** – This intersection operates at a v/c of 1.10 and LOS F, which exceeds the City's dual v/c and LOS standard. This intersection was the only intersection exceeding a v/c of 1.0 under existing conditions, and the operations are worsened by the added vehicular volume and lack of any planned improvements at this location.
>
> **Harvard Avenue at Centennial Drive** – This intersection operates at a v/c of 0.93 and LOS D, which exceeds the City's dual standard of v/c no worse than 0.85 and LOS D or better. Traffic volumes for the southbound left-turn exceed the available capacity.
>
> **I-5 Exit 124 Southbound Ramps at Harvard Avenue**** - This intersection operates at a v/c of 1.10, exceeding the OHP mobility target of 0.85. The future traffic is expected to significantly increase for the eastbound and westbound movements, which puts stress on the amount of time that can be given to turn movements and the ramps.

I-5 Exit 124 Northbound Ramps at Harvard Avenue** - This intersection operates at a v/c of 0.88 which just exceeds the OHP mobility target of 0.85. The worsening conditions at this intersection from existing conditions are due to the increase in traffic volumes.

Diamond Lake Boulevard at Stephens Street – By year 2040, this intersection is expected to operate at a v/c of 0.99, exceeding the OHP target of 0.90. Downtown visitors and employees, as well as tourists and freight traveling along Diamond Lake Boulevard stress the intersection capacity for nearly all movements.

***Indicates intersection results were obtained from the draft Interchange Area Management Plans (IAMPs) for I-5 Exits 124 and 125*

Three of these intersections have an overall v/c exceeding 1.0, and most have at least one movement with a v/c exceeding 1.0. When the traffic demand exceeds the available capacity (v/c greater than 1.0) vehicles experience excessive delay and queuing. It is also expected that vehicles may require more than one signal cycle to pass through the intersection. Signalized intersections can cease to operate at their intended level of service due to changes in traffic patterns and traffic volumes; the original signal timing may no longer be applicable or as efficient.

Unsignalized (STOP Controlled) Intersection Operations

There are five unsignalized intersections expected to exceed mobility targets under the 2040 future no build conditions. This is four more than under the 2016 existing condition. The five intersections are listed below:

Garden Valley Boulevard at Melrose Road (outside UGB) – The eastbound shared left-thru movement exceeds Douglas County's standard of v/c no worse than 0.85. Although the volumes for this movement are only expected to increase by 15 vehicles, the delay drivers are expected to incur while waiting for an acceptable gap in cross-traffic increases.

Garden Valley Boulevard at Roseburg Valley Mall (Middle Entrance) – The southbound movements operate at a v/c of 0.52 and LOS F, exceeding the City's dual v/c and LOS standard. This is due to less available gaps in traffic along Garden Valley Boulevard to for vehicles exiting the mall.

Stewart Parkway at Valley View Drive – The eastbound left-turn operates at a v/c of 1.27 and LOS F, exceeding the City's dual v/c and LOS standard. This intersection was noted during the existing conditions analysis as approaching capacity.

Harvard Avenue at Broccoli Street – The southbound movements operate at a v/c of 1.18 and LOS F, exceeding the City's dual v/c and LOS standard. The traffic entering and exiting the residential neighborhood is not expected to significantly increase, however the available gaps in cross traffic on Harvard Avenue are expected to decrease with additional traffic.

Washington Avenue at Spruce Street – This northbound movements operate at a v/c of 1.30 and LOS F, which exceeds the City's dual v/c and LOS standard and ODOT's mobility target of v/c of 0.90. The forecasted volumes traveling from Spruce Street indicate increased delays on the side streets, however the actual delays may be smaller if traffic chooses an alternate route.

Critical movements at unsignalized intersections are typically the minor-street left turns or, in the case of single-lane approaches, the minor street approaches. These movements are required to yield to all other movements at the intersection and thus are subject to the longest delays and have the least capacity. Left turns from the major street are also subject to delays, since motorists making these maneuvers must also yield to oncoming major-street traffic. At unsignalized intersections, an increase in traffic volumes on the major roadway can result in a decrease in the available gaps in cross traffic, which increases the delay for side streets (minor approach) attempting to enter or cross the major roadway.

System Queuing Analysis

In addition to the operational criteria that measure intersection performance, it is also important to examine queuing and where demand may exceed available storage. Queues that spill out of storage bays and into adjacent travel lanes impair intersection performance by reducing capacity and creating potential safety concerns. Queues may also extend from one intersection through another upstream intersection which also impairs performance. The 95^{th} percentile queue length (meaning 95 percent of all queues will be shorter) is used for this analysis.

There are several factors that can impact queueing. A proliferation of driveways and minor street intersections multiplies the number of conflicts along a roadway segment, thus reducing the capacity of intersections, increasing the probability of crashes, and generally degrading service for all system users. If a roadway segment has a closely spaced traffic signals, signal coordination can reduce delay on the main roadway. Signal coordination can be disrupted if there are vehicles entering the roadway via unsignalized accesses between signals, or if traffic volumes change and make the existing signal coordination obsolete.

Intersections that meet mobility targets are able to successfully serve vehicles throughout the day. That said, users may still encounter areas of slowing that are considered acceptable by operational standards, but can influence how a driver perceives traffic congestion along their route.

The areas that experienced the most congestion under existing conditions will remain congested in the future if no improvements are constructed. These locations are the main arterial corridors at intersections and in areas with increased accesses/driveways. Increases in traffic can influence how a roadway operates.

In addition to the roadways and congestion identified in *Technical Memorandum #3*, the anticipated growth in traffic is expected to increase queuing concerns along Stewart Parkway between Garden Valley Boulevard and Edenbower Boulevard and compound queuing of the side streets at stop-controlled intersections along Garden Valley Boulevard, Harvard Avenue, and Diamond Lake Boulevard. Though not included in the TSP analysis, local observations indicated that congestion on I-5 between Exit 123 (fairgrounds) and Exit 125 (Garden Valley Boulevard) is expected to worsen through the planning horizon. An upcoming project in the Roseburg area is plan to analyze recurring traffic flow bottlenecks on the I-5 mainline between Exits 119 and 129.

For further details on specific movements that exceed available capacity and detailed simulation results, see Appendix A.

Pedestrian System

Future Pedestrian Network

The City of Roseburg's pedestrian system include sidewalks, stairs, ramps, trails, multiuse paths, crosswalks at intersections, and mid-block crossings, as well as the amenities that enhance them (e.g. illumination and benches). The future pedestrian network assumed the following pedestrian projects. These projects are currently funded:

- **Stewart Parkway Widening** – Widen to four lanes between Harvey Avenue and Garden Valley Parkway, straighten S-curves, and install new sidewalks and new bike lanes (CIP).
    - Phase I (under construction): Garden Valley Boulevard to Harvey Avenue
- **Parks and Recreation – Riverfront Park Trail Improvement** – Awarded grant funding to do a trail improvement project on a 1,800 foot section of path through Riverfront Park. The path will be resurfaced and widened from eight feet to ten feet (2018-2021 STIP).
- **Parks and Recreation – Deer Creek Path Stabilization** – Will address ongoing erosion concerns with the path.
- The City is currently updating its American Disabilities Act (ADA) Transition Plan which will help identify important pedestrian accessibility improvements within the City's public rights-of-way (ROW).
- **Roseburg Pedestrian Upgrades –** Install rapid flasher on Stephens Street at Roseland; Countdown pedestrian signals on Stephens Street at Edenbower Boulevard, Newton Creek Road and Stewart Parkway, and on Harvard Avenue at Stewart Parkway, Keady Court, Centennial Drive and Umpqua Street (2018-2021 STIP).

This list does not consider potential pedestrian system improvements made by private development. The City of Roseburg requires that sidewalks are constructed along new collector and arterial facilities. The City's current requirements for sidewalks meet or exceed both the Transportation Planning Rule (TPR) requirement and recommended sidewalk standards of the Oregon Bicycle and Pedestrian Plan.

The City has identified additional projects as part of their CIP and *2009 Bicycle and Pedestrian Plan* that would help fill previously identified gaps in the pedestrian system. These planned projects do not yet have a secured funding source, but will be considered during the solutions development phase of the TSP update. For reference, the City's current CIP is included as an appendix to this memorandum.

Future Pedestrian Network Assessment

As mentioned in previous memorandums, walking is the most affordable and accessible of all transportation modes. Whether an entire trip is on foot or with a mobility device, people must walk for at least part of every trip, even when the trip takes place on transit, in an automobile, or on a bicycle.

A pedestrian qualitative assessment for the existing conditions rated all of the arterial and collector routes within the UGB. The planned projects, as previously described, will improve the pedestrian experience at those locations. In addition, some recently completed projects have improved the pedestrian network, including the Spruce-Parrott, OR 138 Solutions, and new pathway network improvement projects have all contributed to bettering pedestrian mobility, connectivity, access, comfort and safety.

Of the 11 critical routes the Bicycle and Pedestrian Plan (2009) has identified as connections to important destinations within Roseburg, only five of the critical routes were identified as "good" during the existing qualitative assessment. Additional congestion on these roadways resulting from the expected growth will increase the barriers to pedestrian travel, especially if speeds along these roadways are not reflective of pedestrian uses. Higher traffic volumes decreases the opportunities for safe crossing of roadways and driveways and increases the level of discomfort. Enhancing or expanding the multi-use path and trail system could improve the pedestrian network. Increasing connections from the existing multi-use path network to the bicycle network, the downtown, waterfront area, and the high use area along Stewart Park Drive could also benefit the pedestrian network.

The funded projects expected to be constructed within the planning horizon are not expected to alter the qualitative assessment included in *Technical Memorandum #3*. Given the expected increase in population and vehicular traffic, the existing connectivity and safety concerns for pedestrians as documented in *Technical Memorandum #3* are expected to persist in the future.

Bicycle System

Future Bicycle Network

Bicycles are legally classified as vehicles in Oregon, and roadways must be designed to allow bicyclists to ride in a manner consistent with the vehicle code. The basic design treatments to accommodate bicycle travel on the road are: shared roadway (sharrows), shoulder roadway, or bicycle lane. Another type of facility is separated from the roadway: multi-use path. The future bicycle network includes the same projects listed in the future pedestrian network, as listed below:

- **Stewart Parkway Widening** – Widen to four lanes between Harvey Avenue and Garden Valley Parkway, straighten S-curves, and install new sidewalks and new bike lanes (CIP).
    - Phase I (under construction): Garden Valley Boulevard to Harvey Avenue
- **Parks and Recreation – Riverfront Park Trail Improvement** – Awarded grant funding to do a trail improvement project on a 1,800 foot section of path through Riverfront Park. The path will be resurfaced and widened from eight feet to ten feet (2018-2021 STIP)
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This does not consider potential improvements made by private development. The City has identified additional projects as part of their CIP that would help fill previously identified gaps in the bicycle system. These planned projects do not yet have a secured funding source, but will be considered during the solutions development phase of the TSP update. For reference, the City's current CIP is included as an appendix to this memorandum. Since the assessment of future conditions can only assume funded projects, the bicycle system qualitative assessment included in *Technical Memorandum #3* would apply to future conditions as well.

Future Bicycle Network Assessment

The City of Roseburg continues to improve bicycle facilities as part of new development and other capital improvement projects. The existing conditions analysis evaluated Bicycle Level of Traffic Stress (LTS) on the arterial and collector roadway network. In the future, the projected increase in vehicular volumes added to the existing system will exacerbate the level of stress a cyclist feels.

With limited availability in the existing right-of-way, future improvements to bicycle infrastructure may include new pathway connectors separate from the roadway network. As mentioned in *Technical Memorandum #3*, bicycle connections are lacking to the north of Garden Valley Boulevard. Pedestrian and bicycle access is limited to the use of sidewalks and roadway bike lanes where they exist. Connectivity is limited, specifically to the Winchester area north of Roseburg and the Umpqua Community College Campus. With the areas of increased employment and households forecasted north of Garden Valley Boulevard, safe and convenient bicycle routes will be needed.

Transit System

Future Transit Network

The transit network includes transit routes, bus shelters, bus pull-outs and transit/paratransit services. Douglas County has established a Transit District to serve Roseburg and other Douglas County cities and destinations.

Future Transit Network Assessment

As identified in previous memoranda, Public transportation in Roseburg is provided by UTrans, operated by United Community Action Network (UCAN) through a contract with Douglas County. UTrans provides fixed-route and paratransit service for the greater Roseburg area, with commuter services to nearby cities and six transit lines provide service within Roseburg.

As part of any new transit system start-up, there are notable system and support gaps as summarized below:

- **Limited bus stop shelters and amenities**: Less than half of the transit stops have shelters with seating amenities (45%). Additional shelters and consistent route signs with scheduled service would increase the convenience and comfort of riders, and may encourage new transit riders in the future.
- **Transit service frequency**: With bus headways of an hour or greater, fixed-route bus transit serves mostly *captive* riders. Increased service frequency can attract more *choice* riders by providing greater and more reliable time-of-day ride options.
- **Limited Transit Access:** Greater walking and biking route options linking Roseburg's residential neighborhoods to fixed-route bus service will help expand transit utility. Completing important gaps in the bicycle network, and enhancing pedestrian crossings on arterial streets will also improve transit access, especially at important bus stops serving key transit trip destinations.

Freight System

Future Freight Network

The freight network supports the movement of goods and commodities into, out of, and through the Roseburg UGB. Freight is heavily dependent on the highway and roadway network, but freight also occurs via rail. Freight facilities can include freight routes, major shippers, loading zones, switchyards and truck stops. The upcoming Roseburg I-5 Bottleneck Study will include a detailed traffic analysis of recurring traffic flow bottlenecks on the I-5 mainline between Exits 129 and 119.

In October 2017, a reduction in the speed limit from 65 mph to 60 mph was approved for the I-5 mainline from mile post 123 to 127 due to concerns related to crash data, traffic weaving and spacing of interchange ramps. The speed limit for semitrucks, which is currently 55 mph, will remain the same.

There are no other known funded truck or rail freight projects within the study area.

Future Freight Network Assessment

The freight routes within Roseburg were reviewed following the same methodology as *Technical Memorandum #3*.

Truck Freight

As shown in Table 2 (page 9), there are two local intersections along Garden Valley Boulevard that play an important role in the freight network and are expected to exceed its mobility target under year 2040 traffic conditions. In addition to the local network concerns, the ramp terminals at I-5 Exits 124 and 125 are expected to experience congestion and delays during the future 2040 PM peak hour.

It will be important to maintain adequate road geometry to maintain ODOT's "hole in the air" along OR 138 pursuant to Oregon Revised Statutes 366.215. The term "hole in the air" means that an identified freight route cannot undergo permanent changes that would reduce the vehicle-carrying capacity of the roadway. Any future improvements should maintain adequate geometry for larger vehicles along local freight routes, including Stephens Street, Pine Street, and Diamond Lake Boulevard. In addition to these corridors, I-5 and the interchange ramps in the study area are important routes for serving regional freight shipping.

Rail Freight

As mentioned in *Technical Memorandum #3,* the relocation of the rail switchyard from downtown Roseburg to the Winchester area causes vehicular delays and congestion at the north end of the UGB, though it improved the traffic conditions downtown. When trains are stacked at the rail switchyard, traffic on North Bank Road experiences delays and emergency service response could be impacted. The impact and delay for medical related emergencies is the resident's major concern.

The Douglas County Public Works Department has looked at providing an alternative route around the railroad tracks and switchyard to North Bank Road, but has yet to find an alternative alignment or funding source for this project.

Air Freight

The airport master plan is currently undergoing an update. Future air freight is not expected to change in the planning horizon. In the unlikely event that it does increase, the existing transportation system is equipped to accommodate the growth.

Water and Pipeline System

The South Umpqua River winds through the City of Roseburg, providing opportunities for recreational activities. It is not a navigable waterway and is not used for freight movement. No future changes are anticipated to the water transportation system.

The natural gas pipeline in the Roseburg UGB and distribution lines that spur off the mainline provide gas to residences and businesses. The major pipeline is part of a system operated by Northwest Pipeline LLC and no future changes are anticipated.

Funding

An important aspect of the TSP update will be to develop a Transportation Funding Program. The Transportation Funding Program will define the range of federal, state and local transportation funding. The funding estimates will support the city and state in the identification and prioritization of TSP projects as well as helping set policy to fund the TSP. This section offers a snapshot of the City's current and primary revenue sources to fund transportation system maintenance, operations and capital improvements.

City Transportation Revenue and Expense Estimate: FY 2017-2018

City of Roseburg

The city's current and primary revenue sources to fund transportation system maintenance, operations and capital improvements include State Highway Fund (gas tax, vehicle registration fees and truck weight-mile fees), new HB 2017 funding package, statewide funding, city franchise fees, and city transportation system development charges (SDCs). Figure 4 summarizes the City's estimate of transportation revenue and expense for Fiscal Year, 2017-2018. Applicable State and Douglas County funding will be included in the final transportation improvement finance program.

FIGURE 4. ROSEBURG'S TRANSPORTATION REVENUE AND EXPENSES – FY 2017-2018

Revenue	
STBG	$260,000
Gas Tax	$1,301,514
HB 2017	$248,886
Franchise Fees	$507,100
SDC Revenues	$200,000
Miscellaneous	$20,000
	$2,537,500
Expense	
Materials and Services	**$2,146,024**
Capital Expenditures	**$331,440**
	$2,477,464

Source: *City of Roseburg*
All figures in 2018 dollars.

REVENUE

- ***STBG*** – is the federal Highway Trust Fund, largely sourced by the federal gas tax and is distributed by formula to individual states through the Surface Transportation Block Group (STBG) program.
- ***HB 2017*** – Oregon Legislative Transportation Package, additional vehicle registration fees, title fees and fuels tax apportioned to local city governments by population; four increases, stair-stepped over 6-year period and last 3 increases are conditional on accountability measures. Roseburg estimate is year 1 of HB 2017.

EXPENSE

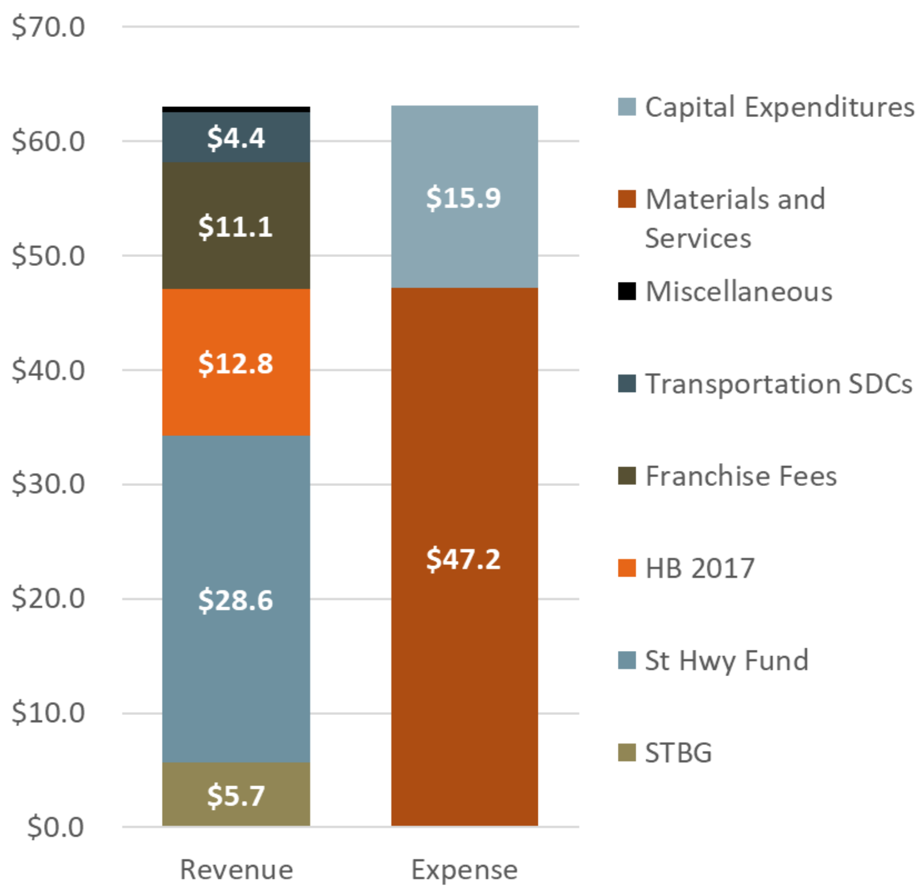
Materials and Services - includes Pavement Management Plan expense assumed at $1.2 million (annual), approximately $0.2 million short of $1.4 million 'need' identified in 2016.

Future Transportation Funding Revenue and Expense Estimate: 2018-2040

City of Roseburg

The city's estimated, 20-year transportation revenue and expenses are summarized in Figure 5**.**

FIGURE 5. CITY OF ROSEBURG TRANSPORTATION REVENUE AND EXPENSE ESTIMATE: 2018-2040 (IN MILLIONS OF DOLLARS)



Sources: City of Roseburg and Oregon Department of Transportation, Legislative Office (all figures rounded to nearest $100,000). All figures in 2018 dollars.

REVENUE

- ***STBG*** - assumes continued and consistent funding through Oregon, assumed at $200,000 per year.
- ***State Highway Fund*** – assumes a 3.5% increase in Roseburg's SHF receipts for 2018 (FY 2017/2018), averaged for 22-years to 2040. Does not account for variation in future population growth rates of Roseburg in relationship to other Oregon cities, nor other factors affecting declining fuel tax revenue and variable highway & street user growth impact trends.
- ***HB 2017*** – Assumes full, 10-year funding allocation to Roseburg with stair-stepped increases through first ten (10) years, then a tenth-year annual average thereafter to year 2040. <u>If HB 2017 conditional performance measures are not met by 2021, and later increases in the fee and fuel tax rates are not implemented, the total, 20-year HB 2017 revenue for Roseburg will be in the range of $8.9-$9.0 million, rather than $12.8 million.</u>
- ***Franchise Fees*** - assumes an annual average revenue of $507,100 for planning horizon.
- ***Transportation SDCs*** - assumes an annual average revenue of $200,000 for planning horizon.

EXPENSE

- ***Materials and Services*** - includes Pavement Management Plan (PMP) expense assumed at $1.2 million per year, approximately $0.2 million short of $1.4 million annual 'need' identified in 2016 PMP.
- **Capital Expenditures** – is the product of *Total 22-year Revenue* ($63 million) less 22-year *Material and Services Expense ($47.2 million)*

Findings

The gaps noted in Roseburg's existing transportation system (see *Technical Memorandum #3: Existing Conditions)* will widen in the future as a result of increased travel demand. The City and State's completion of their current capital improvement plans will help abate some of these concerns. The next steps to drafting Roseburg's TSP Update will consider how to align funding sources with future transportation improvements that help bridge those gaps identified in this memorandum, resulting in a series of connected and interconnected multimodal systems. Key findings for each system are summarized below.

Streets and Highways System:

- A limited network of arterial and collector streets in the core Roseburg area forces greater reliance on key arterials to carry future traffic demand beyond their capacity.
- There are 15 intersections expected to operate at levels above their corresponding mobility targets (See Table 2 for more detail). These intersections are mostly found in commercial areas along Garden Valley Boulevard, Stephens Street and Harvard Avenue.
- The presence of multiple full access driveways contributes to queuing concerns along Garden Valley Boulevard.
- Signal timing and progression could change by year 2040. Queuing can be impacted by increased traffic demand, access spacing, capacity (number of lanes), adequate signage and travel speeds.

Pedestrian System:

- Opportunities for increasing safe crossings and travel of arterial roadways:
    - Stephens Street north of Edenbower Boulevard
    - Stewart Parkway
    - East Diamond Lake Boulevard
- There are lighting and comfort concerns for existing trail system.
- Increased traffic volumes at accesses and along roadways will impact level of comfort for pedestrians, specifically on Garden Valley Boulevard.

Bicycle System:

- Roseburg lacks a fully connected bike route system that adequately connects neighborhoods with commercial and institutional centers, recreational areas, and transit corridors, specifically north of Garden Valley Boulevard.

Transit System:

- There are a limited number of covered transit stops and there are gaps in service and frequency. Some neighborhoods to the south and west of downtown are not within convenient walking distance to a nearby transit stop.
- Areas of the City located in a major residential and/or employment growth areas should incorporate transit amenities and ensure pedestrian and bicycle connectivity in preparation for transit service. While biking can increase access to transit for people living in neighborhoods distant from bus stops, gaps in the existing bicycle network and a lack of bicycle parking near stops limits the attractiveness of biking to transit, which would be exacerbated by projected increases in traffic in Roseburg by 2040.

Freight System:

- It is important that future improvements maintain the geometry required to accommodate large freight vehicles along I-5, OR 138 and local freight routes.

As mentioned in this memorandum, the city continues to add bicycle facilities and improve pedestrian routes, usually as part of larger roadway capital improvement projects. Developing these projects in tandem allows for a more cohesive transportation system.

In the future, there will continue to be an underlying network connectivity concern that will only increase congestion and accessibility concerns with future growth. Potential for land use changes may be needed to compliment transportation improvements to reduce travel demand on impacted transportation facilities.

Roseburg TSP MEMORANDUM #4 - Appendix

Appendix A

Future Transportation System Operation Analysis

TECHNICAL MEMORANDUM #4: APPENDIX A

DATE: January 13, 2018

TO: City of Roseburg

FROM: Angela Rogge, PE, David Evans and Associates, Inc.
Dana Shuff, EIT, David Evans and Associates, Inc.

SUBJECT: Roseburg Transportation System Plan Update
Task 6.3 Final Future Transportation System Operation Analysis

This memorandum presents data and analysis output for the transportation system under a future year 2040 baseline[1] scenario as it relates to vehicular, bicycle and pedestrian volumes. The baseline scenario uses the long-range regional growth forecasts that are consistent with current land use zoning and funded projects planned for within the Roseburg UGB. The a detailed forecasting methodology is described in a memorandum written by the Oregon Department of Transportation (ODOT) Transportation Planning and Analysis Unit (TPAU) (see Appendix B). This appendix (Appendix A) summarizes the technical analysis in graphical and tabular form, whereas *Technical Memorandum #4* summarizes the outcomes of the future analysis in narrative form. Future, 2040 PM peak hour traffic volumes are summarized in Figure 1.

The assessment of the transportation system's operational conditions includes development of future traffic volumes, evaluation of vehicular operations and a summary of non-motorized (multi-modal) transportation movements, all in accordance with the approved methodology presented in *Technical Memorandum #1, Appendix A (Methodology and Assumptions Memorandum)*.

Mode	Analytical Methods
	• Volume–to–capacity (v/c) ratio (Table 1) • Level of Service (LOS) (Table 1) • 95th percentile queues from Simtraffic[2] (Table 2)
	Bicycle Level of Traffic Stress *(Technical Memorandum #4)*
	Qualitative Assessment *(Technical Memorandum #4)*
	Qualitative Assessment *(Technical Memorandum #4)*

[1] Baseline scenarios assumes only planned transportation improvements with identified and committed funding source
[2] Synchro/SimTraffic (version 9) software for analysis provides the v/c ratio and LOS output of an HCM analysis and considers the systematic interaction of the intersections with regard to queuing and delays

Vehicular Analysis

The analysis for this update of the Transportation System Plan (TSP) includes 75 locations. Of the 75 intersections, 31 have been recently studied. Findings from these recent studies are incorporated directly.[3]

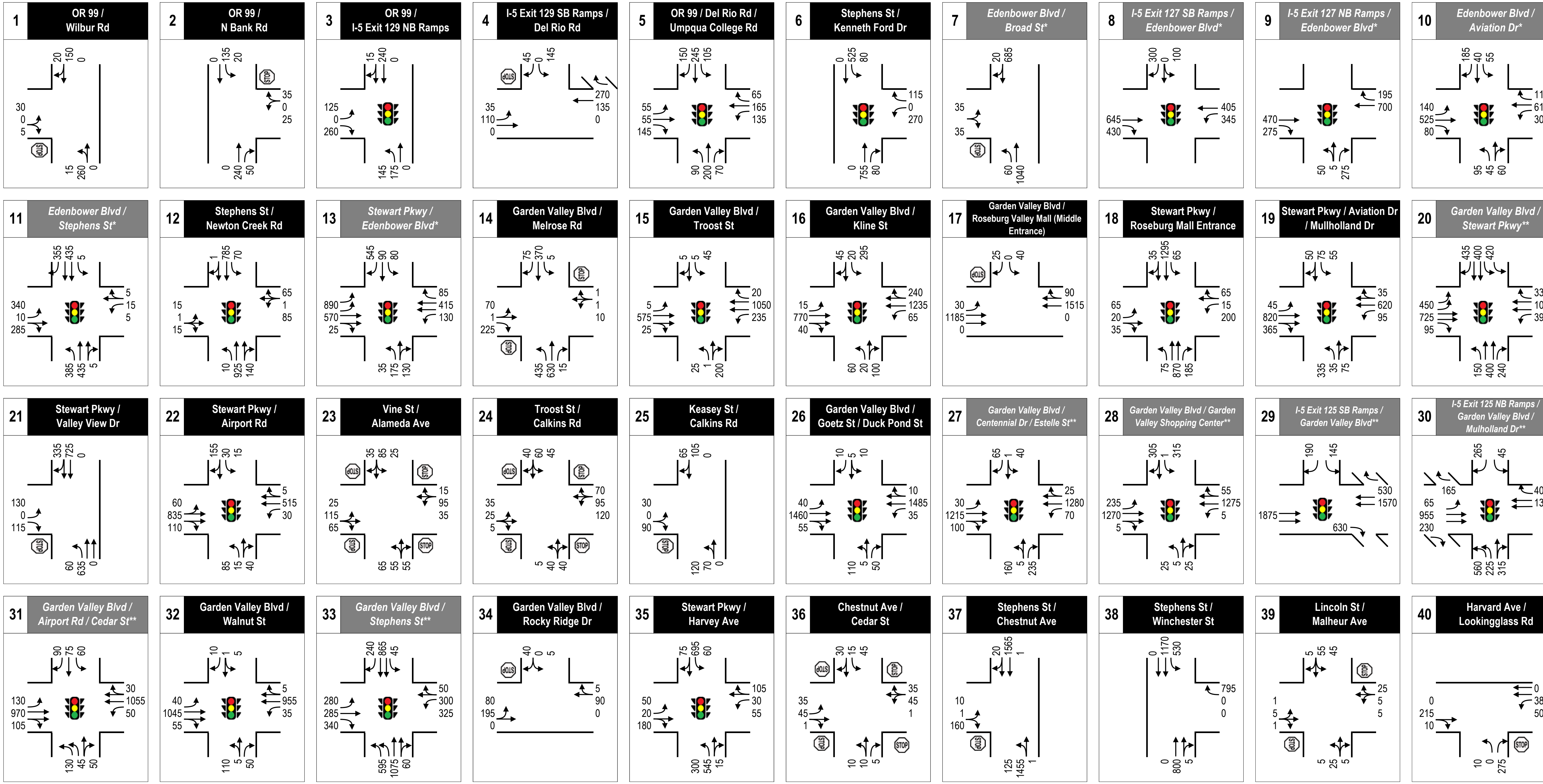
Volume Development

The future baseline year 2040 PM peak hour volumes were developed from existing turning movement volumes and travel demand forecasting output from the 2010 and 2035 Roseburg V2 models and the 2016 existing traffic data. The forecast year for this TSP is 2040; thus, model volumes were extrapolated to 2040. The volumes were post-processed following the methodologies outlined in the TPAU *Analysis Procedures Manual* (APM) *Volume 2* and National Cooperative Highway Research Program (NCHRP) *Report 765* guidelines. The methodologies used are described in detail in *Technical Memorandum #1, Appendix A (Methodology and Assumptions Memorandum).*

PM Peak Hour Turning Movement Volumes

Figure 1a and Figure 1b summarizes the study area intersections, their 2040 traffic control, lane configurations and the balanced 2040 PM Peak Hour turning movement volumes.

[3] The original scope of work incorrectly identified the intersection of NW Garden Valley Blvd at NW Stewart Pkwy as a previously studied intersection. Data was not available for this intersection and thus volumes and operational output are not included in this memorandum; a general performance narrative will be included in *Technical Memorandum #4*.



Legend

1 Intersection *, ** — Intersection volumes developed from previous study or plan

* IAMP 127 (December 2014)

** IAMPs 124/125 (October 2013)

Signalized intersection

STOP controlled intersection

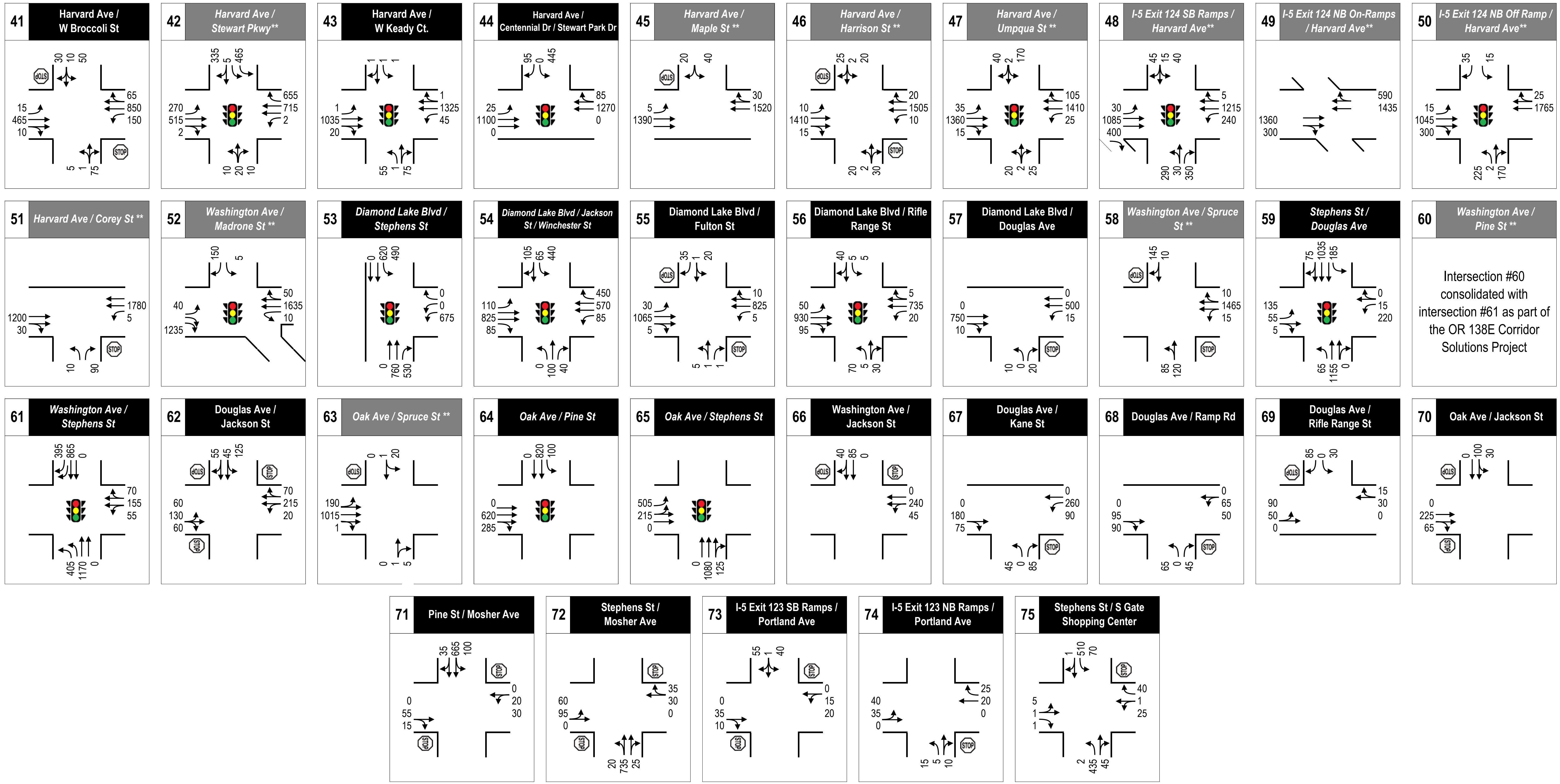
Lane configuration

Roseburg TSP

Figure 1a

Future (2040) Baseline PM Peak Hour Turning Movement Volumes

N



Legend

1 Intersection *, **	Intersection volumes developed from previous study or plan
*	IAMP 127 (December 2014)
**	IAMPs 124/125 (October 2013)
(signal)	Signalized intersection
(STOP)	STOP controlled intersection
(arrows)	Lane configuration

Roseburg TSP

Figure 1b

Future (2040) Baseline PM Peak Hour Turning Movement Volumes

N

Intersection Delay and Capacity Analysis Results

Future PM peak hour traffic operations were evaluated for the study area. Transportation engineers have established various methods for measuring traffic operations of roadways and intersections. Most jurisdictions use either volume-to-capacity (v/c) ratio or level of service (LOS) to establish performance criteria. Both the LOS and v/c ratio concepts require consideration of factors that include traffic demand, capacity of the intersection or roadway, delay, frequency of interruptions in traffic flow, relative freedom for traffic maneuvers, driving comfort, and convenience.

> **Volume-to-Capacity (V/C) Ratio:** A comparison of traffic volume demand to intersection capacity. As the v/c ratio approaches 1.00, traffic becomes more congested and unstable, with longer delays.

> **Level of Service (LOS):** Level of service is a function of control delay, which includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.

Traffic Mobility Targets

The City's performance measure standards are as follows:

Outside of Downtown District Boundary:

- Volume-to-capacity (V/C) ratio:
  - Arterial = 0.85
  - Collector = 0.90
  - Local = 0.95
- Level of service (LOS) standards:
  - LOS D for signalized intersections
  - LOS E for unsignalized intersections

Within Downtown District Boundary:

- Volume-to-capacity (V/C) ratio: 0.95
- Level of service (LOS) standards: LOS E (signalized and unsignalized)

All of the study area intersections will be compared to the City's mobility targets unless otherwise noted below.

Douglas County

The mobility targets of Douglas County facilities vary by the classification of the route and its urban or rural nature. All of the County facilities studied as part of the TSP are considered urban because they function as routes to and from the city and surrounding area. The County's standards are as follows:

- V/C ratio:
  - Arterial = 0.85
  - Major Collector = 0.90
  - Minor Collector = 0.95

According to the Douglas County Comprehensive Plan, "where two different county route classifications intersect, the V/C ratio of the higher county classification shall be used for the intersection."

State

For State facilities, the Oregon Highway Plan (OHP) will be used in the assessment of intersection operations. Table 6 of the OHP provides V/C targets based on characteristics of the facility. The applicable OHP standard and the intersections they apply to are listed below:

State Facility	Mobility Target
I-5 Exit 129 NB Ramps at OR 99	0.75
I-5 Exit 129 SB Ramps at Del Rio Road	0.95
I-5 Exit 127 SB Ramps at Edenbower Boulevard	0.90
I-5 Exit 127 NB Ramps at Edenbower Boulevard	0.90
I-5 Exit 125 SB Ramps at Garden Valley Boulevard	0.85
I-5 Exit 125 NB Ramps at Garden Valley Boulevard at Mulholland Drive	0.85
I-5 Exit 124 SB Ramps at Harvard Avenue	0.85
I-5 Exit 124 NB On-Ramps at Harvard Avenue	0.85
I-5 Exit 124 NB Off Ramp at Harvard Avenue	0.85
Harvard Avenue (OR 138) at Corey Street	0.90
Washington Avenue (OR 138) at Madrone Street	0.90
Washington Avenue (OR 138) at Spruce Street	0.90
Stephens Street (OR 138) at Douglas Avenue	0.90
Washington Avenue (OR 138) at Pine Street (OR 138)	0.90
Washington Avenue (OR 138) at Stephens Street (OR 138)	0.90
Oak Avenue (OR 138) at Spruce Street	0.90
Oak Avenue (OR 138) at Pine Street (OR 138)	0.90
Oak Avenue (OR 138) at Stephens Street (OR 138)	0.90
Diamond Lake Boulevard at Stephens Street	0.90
Diamond Lake Boulevard at Jackson Street/Winchester Street	0.90
Diamond Lake Boulevard at Fulton Street	0.90 (E/W) 0.95 (N/S)
Diamond Lake Boulevard at Rifle Range Street	0.90
Diamond Lake Boulevard at Douglas Avenue	0.85 (E/W) 0.90 (N/S)
I-5 Exit 123 SB Ramps at Portland Avenue	0.95
I-5 Exit 123 NB Ramps at Portland Avenue	0.95

It is to be noted that Old OR 99 (Stephens St) is no longer under state jurisdiction.

Table 1 summarizes the applicable mobility targets, future (2040) baseline PM peak hour v/c ratios and LOS performance by lane group for the area intersections. These findings reflect the optimized signal timing in accordance with the APM. Detailed analysis worksheets are attached.

TABLE 1. FUTURE (2040) BASELINE PM PEAK HOUR TRAFFIC OPERATIONS

	Intersection	Traffic Signal	Critical Movement[1]	V/C[2]	LOS[2]	Mobility Target[3]
1	OR 99 at Wilbur Rd		EB L/R	0.07	B	0.85
2	OR 99 at N Bank Rd		WB L/R	0.10	B	0.85
3	OR 99 at I-5 Exit 129 NB Ramps	✓	Overall	0.35	B	0.75
4	I-5 Exit 129 SB Ramps at Del Rio Rd		SB L	0.23	B	0.95
5	OR 99 at Del Rio Rd at Umpqua College Rd	✓	Overall	0.56	C	0.85, LOS D
6	Stephens St at Kenneth Ford Dr	✓	Overall	0.79	B	0.85, LOS D
7	Edenbower Blvd at Broad St*		EB L/R	0.26	C	0.85, LOS E
8	I-5 Exit 127 SB Ramps at Edenbower Blvd*		Overall	0.69	B	0.85
9	I-5 Exit 127 NB Ramps at Edenbower Blvd*		NB R	0.48	D	0.85
10	Edenbower Blvd at Aviation Dr*	✓	Overall	0.61	B	0.85, LOS D
11	Edenbower Blvd at Stephens St*	✓	Overall	0.71	C	0.85, LOS D
12	Stephens St at Newton Creek Rd	✓	Overall	0.59	B	0.85, LOS D
13	Stewart Pkwy at Edenbower Blvd*	✓	Overall	0.82	C	0.85, LOS D
14	**Garden Valley Blvd at Melrose Rd**		**EB L/T**	**>2.0**	**F**	**0.85**
15	Garden Valley Blvd at Troost St	✓	Overall	0.53	B	0.85, LOS D
16	Garden Valley Blvd at Kline St	✓	Overall	0.83	D	0.85, LOS D
17	**Garden Valley Blvd at Roseburg Valley Mall (Middle Entrance)**		**SB L/R**	**0.52**	**F**	**0.85, LOS E**
18	Stewart Pkwy at Roseburg Mall Entrance	✓	Overall	0.75	B	0.85, LOS D
19	**Stewart Pkwy at Aviation Dr/Mullholland Dr**	✓	**Overall**	**0.86**	**C**	**0.85, LOS D**
20	**Garden Valley Blvd at Stewart Pkwy****	✓	**Overall**	**1.10**	**F**	**0.85, LOS D**
21	**Stewart Pkwy at Valley View Dr**		**EB L**	**1.27**	**F**	**0.85, LOS E**
22	Stewart Pkwy at Airport Rd	✓	Overall	0.59	B	0.85, LOS D
23	Vine St at Alameda Ave		EB L/T/R	0.30	A	0.90, LOS E
24	Troost St at Calkins Rd		WB L/T/R	0.43	B	0.90, LOS E
25	Keasey St at Calkins Rd		EB L/R	0.17	B	0.90, LOS E
26	Garden Valley Blvd at Goetz St/Duck Pond St	✓	Overall	0.72	B	0.85, LOS D
27	Garden Valley Blvd at Centennial Dr at Estelle St**	✓	Overall	0.77	B	0.85, LOS D
28	**Garden Valley Blvd at Garden Valley Shopping Center****	✓	**Overall**	**0.99**	**D**	**0.85, LOS D**
29	I-5 Exit 125 SB Ramps at Garden Valley Blvd**	✓	Overall	0.78	B	0.85
30	**I-5 Exit 125 NB Ramps at Garden Valley Blvd at Mulholland Dr****	✓	**Overall**	**0.99**	**D**	**0.85**
31	Garden Valley Blvd at Airport Rd at Cedar St**	✓	Overall	0.76	C	0.85, LOS D
32	Garden Valley Blvd at Walnut St	✓	Overall	0.54	A	0.85, LOS D
33	**Garden Valley Blvd at Stephens St****	✓	**Overall**	**1.15**	**F**	**0.85, LOS D**
34	Garden Valley Blvd at Rocky Ridge Dr		EB L/T	0.06	A	0.85, LOS E
35	Stewart Pkwy at Harvey Ave	✓	Overall	0.66	C	0.85, LOS D
36	Chestnut Ave at Cedar St		WB L/T/R	0.13	A	0.90, LOS E
37	Stephens St at Chestnut Ave	✓	Overall	0.78	B	0.85, LOS E
38	Stephens St at Winchester St		SB L	0.75	C	0.85, LOS E
39	Lincoln St at Malheur Ave		WB L/T/R	0.05	A	0.90, LOS E
40	Harvard Ave at Lookingglass Rd		WB L	0.41	A	0.85, LOS E
41	**Harvard Ave at W Broccoli St**		**SB L/T/R**	**1.18**	**F**	**0.85, LOS E**
42	**Harvard Ave at Stewart Pkwy****	✓	**Overall**	**0.99**	**E**	**0.85, LOS D**
43	Harvard Ave at W Keady Ct.	✓	Overall	0.63	B	0.85, LOS D
44	**Harvard Ave at Centennial Dr**	✓	**Overall**	**0.93**	**D**	**0.85, LOS D**
45	Harvard Ave at Maple St **		SB L/R	0.24	C	0.85, LOS E

TABLE 1. FUTURE (2040) BASELINE PM PEAK HOUR TRAFFIC OPERATIONS

	Intersection	Traffic Signal	Critical Movement[1]	V/C[2]	LOS[2]	Mobility Target[3]
46	Harvard Ave at Harrison St **		NB L/T/R	0.33	D	0.85, LOS E
47	Harvard Ave at Umpqua St **	✓	Overall	0.84	C	0.85, LOS D
48	**I-5 Exit 124 SB Ramps at Harvard Ave****	✓	**Overall**	**1.10**	**F**	**0.85**
49	**I-5 Exit 124 NB On-Ramps at Harvard Ave****		**Overall**	**0.88**	**B**	**0.85**
50	**I-5 Exit 124 NB Off Ramp at Harvard Ave****	✓				
51	Harvard Ave at Corey St **		NB L/R	0.05	C	0.90
52	Washington Ave at Madrone St **	✓	Overall	0.72	B	0.90
53	**Diamond Lake Blvd at Stephens St**	✓	**Overall**	**0.99**	**D**	**0.90**
54	Diamond Lake Blvd at Jackson St at Winchester St	✓	Overall	0.78	D	0.90
55	Diamond Lake Blvd at Fulton St		SB L/T/R EB L	0.35 0.04	E A	0.95 (N/S) 0.90 (E/W)
56	Diamond Lake Blvd at Rifle Range St	✓	Overall	0.51	A	0.90
57	Diamond Lake Blvd at Douglas Ave		NB L/R WB L	0.08 0.02	B B	0.90 (N/S) 0.85 (E/W)
58	**Washington Ave at Spruce St ****		**NB L/T** WB L/T	**>2.0** 0.42	**F** A	**0.95, LOS E** 0.90
59	Stephens St at Douglas Ave	✓	Overall	0.79	C	0.90
60	Washington Ave at Pine St[4]	✓	Overall	-	-	0.90
61	Washington Ave at Stephens St	✓	Overall	0.79	B	0.90
62	Douglas Ave at Jackson St		EB L/T/R	0.47	B	0.95, LOS E
63	Oak Ave at Spruce St **		SB L	0.08	C	0.90
64	Oak Ave at Pine St	✓	Overall	0.60	B	0.90
65	Oak Ave at Stephens St	✓	Overall	0.62	B	0.90
66	Washington Ave at Jackson St		WB T	0.24	A	0.95, LOS E
67	Douglas Ave at Kane St		NB L	0.16	C	0.95, LOS E
68	Douglas Ave at Ramp Rd		NB L	0.13	B	0.90, LOS E
69	Douglas Ave at Rifle Range St		SB L/R	0.15	A	0.90, LOS E
70	Oak Ave at Jackson St		EB T	0.22	A	0.95, LOS E
71	Pine St at Mosher Ave		EB T/R	0.26	C	0.95, LOS E
72	Stephens St at Mosher Ave		EB L/T	0.51	D	0.95, LOS E
73	I-5 Exit 123 SB Ramps at Portland Ave		WB T/R	0.06	A	0.95
74	I-5 Exit 123 NB Ramps at Portland Ave		EB L/T	0.03	A	0.95
75	Stephens St at S Gate Shopping Center		WB L/T	0.19	D	0.85, LOS E

Shaded rows exceed applicable mobility targets; Acronyms: EB = eastbound; WB = westbound; NB = northbound; and SB = southbound. L = left; T = through; and R = right.

* Intersection operations reported from Interchange Area Management Plan (IAMP) 127 (December 2014) for year 2035

** Intersection operations reported from IAMPs 124/125 (October 2013) for year 2035

1. At unsignalized intersections the results are reported for the worst operating movements on major and minor approaches that must stop or yield the right of travel to other traffic flows. For signalized intersections, the overall operations are reported.
2. The v/c ratios and LOS are based on the results of the macrosimulation analysis using Synchro, which does not account for the influence of adjacent intersection operations.
3. Unsignalized intersections may have unique mobility targets for the major and minor approaches.
4. Intersection consolidated with Washington Avenue at Stephens Street as part of the OR 138E Corridor Solutions Project.

Queuing Analysis

Evaluation of the transportation system included a 95th percentile queuing analysis -- meaning 95 percent of all queues will be shorter. Table 2 summarizes intersection movements where the 95th percentile queues either exceed available storage, extend beyond the nearest upstream intersection or exceed ¼-mile.

TABLE 2. FUTURE (2040) 95TH PERCENTILE QUEUES EXCEEDING AVAILABLE STORAGE

	Intersection	Approach & Movement	95th Percentile Queue (ft.)	Available Storage
6	Stephens St at Kenneth Ford Dr	NB R	175	150
		SB T	625	350
10	Edenbower Blvd at Aviation Dr*	EB L	150	125
		WB R	150	100
11	Edenbower Blvd at Stephens St*	EB L	275	125
		NB L	200	150
		SB R	175	150
13	Stewart Pkwy at Edenbower Blvd*	EB L	350	325
		WB L	125	100
		WB T	175	125[1]
		WB R	100	75
		NB T/R	275	225[1]
		SB R	175	150
16	Garden Valley Blvd at Kline St	EB T	750	732
		EB TR	750	732
		SB L	1050	815
		SB T	1075	815
17	Garden Valley Blvd at Roseburg Valley Mall Middle Dwy	SB L/R	475	351
18	Stewart Pkwy at Roseburg Valley Mall Dwy/Walmart Dwy	SB T	1750	350
19	Stewart Pkwy at Aviation Dr/Mullholland Dr	EB L	175	150
		NB L	175	75
21	Stewart Pkwy at Valley View Dr	EB L	350	250
27	Garden Valley Blvd at Centennial Dr at Estelle St**	NB L/T	200	150
28	Garden Valley Blvd at Garden Valley Shopping Center**	SB L	125	50
		SB T/R	275	200
30	I-5 Exit 125 NB Ramps at Garden Valley Blvd at Mulholland Dr**	NB T/R	1,100	1,000
32	Garden Valley Blvd at Walnut St	EB L	125	125
		EB T	475	442
		NB L/T	125	100
35	Stewart Pkwy at Harvey Ave	NB L	300	200
		SB L	300	175
37	Stephens St at Chestnut Ave	NB L	250	100
		NB T	1625	1150
38	Stephens St at Winchester St	NB T	1225	1012
		SB L	275	170
43	Keady Ct at Harvard Ave	WB L	175	150
		WB T	1800	1356
44	Harvard Ave at Stewart Park Dr/Centennial	WB T	1025	892
48	I-5 Exit 124 SB Ramps at Harvard Ave**	NB L/T	275	150
		NB R	200	150
53	Diamond Lake Blvd at Stephens St***	WB L	575	390

		SB L	575	300
54	Diamond Lake Blvd at Jackson St at Winchester St**	EB T EB R WB R SB L SB T/R	475 175 150 425 1775	426 75 100 300 1494
59	Stephens St at Douglas Ave**	NB T	525	320
61	Washington Ave at Stephens St*	NB L	325	315
62	Douglas Ave at Jackson St	WB L/T	75	25

Acronyms: EB = eastbound; WB = westbound; NB = northbound; and SB = southbound. L = left; T = through; and R = right.

* Intersection operations reported from IAMP 127 (December 2014) for year 2035

** Intersection operations reported from IAMPs 124/125 (October 2013) for year 2035

1. Storage distance reflects spacing to the next public access point.

Bicycle, Pedestrian and Transit Assessment

While there is great interest in developing forecasting models for bicycles and pedestrians, the traditional travel demand methodology used for estimating motor vehicle activity does not easily apply to bicycle and pedestrian travel for a number of reasons, including:

- Data on walking and biking is typically too limited or inaccurate to develop accurate models.
- The nature of bicycle and pedestrian travel and decision-making is not easily understood and the cost to analyze and develop walk and bike models is prohibitive; Roseburg does not have a model currently in place.

As such, the future needs for walking, biking and transit in Roseburg are determined by reviewing areas of future growth in the City, how well the City is served by existing facilities and how planned/funded projects might improve future systems. This is information is provided in *Technical Memorandum #4.*

Appendix B

City of Roseburg Base Year 2010 and Future Year 2035 Scenario Travel Demand Model Forecasting Model Documentation

Oregon Department of Transportation

City of Roseburg Base Year 2010 and Future Year 2035 Scenario Travel Demand Forecasting Model Documentation

June 2017

Transportation Planning Analysis Unit

Transportation Development Division, Salem, Oregon

Acknowledgements

This study required a team of people working closely together in order to meet the objectives of the model development:

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I. Introduction

The base year 2010 Roseburg model was developed to address the need for a travel demand forecasting tool that could be used for a variety of purposes, including transportation system planning (TSP) in a manner consistent with the Oregon Transportation Planning Rule (TPR), the preparation of subarea transportation studies, the analysis of the transportation system impacts of large-scale development proposals, and the evaluation of the effects by large-scale transportation projects.

The general structure of the model follows a basic four-step process consisting of pre-generation, trip generation, trip distribution, and traffic assignment. Within the pre-generation step, all of the necessary inputs for trip generation are produced using a set of household sub-models that stratify households by number of workers, household size, and number of workers by household size. The trip generation model generates average weekday vehicular person trip productions by trip purpose. Within the trip distribution step, a destination choice model is used to distribute internal-internal trips, while internal-external, external-internal, and external-external trips are handled with Statewide Integrated Model (SWIM). Trip assignment is performed using a single-class, equilibrium capacity restraint technique.

The model is implemented entirely through a series of script files written in the R statistical programming language, with the exception of traffic assignment, which is carried out in VISUM computer software.

The development of the model consisted primarily of calibrating and validating the Oregon Small Urban Model (OSUM) for the Roseburg area. OSUM was estimated by the Oregon Department of Transportation (ODOT) with assistance from Portland Metro staff. The 1994/1995 household activity survey data was collected from a sample of 3,200 households in eight rural counties throughout Oregon and used for the model estimation.

The first three sections of the documentation provide an overview of the model and model development process (Section I), an explanation of how the overall model structure was defined (Section II), and a description of the model zone system and network (Section III). Section IV provides references to the survey data used for the OSUM estimation. Section V describes the general types of input data that are used in the model. Section VI contains “nuts and bolts” information about the structure of the individual model components. In Section VII., the model validation process and results are presented. Finally, Section VIII documents the 2035 Future Year RTP Scenario Roseburg travel demand model input and outputs.

II. Model Structure

Identification of Model Requirements

Because the development process for the Roseburg model consisted primarily of calibrating and validating OSUM for local conditions rather than developing the model "from scratch", the identification of model requirements was done as a part of the OSUM development project. These requirements reflect the general modeling needs of small urban areas throughout the state.

As described in the *ODOT Travel Demand Model Development and Application Guidelines,*[1] all models must conform to the Transportation Planning Rule. While the TPR does not regulate transportation modeling, it does set the requirements for the preparation of local TSPs that "establish a system of transportation facilities and services adequate to meet identified local transportation needs".[2] Some of these requirements have direct implications for the type of models that are needed for developing TSPs, namely that:

- Within urban growth boundaries, the determination of transportation needs must be based upon population and employment forecasts and distributions for at least 20 years that are consistent with the acknowledged comprehensive plan, as well as measures to encourage reduced reliance on the automobile; and
- TSPs must be based upon the evaluation of system alternatives that may include improvements to existing facilities or services, new facilities and services, including different modes of transportation that could reasonably meet identified needs, transportation system management measures, and demand management measures.

The following model features are defined as necessary in non-attainment areas:

- Household sub-models provide household and worker distribution patterns;
- Trip generation model estimates motorized person trips, segmented by trip purpose;
- Trip distribution model stratified by same trip purposes as trip generation model and that uses spatial separation measure;
- Average vehicle occupancies by different trip purposes are applied to the motorized person trips to derive vehicular trips;

[1] Oregon Department of Transportation, Travel Demand Model Development and Application Guidelines, (1995).
[2] Oregon Land Conservation and Development Department, OAR 660-012-0005, (1999).

- Estimation of commercial and external vehicle trips; and
- Traffic assignment using equilibrium capacity restraint technique.

In addition to the development of TSPs, several other required uses for models in small urban areas are the preparation of subarea transportation studies, in which a model is focused for a subarea of the city or county to examine detailed land use or transportation system alternatives, analysis of the transportation system impacts by large-scale development proposals, evaluation of the effects by large-scale transportation projects, such as: freeway interchange and bypasses, and, in certain areas, the establishment and administration of system development charge (SDC).

External Related Trips by SWIM

The basic form of the model was established as a part of the OSUM development project, so that the consideration of alternative model forms was not relevant for the Roseburg model. One significant decision needed to be made, however, regarding the specifics of implementing inbound/outbound/through trips externally related to the Roseburg area. The following descriptions are excerpts from Appendix E of "OSUM User's Guide" documentation.

"The SWIM External Model was originally developed for JEMnR (Joint Estimated Model in R, used for the MPO areas, which ODOT operates). The concept is that a given urban model area is 'cut' out of the larger StateWide Integrated Model (SWIM) area. The trends from SWIM provide the best source of information for how passenger cars and long-distance freight travel to, from, and through the 'cut' area. When a 'cut' boundary is created, a process is run in SWIM to create a subset of the full SWIM car and truck tables. The subset includes all the trip ends that travel in, to, from, or through the 'cut' area. This provides the basis for the trends for the external model for the given local urban model, the 'cut' area.

"It is very important to understand that SWIM is only providing trends, or travel distributions. It is not providing raw results or volumes that would be fed directly into the local model. There are several reasons why raw SWIM output is not used:

- SWIM is a model for statewide policy. The small and medium sized external stations to an urban area are not calibrated to high precision in SWIM. These external points may have smaller volumes, but the small external volume, might be very influential to the network and zones that are in close proximity to the given external station. For this reason and others, external volume control totals are still provided. The control totals dictate the total volume at an external station by time of day, while the SWIM results provide the zone to zone trip patterns and distribution (what % of the trips go to zone A vs B).

- SWIM is a policy tool that requires that land use be modeled and integrated with transportation and the economy. This means that SWIM is modeling more than just the transportation element that our urban trip based models capture. SWIM is also modeling the land use that would accompany the given transportation and economic scenarios. Because of this SWIM's land use is not 'set' or dictated like in OSUM and JEMnR. OSUM and JEMnR require that the dictated land use for a given scenario be adhered to. This inconsistency explains the second reason why SWIM's raw volumes / results cannot be fed directly into the urban models – because the land use doesn't match. Before SWIM's trends can be used, the trip tables are first re-weighted by SWIM-to-local land use factors, so that the number of trips to a given zone represents the local measured or asserted land use, as opposed to the modeled land use in SWIM.
- SWIM is a stochastic model, meaning that each run of SWIM will provide slightly different results. To get a good "average" set of external trends, multiple sets of SWIM output need to be averaged together.

All of these reasons explain why SWIM is used for trend information (that cannot be obtained from other sources), and while control totals are still needed in the SWIM external model process."

Model Structure

The following flow charts depict the Oregon Small Urban Model Structure (Figure 1), which includes:

- Household Sub-Model – Worker Distribution (Figure 2)
- Trip Generation (Figure 3)
- Trip Distribution (Figure 4)
- Original External Model (Figure 5)
- Traffic Assignments (Figure 6)

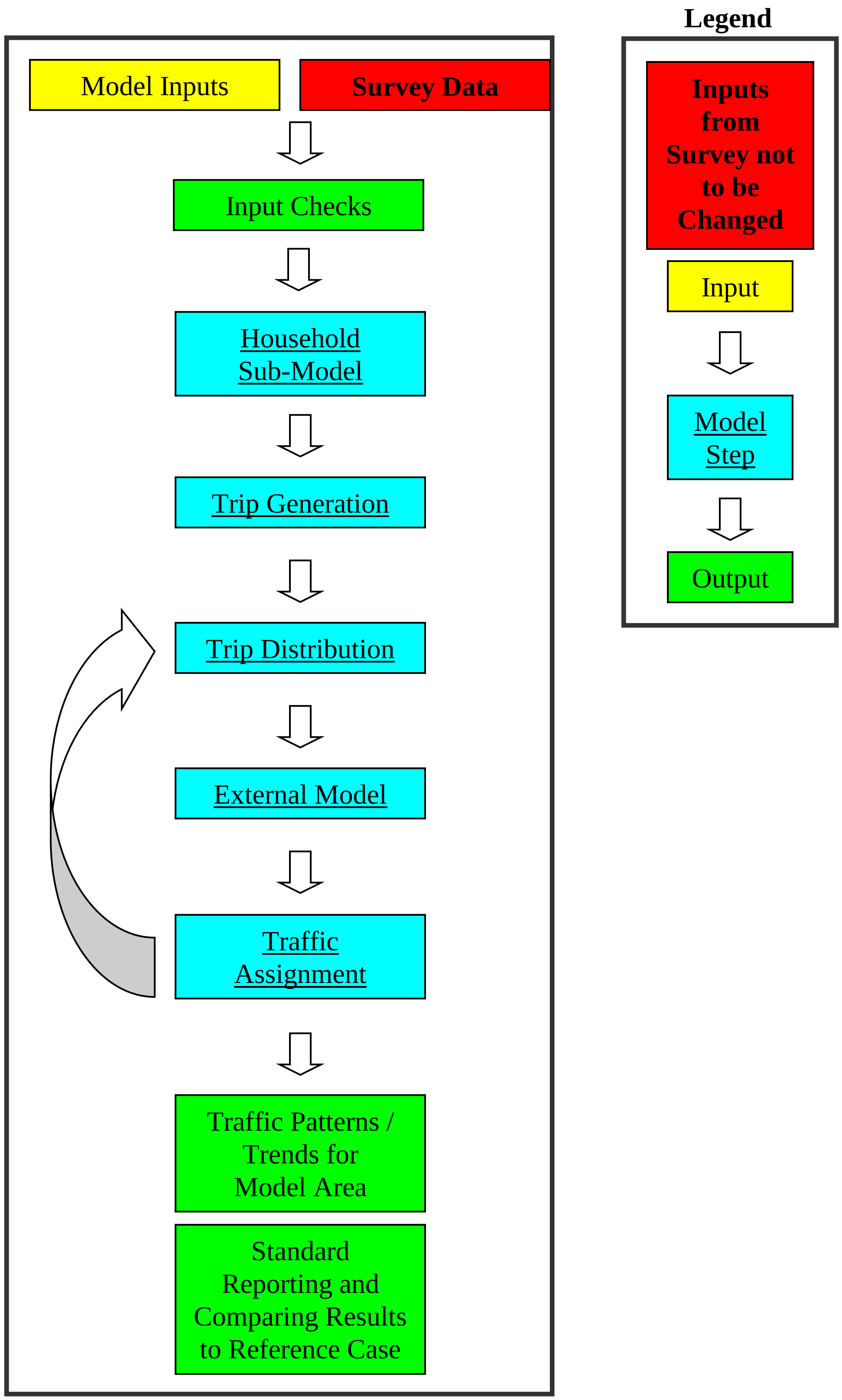


Figure 1: Oregon Small Urban Model Structure

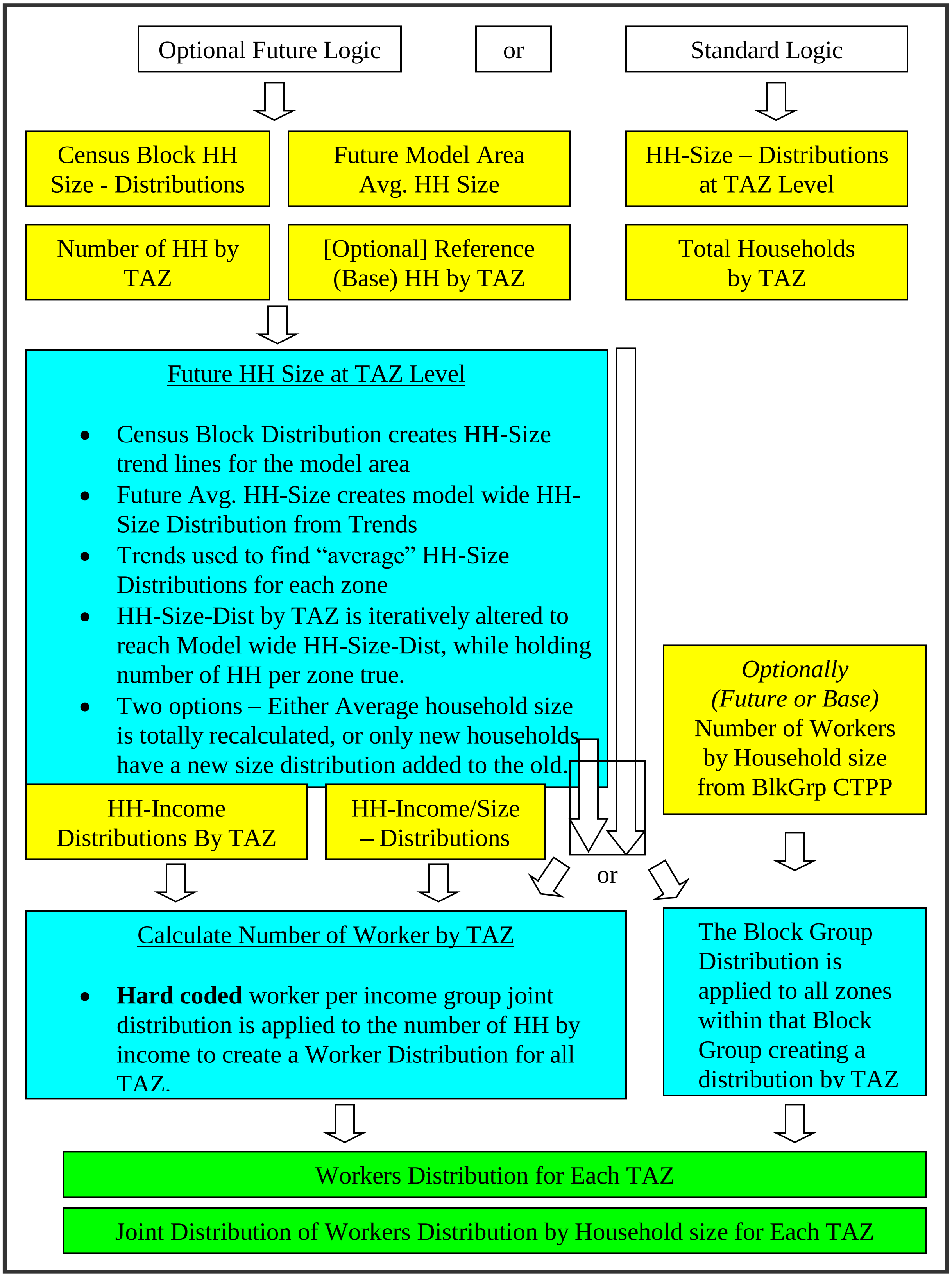


Figure 2: Household Sub-Model – Worker Distributions

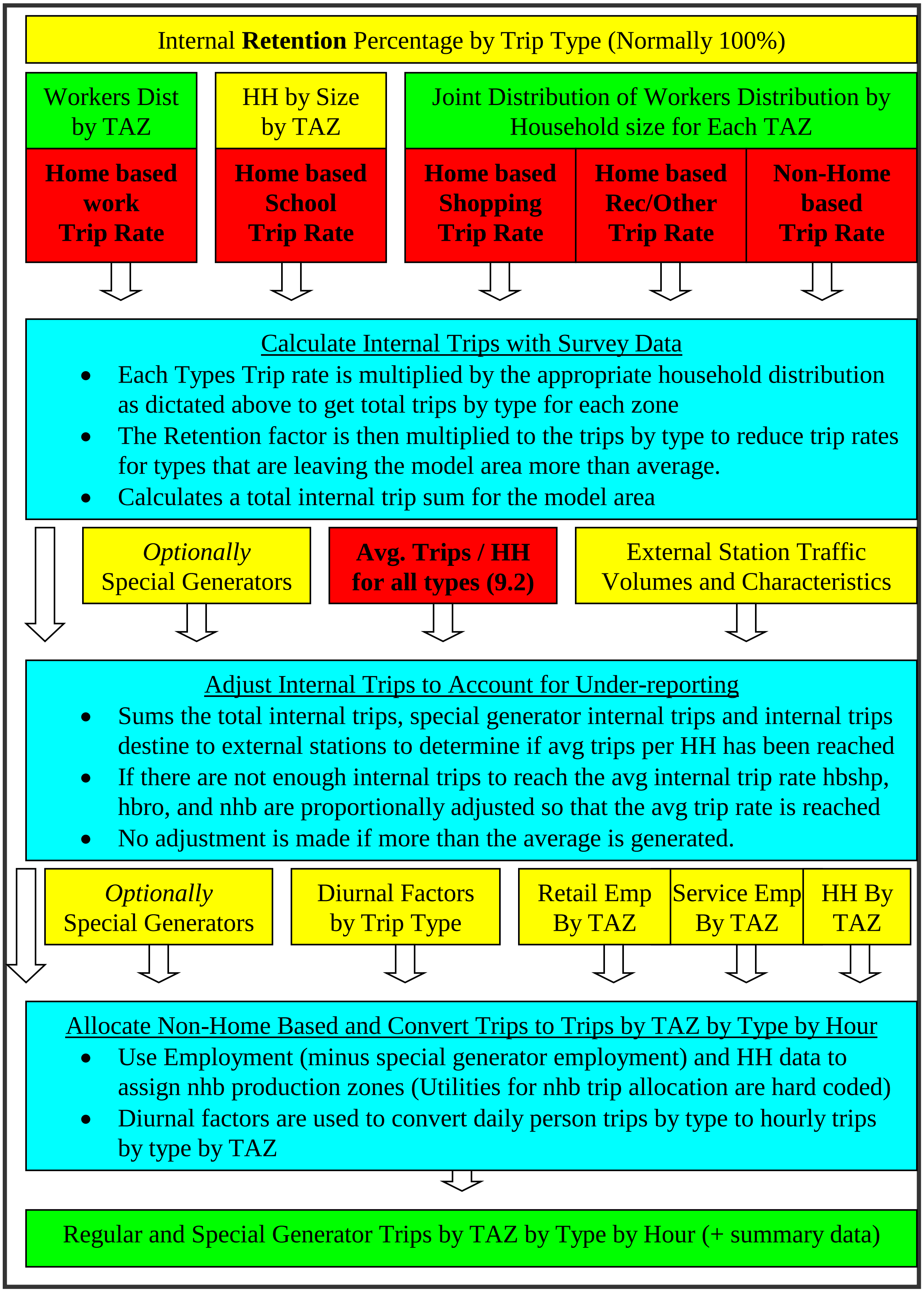


Figure 3: Trip Generation

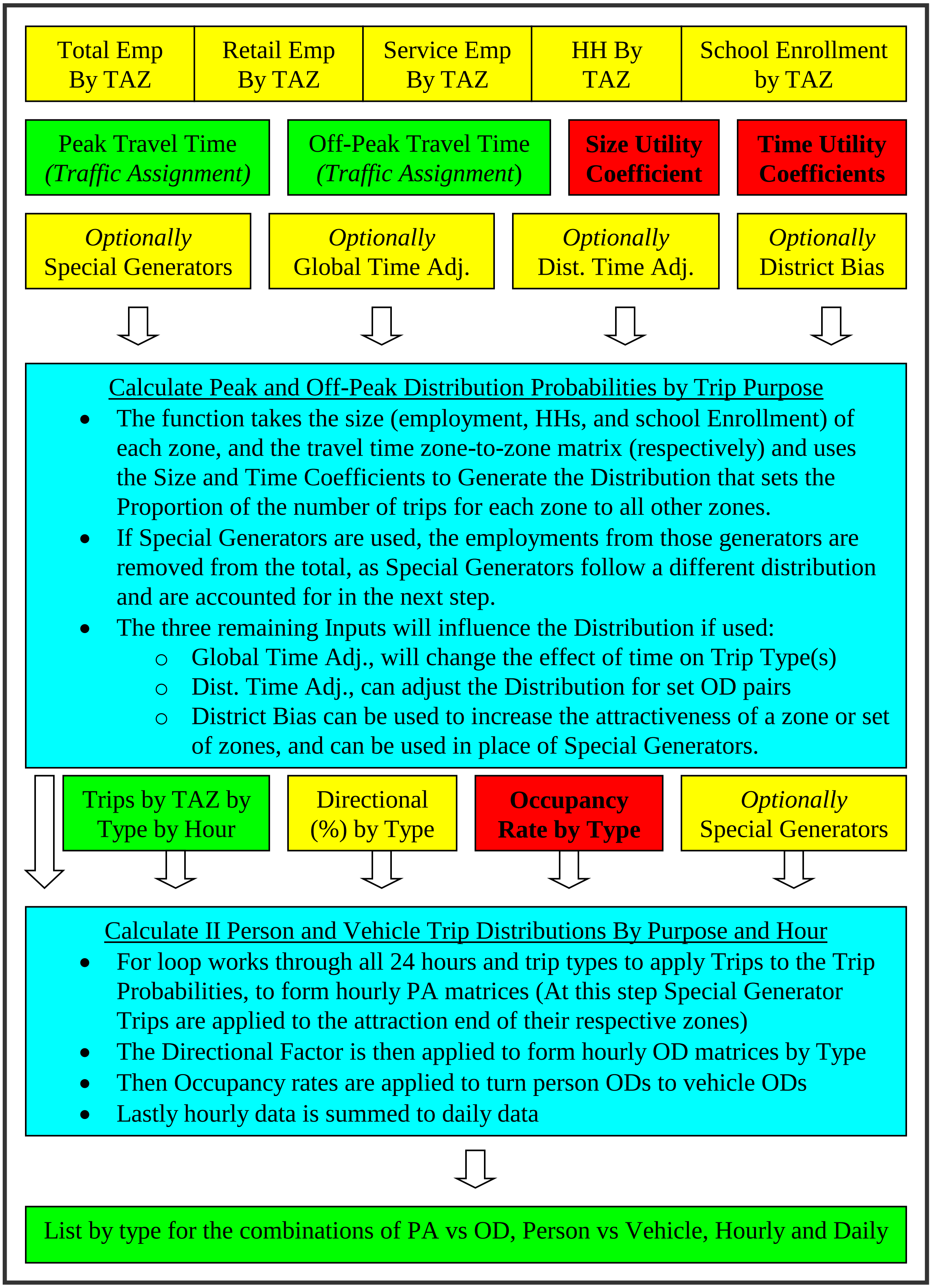


Figure 4: Trip Distribution

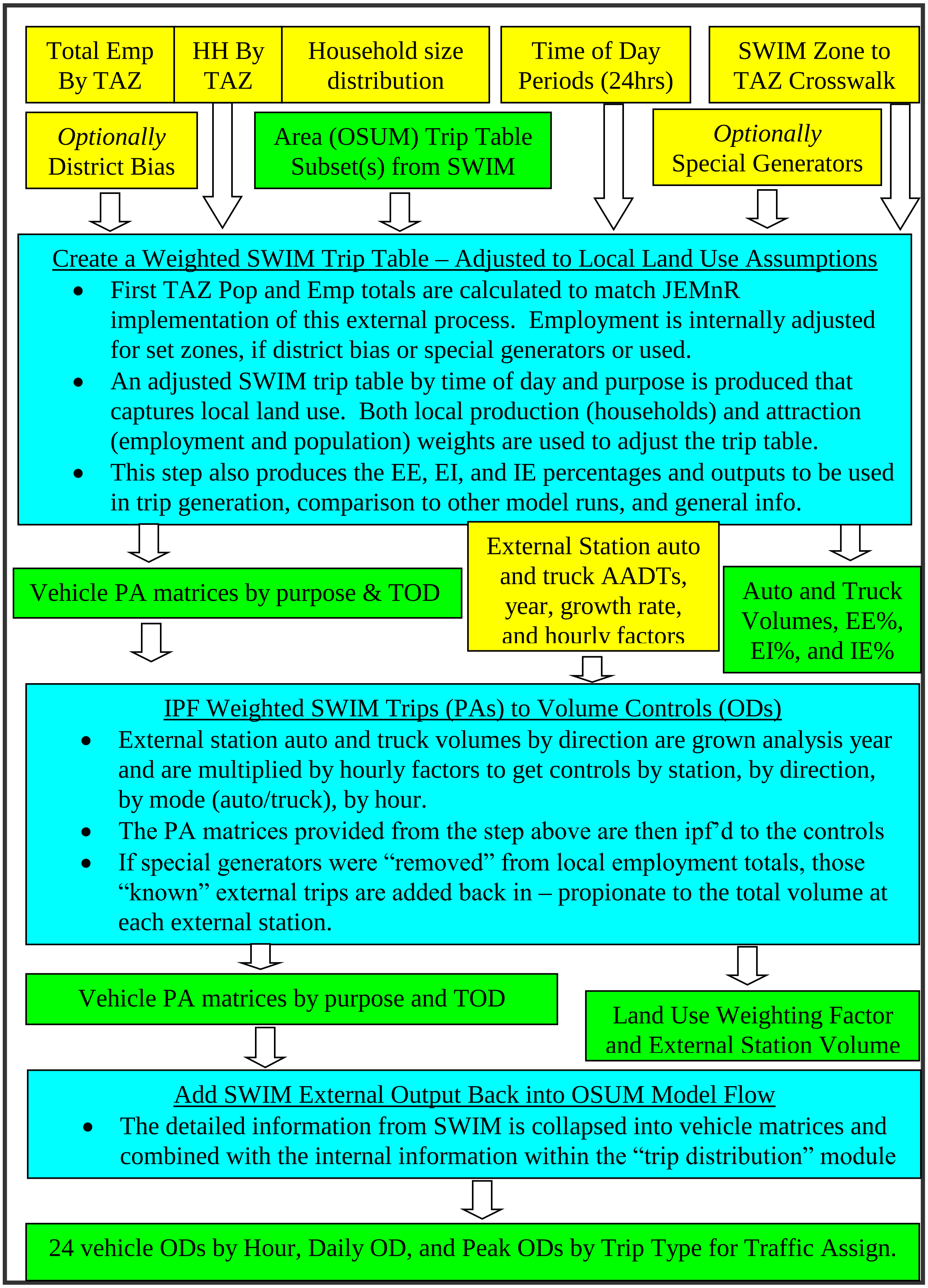


Figure 5: SWIM External Model

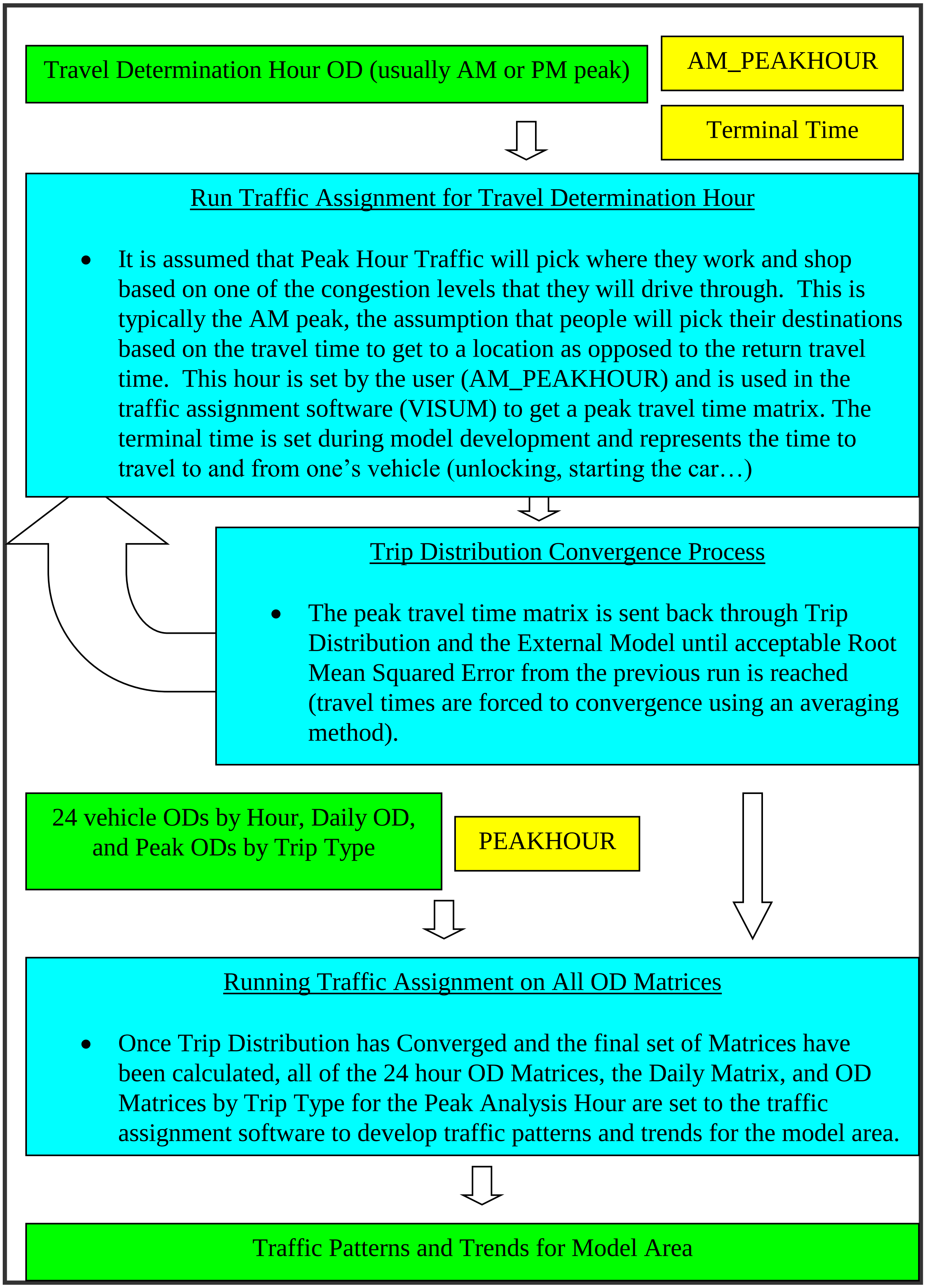


Figure 6: Traffic Assignment

III. Zone System and Highway Network

As shown in Figure 7, the boundaries of the modeling area extend as far north as OR138 along I-5, as far south as Dillard Hwy at South Umpqua River, to Buckhorn Road at OC Brown Road to the east, and to Melrose Rd at Old Melrose Rd to the west. The internal TAZs are aggregations of census blocks.

There are 14 external stations located at the periphery of the modeling area as shown in Table 1 below:

Table 1: External Stations (TAZs)

External TAZ	Location Description
1	I-5 at OR-138
2	Old Hwy 99 at Oak Hill Rd
3	Buckhorn Rd at OC Brown Rd
4	I-5 Pacific Highway at Roberts Creek Rod
5	Dillard Hwy at South Umpqua River
6	Coos Bay-Roseburg Hwy (OR42) at Brockway Creek
7	Lookingglass Rd at Brockway Rd
8	Melrose Rd at Old Melrose Rd
9	Garden Valley Rd at Turkey Crick Ln
10	North Bank Rd at Forest Glenn Ln
11	North Umpqua Highway at OR-138
12	Hatfield Dr at Buckhorn Rd
14	Brockway Rd at Kent Creek Rd
15	Lookingglass Rd at Millitary Ave
16	Happy Valley Rd at Steinhauer Rd
17	Roberts Creek Rd at Glengary Loop Rd

The Base Year 2010 Roseburg Model TAZ numbering scheme is 1 – 17 for external stations and 19 – 197 for internal zones.

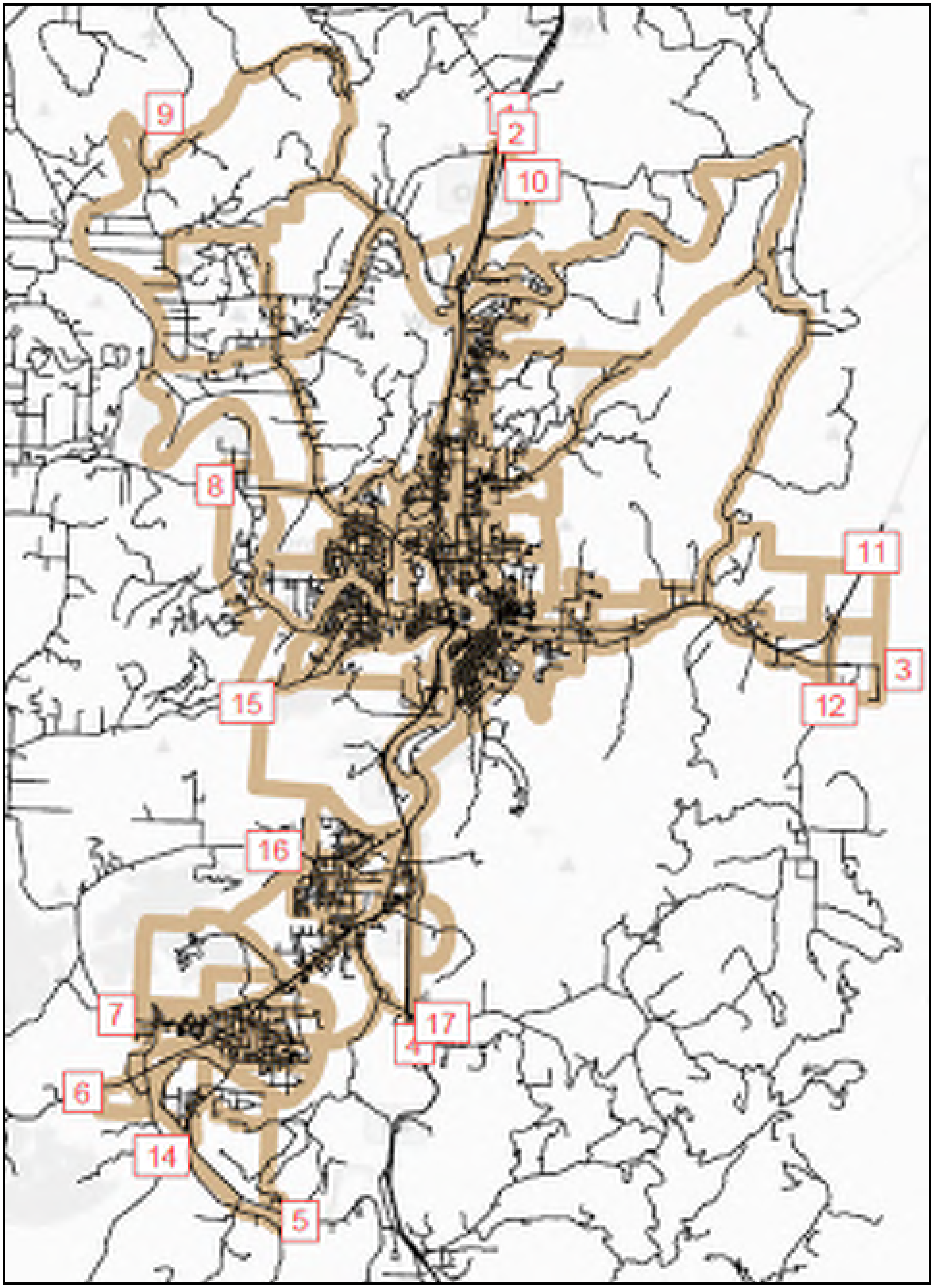


Figure 7: Roseburg Model External TAZ System

Highway Network

All roads with a functional classification of minor collector or higher were included in the coded highway network, as well as local roads that connect higher level facilities or subareas or that connect TAZs to the remainder of the network.

The more important node and link attributes are listed in Table 2 and Table 3, respectively, below:

Table 2: Zone and Node Attributes

Attribute	Value	Description
I.D.	1-197	Zone centroid
	$\geq$1000	Regular node

Table 3: Key Link Attributes

Attribute	Value	Description
LinkType	1	Freeway
	2	Principal arterial
	3	Minor arterial
	4	Collector/Minor collector
	5	Local
	9	Centroid connector
	30	Freeway ramp
TypeNo	0	No valid mode
	1	Signalized facility
	2	All other
TSysSet	C	Auto Mode
Length	miles	Link length
NumLanes	1-4	Number of lanes
V0Prt	20-65	Free-flow speed
CapPrt	400-9,999	Link Capacity
2010 DailyCounts	1,000 - 5,000	Base Year 2010 Traffic Counts
DAILY_VOLUME	1,000 - 20,000	Base Year 2010 Daily Model Volumes (Sum of 24 Hourly Volumes)
DAILY_ASSN	1,000 - 20,000	Base Year 2010 Daily Trip Table Assigned Volumes
2010PmPkHrCounts	50 - 9,999	Base Year 2010 PM Peak Hour (4-5PM) Traffic Counts
VOL_4PM_5PM	50 - 9,999	Base Year 2010 PM Peak Hour Model Volumes

Link speeds were coded using posted speed limits and a few of the link speeds were calibrated to reality speeds. Capacities were coded based upon facility type and area type using the look-up Table 4 as shown below.

Table 4: Link Capacity Look-Up Table

Facility Type	CBD	CBD Fringe	Reservation	Rural
Freeway (1)	1900	1900	1900	1900
Principal Arterial (2)	700	800	850	950
Minor Arterial (3)	575	625	700	760
Collector/Minor Collector (4)	450	500	525	650
Local (5)	400	450	500	625
Centroid Connector (9)	9999	9999	9999	9999
Freeway Ramp (30)	850/1000	850/1000	850/1000	850/1000

IV. Survey Data

OSUM was estimated using the 1994-1995 Oregon household and travel behavior survey data from a two-day survey of 3,200 households in eight counties (Clatsop, Coos, Deschutes, Josephine, Klamath, Lincoln, Malheur, and Umatilla) that provided a good geographical cross-section of Oregon's rural areas and small urban areas.

For specific information on the survey methods, survey data preparation, and survey results, the reader is referred to the *Oregon Travel Behavior Survey, Summary of Findings*[3], prepared by the Oregon Department of Transportation.

The *Oregon Household Activity Survey (OHAS)*[4] was conducted statewide in 2009/2010 and this OHAS statistical data was used to calibrate the trip length distribution patterns in terms of mean travel distance and travel time, as well as the distribution curves by trip purpose.

[3] Oregon Department of Transportation, Oregon Travel Behavior Survey, Summary of Findings, (2000).
[4] Oregon Department of Transportation, Oregon Household Activity Survey, (2010).

V. Input Data

Socioeconomic and Land Use Data

Table 5: Roseburg Travel Demand Model Zonal Data Input

Data	Input To:	Data Source
1. TAZ No: Traffic Analysis Zone Number	Zonal data	Roseburg Travel Demand Model
2. AHHS: Average Household Size	Future households	Census data
3. HH: Base year total households	Household size sub-model, and Destination Choice model	1. Base year – Census data 2. Future – City, county staff, DEA Consultants
4. HHI1, HHI2, HHI3, HHI4: Base year households by income categories 1, 2, 3 & 4	Household worker sub-model	PUMS data
5. HHS1, HHS2, HHS3, HHS4: Base year households by size categories 1, 2, 3, & 4+	Household worker sub-model	Census data
6. EMP: Base year total employees	For calculation of other employee numbers	1. Base year – ES202 data Future – City, county staff
7. RETL: Retail employment	Destination choice model	2. Base year – ES202 data 3. Future – City, county staff
8. SERV: Service employment	Destination choice model	1. Base year – ES202 data 2. Future – City, county staff
9. OTHER: Employment	Destination choice model	Calculated*
10. SCHE: School enrollment	Destination choice model	1. Base year – School district 2. Future – City, county staff

* Calculated as: Other Employment = Total Employment – Retail Employment – Service Employment

Travel Time Data

Auto travel time skims are used as inputs to the destination choice models. Separate sets of skims are produced for the peak and off-peak time periods. In the Roseburg model, peak hours are defined as between 7:00 A.M. and 8:00 A.M. and between 4:00 PM and 5:00 PM, respectively, and off-peak hours are the rest hours.

Free-flow travel times are used for the off-peak period. The skims are prepared by performing a zero-iteration assignment using zero-valued scalar matrix. Following the assignment, intra-zonal travel times are computed for each TAZ as one-half of the travel time to the nearest neighboring zone and then added to the free-flow travel time matrix. A terminal time of 1.00 minutes is then added for both the production zones and the attraction zones.

Congested travel times are used for the peak period. The peak period skims are prepared by performing an A.M. peak hour assignment (7:00 A.M. - 8:00 A.M.) and adding the intra-zonal and terminal times as is done for the off-peak skims. An A.M. rather than P.M. peak hour assignment is performed because this produces congested times in the proper (P–A) direction, which are needed for the destination choice model. (A P.M. peak hour assignment would produce uncongested, or less congested, times in the P-A direction). The final peak period skims are developed after the second iteration of destination choice model runs and trip assignments, since free flow travel times must by necessity be used as input to the destination choice model on the first iteration.

Other Input Data

Table 6: Roseburg Travel Demand Model Other Input Data

Data	Input To:	Data Source
1. Time-of-day factors by trip purpose	1. Trip generation model 2. Special generator model	OHAS
2. Daily special generator trips ends	1. Special generator model 2. SWIM model	1. Trip generation rates – *ITE Trip Generation Manual*[5] 2. Trip generation data – local staff
3. % of I-I special generator trips	1. Special generator model 2. SWIM model	Local staff
4. Avg. vehicle occupancy by trip type (hbw, hbro, hbsch, hbshp and nhb)	1. Special generator model 2. Destination choice model	OHAS
5. 24-Hour Directional factors by trip type (hbw, hbro, hbsch, hbshp and nhb)	Destination choice model	OHAS
6. External station ADT	SWIM Daily and PM peak models	1. Base year – traffic counts 2. Future – SWIM Models
7. Time-of-day factors for external stations	E-I, I-E, E-E models	Traffic counts
8. Percentage of trucks at external stations	SWIM model	Traffic counts
9. Percentage of vans and pickups at external station	SWIM model	Traffic counts

[5] Institute of Transportation Engineers, Trip Generation 6th Edition, (1997).

VI. Model Components

The general structure of the model follows a basic four-step process consisting of pre-generation, trip generation, trip distribution, and traffic assignment.

- Within the pre-generation step, all of the necessary inputs for trip generation are produced using a set of household sub-models that stratify households by number of workers, household size, and number of workers by household size.

- The trip generation model generates average weekday daily motorized person trip productions by trip purpose. A special generator model is also included which estimates daily trip ends for eight special generators and then allocates the trips to internal and external TAZs.

- Within the trip distribution step, a destination choice model is used to distribute daily internal-internal trips, while internal-external, external-internal, and external-external trips are handled with separate procedures as by SWIM. Post to trip distribution, a special SWIM model is used to estimate the percentages of external-internal/internal-external traffic at each external station as well as a daily through (external-external) trip matrix.

- Trip assignment is performed using a single-class, equilibrium capacity restraint technique.

Within the following sections, each model component is described in a standard format. A brief description of the model's function, relationship to other components, and basic structure is followed by the definition of variables (including variable names), allowable values (if applicable), and data sources.

The calibrated model functions are then listed, as well as the estimated model coefficients from the OSUM development project. Because of the availability of the 2010 OHAS travel survey data specific to the Roseburg area, comparisons of estimated model data to the observed travel data are made to validate each model component.

Pre-Generation

In the pre-generation step, estimates are prepared for each TAZ of the number of households by:

- Size category (1, 2, 3, and 4+);
- Number of workers category (0, 1, 2, and 3+); and
- Size and number of workers categories.

These estimates are required inputs to the trip generation models discussed in the next section.

For the base year 2010, the households by size distributions were obtained directly from 2010 Census data. Information on future households by size category was calculated by adding estimates of household growth to the base year distributions. Probabilities for the number of workers per household were estimated based on joint household size and worker distributions for both the base and future years. Joint distributions of the number of households by size and number of workers were derived using the joint household size and income distribution and the worker probabilities.

Household Size Sub-model

The household size sub-model produces estimates of the future number of households by size category for each TAZ. This information is used as input to the trip generation models described in the next section.

The household sub-model is implemented within the “Household sub-model” module shown in the model flowchart according to the following steps:

1. 2010 Census data for the entire model area is used to fit a relationship between average household size and the proportion of households in each household size category. The curves are iteratively fit using cubic splines according to the constraints that:

    - for each average household size, the sum of the proportions equals one;
    - the proportion of one-person households equals one for the average household size of 1.0; and
    - the proportions for the area-wide average household size equal the area-wide proportions.

2. Future average household size for the model area is calculated from projections of future population and future households.

3. The area-wide distribution of future households by size is calculated using the model from Step 1, the average household size from Step 2, and the future household total.

4. The proportion of total new households within each size category is obtained by subtracting the existing households from the future households within each category and then calculating the proportions.

5. Changes in the number of households by size category are calculated for each TAZ by multiplying the total change in households by TAZ by the area-wide proportions from in Step 4.

The changes in households by size category are added to the base year household size distributions within the household sub-model described above to obtain future distributions by TAZ.

Table 7: Definition of Household Size Sub-model Variables

Name	Description	Values	Data Source
HHS_BASE	Base year households by size category (TAZ)	19,651	2010 Census data
POPBASE	Base year population (census block)	48,410	2010 Census data
AHHS_BASE	Base year average household size (census block)	2.427	2010 Census data
POPFUTUR	Future population (TAZ)	79,124	City staff, DEA Consultants
HHFUTUR	Future households (TAZ)	29,803	City staff, DEA Consultants

Household Worker Sub-model

The household worker sub-model estimates worker probabilities as a function of household size and income. The probabilities are used in the household sub-model together with the joint distribution of households by size and income to calculate the number of households by size and number of workers for each TAZ. This distribution is input to the trip generation model.

The first step in the worker sub-model is the calculation of worker utilities for each combination of household size (1, 2, 3, and 4+) and income category (note in 1994$):

- Income1 < $15,000
- Income2 >= $15,000 and < $30,000
- Income3 >= $30,000 and < $60,000; and
- Income 4 >= $60,000

The utility equations were estimated as a part of the OSUM development project. Following this, worker probabilities are calculated based on the utilities. The probabilities are stored as an array, with the number of workers as the rows, income category as the columns, and household size as the tables.

Table 8: Definition of Household Worker Sub-Model Variables

Name	Description	Values	Data Source
HHSIZE	Household size category	1-4	2010 Census
INCOME_	Dummy variables for household income category	0, 1	2010 Census

CALIBRATED MODEL FUNCTIONS

$\text{Utility}_{0\ wkr} = 0$

$\text{Utility}_{1\ wkr} = -1.462 + 0.6092*\text{HHSIZE} + 0.5369*\text{INCOME3} + 0.6864*\text{INCOME4}$

$\text{Utility}_{2\ wkr} = -4.488 + 1.323*\text{HHSIZE} + 0.6838*\text{INCOME2} + 1.464*\text{INCOME3} + 2.458*\text{INCOME4}$

$\text{Utility}_{3+\ wkr} = -10.09 + 2.4898*\text{HHSIZE} + 1.254*\text{INCOME3} + 2.448*\text{INCOME4}$

Table 9: Estimated Variable Coefficients

Variable Name	0 Worker Coeff.	1 Worker Coeff.	2 Worker Coeff.	3+ Worker Coeff.
Constant	0	-1.462	-4.488	-10.09
HHSIZE	0	0.6092	1.323	2.4898
INCOME1	0	0.0	0.0	0.0
INCOME2	0	0.0	0.6838	0.0
INCOME3	0	0.5369	1.464	1.254
INCOME4	0	0.6864	2.458	2.448

The 0-worker choice utility is held constant at zero.

Household Joint Size and Worker Sub-model

The household sub-model uses the output from the household size and worker sub-models to produce distributions of the number of households by size (1, 2, 3, and 4+) and worker category (0, 1, 2, and 3+), and number of households by worker category for each TAZ. For the base year, the household sub-model functions as follows:

1. Distributions of the number of households by size category obtained from the 2010 Census data are input for each TAZ.

2. Distributions of the number of households by income category obtained from the 2010 Census data are input for each TAZ after adjusted to 1994 US$ by CPI.

3. A joint household size and income distribution is calculated for each TAZ from the marginal household size and income distributions using an iterative proportional fitting (IPF) procedure and a seed matrix. The seed matrix is the joint household size – income distribution for the region obtained from the 2010 Census Public Use Microdata Samples (PUMS) data.

4. A joint household size and worker distribution is calculated for each TAZ using the joint size - income distribution by TAZ and the worker probabilities calculated by the household worker sub-model.

5. The distribution of the number of households by worker category is calculated for each TAZ by collapsing the joint size – worker distribution across the size categories.

The household sub-model functions in the same manner for the future year, with the exception of Step 1 and Step 2.

- In Step 1, the distribution of households by size category is calculated for each TAZ by adding the number of additional future households within each category from the household size sub-model to the base year distribution.
- In step 2, the base year distribution of households by income category is multiplied by the total number of future households within each TAZ to obtain the number of future households by income category.

Table 10: Definition of HH Joint Size and Worker Sub-Model Variables

Name	Description	Values	Data Source
HH	Total Households by TAZ	19,651	Census data
HHS1 HHS2 HHS3 HHS4	% of 1-person households by TAZ % of 2-person households by TAZ % of 3-person households by TAZ % of 4+person households by TAZ	Varies from 0% to 100%	Census data
HHI1 HHI2 HHI3 HHI4	% of household income class 1 ($0-$15K) by TAZ % of household income class 2 ($15K-$25K) by TAZ % of household income class 3 ($25K-$40K) by TAZ % of household income class 4 ($40K+) by TAZ	Varies from 0% to 100%	Census data
AHHS	Average Household Size by TAZ	1.00 - 4.39	Census data

Trip Generation

The trip generation model is used to estimate the daily number of trip productions generated by internal TAZs for the following trip purposes:

- Home-based work (HBW)
- Home-based school (HBSCH)
- Home-based shopping (HBSHP)
- Home-based recreation/other (HBRO)
- Non-home-based (NHB)

Trip productions are calculated based on a set of trip generation rates estimated as a part of the 2010-2011 OSUM development project. Inputs to the model are the number of households by size and worker categories and the number of households by worker category that are produced by the household sub-models.

The model also separately estimates internal trip productions associated with special generators by hour-of-the-day. Inputs to the model are total daily trip ends for the special generators and the percentage of special generator trips produced within the internal modeling area.

If necessary, estimated productions are adjusted to a level corresponding to a national average daily household trip generation rate, which is 9.2 by referencing to "*NCHRP Report 365 – Travel Estimation Techniques for Urban Planning*[6] ."

The estimated trip productions from the model are inputs to the destination choice model discussed later.

Standard Model

The standard trip generation model estimates internally-generated trip productions for non-special generator trips according to the following steps:

1. Internal-internal (I-I) trip productions are calculated as:

    - Home-based work productions = HBW trip rate$_i$ * households$_i$

        where i = workers per household category

[6] NCHRP Report365 – Travel Estimation Techniques for Urban Planning.

- Home-based school productions = HBSCH trip rate$_i$ * households$_i$

  where i = household size category

- Home-based shopping productions = HBSHP trip rate$_{ij}$ * households$_{ij}$
- Home-based recreation/other productions = HBRO trip rate$_{ij}$ * households$_{ij}$
- Non-home-based productions = NHB trip rate$_{ij}$ * households$_{ij}$

  For HBShp, HBRec and NHB Productions:
  where i = workers per household category; and
  j = household size category

2. Internal-external/External-Internal (I-E/E-I) vehicle trip productions are calculated based on the average daily traffic (ADT) at each external station and the corresponding proportion of traffic that is comprised of I-E trips. These are converted into person vehicular trips by multiplying by an average external vehicle occupancy rate.

3. A target trip generation total for the modeling area is calculated by multiplying the assumed average daily household trip generation rate (9.2) by the number of households in the modeling area. The sum of the estimated I-I, I-E, and special generator trip productions (see following section) is subtracted from the trip generation target. If a deficiency is found, Step 4 is performed to adjust the estimated trip productions upward to match the target trip generation value.

4. If needed, the adjustment process is carried out for the HBSHP, HBRO and NHB trip purposes only. It is based on a methodology outlined in *Transportation Research Record No. 1412*[7] which addresses the problem of underreporting of trips in household surveys for these trip purposes. The report found that the rate of underreporting varies by household size. Thus, the estimate of unreported trip productions from Step 3 is first apportioned to area-wide households based on household size using the following size weighting factors: 1-person = 1; 2-persons = 1.4; 3-persons = 2; and 4+ persons = 3. These are allocated by trip purpose within each household size category based on the proportion of total I-I productions for each purpose. The unreported trip productions by household size category and trip purpose are then allocated to individual TAZ according to the proportion of area-wide I-I trip productions by size and purpose for each TAZ. Total trip productions by trip purpose for each TAZ are calculated by adding the unreported productions to the initial I-I trip production estimates from Step 1 and summing across size categories.

[7] Transportation Research Board, Transportation Research Record 1412, (1994).

5. The NHB trip productions by TAZ are summed to an area-wide total and then allocated to non-residential TAZs using utility equations from OSUM that estimate the attractiveness of NHB trip-making.

6. The total daily trip productions by purpose are allocated to each hour of the day using diurnal factors by trip purpose.

7. If present, a user-specified rural trip generation adjustment factor is applied to non-special generator trip productions for rural TAZs.

The output of the model is a set of I-I trip production vectors by hour-of-the-day for each trip purpose.

Table 11: Definition of Standard Trip Generation Model Variables

Name	Description	Values	Data Source
HH.WKR.DIST	Households by worker category	N/A	Household sub-model
HH.SIZE.DIST	Households by size category	N/A	Household size sub-model
SIZE.BY.WKR	Households by size and worker categories	N/A	Household sub-model

TRIP PRODUCTION RATES

Calibrated Rates

Table 12: HBW – Home-Based Work

Workers per Household	Daily Trips Per Household
0	0.225102
1	1.384022
2	2.562093
3+	2.290681

Table 13: HBSCH – Home-Based School

Household Size	Daily Trips Per Household
1	0.016614
2	0.098374
3	1.168918
4+	2.916405

Table 14: HBSHP – Home-Based Shopping

Household Size	Workers per Household			
	0	1	2	3+
1	0.638499	0.350143	0	0
2	1.186872	0.858026	0.655354	0
3	1.751793	1.257899	0.830997	0.391324
4+	1.148286	1.329013	1.301246	0.748213

Table 15: HBRO – Home-Based Recreational/Other

Household Size	Workers per Household			
	0	1	2	3+
1	1.227290	0.729757	0	0
2	2.745928	1.965329	1.324301	0
3	3.512685	3.035886	2.535976	2.352593
4+	7.522069	6.151105	4.598508	1.520459

Table 16: NHB – Non-Home Based

Household Size	Workers per Household			
	0	1	2	3+
1	1.217569	1.429768	0	0
2	2.652868	2.522066	2.743953	0
3	2.528181	2.766461	3.723198	3.663694
4+	7.577921	4.204060	4.818023	3.338120

Estimated Rates

The estimated trip production rates are the same as the calibrated rates. The only exception to this is the estimated trip rates for the NHB trip purpose, which is shown in Table 16.

Special Generator Model

The trip generation portion of the special generator model estimates internal trip productions for special generators within the modeling area. As shown in Table 17: The special generators are Hospital, Abertson/Sherms/Big5, Fred Meyer, City/County Government Facilities and Library, Umpqua Community College/Wine College, Valley Mall, Walmart and JC Penny/PetCo Stores. The special trip generation is done by estimating the number of internal daily vehicle trip attractions for each special generator, then allocating these attractions, in the form of trip productions, to the internal TAZs.

Table 17: 2010 Base Year Roseburg Model Special Generator Estimation

SPECIAL GENERATORS	zone	type	trips	int.pct	retl.emp	serv.emp	othr.emp	hh	sch.enrl	ITE Codes
Hospital	30	hbro	4,752	0.75	0	1,056	0	98	0	610
Albertson'sShermsBig5	32	hbshp	12,174	0.7	478	493	95	0	0	854
FredMeyer	63	hbshp	4,224	0.7	201	858	154	2	0	850
CityCountyGovLib	85	hbro	6,117	0.75	23	89	1,184	13	0	733
UmquaCCWineColl	145	hbw	2,961	0.8	0	6	454	99	0	861
ValleyMall	162	hbshp	4,635	0.7	98	84	0	7	0	820
Walmart	163	hbshp	4,177	0.7	92	72	0	29	0	854
JCPennyPetco	168	hbshp	12,314	0.7	586	95	22	68	0	850

For each special generator, daily vehicle trip attractions are calculated by multiplying the daily vehicle trip ends by the percentage of internal trips. The daily vehicle trip ends, percentage of internal trips, and primary trip purpose are established as user inputs to the model.

The daily trip attractions are allocated as trip productions to each internal TAZ based on the probability of the attractions having a linkage to the TAZ. The probabilities are calculated as the number of households within a TAZ divided by the total households for all internal TAZs. The daily trip productions are allocated to each hour of the day using the diurnal factors for the primary trip purpose associated with the special generator.

The output of the model is a set of I-I trip production vectors by hour-of-the-day for each special generator.

Table 18: Definition of Special Generator Model Variables

Name	Description	Values	Data Source
TRIPS	Daily special generator trip ends	51,355	1. Trip generation rates – *ITE Trip Generation Manual*[8] 2. Trip generation data – local staff
INT.PCT	% of I-I special generator trips	0.70-0.80	3. Assumptions

TRIP PRODUCTION RATES

Calibrated Rates

Special generator trip ends are calculated outside of the model using trips rates from the *ITE Trip Generation Manual*.[9]

[8] Institute of Transportation Engineers, Trip Generation 9th Edition, (2012).

Trip Distribution

Within the trip distribution step, separate trip matrices are developed for the internal-internal (I-I), internal-external (I-E), external-internal (E-I), and external-external (E-E) trip types.

- I-I matrices are developed by trip purpose and hour-of-the-day using the trip productions from the trip generation model and a destination choice model based on the multinomial logit formulation in OSUM.

- Daily I-E and E-I matrices are estimated using special procedures (SWIM) in which trip ends at the external stations are linked and balanced to internal TAZs based on the relative number of trip ends within each internal TAZ.

- A daily E-E trip matrix is estimated using the SWIM model, as described on Pages 3-4. Diurnal factors are applied to the external trip matrices to produce I-E, E-I and E-E trips by hour-of-the-day.

- At the end of the step, the internal and external trip matrices are combined to form hourly total trip matrices that are balanced and used in the trip assignment step.

Destination Choice Model

The destination choice model is used to distribute non-special generator I-I trips by trip purpose and hour-of-the-day. For each production zone, the number of trips distributed to a destination zone is calculated as a function of the trip productions and the destination choice probability for that zone. The destination choice probability reflects the relative attractiveness of a specific destination zone compared to all other zones. The attractiveness of a zone is represented as a utility, which is estimated as a function of size variables for the zone (retail, service, and other employment, households, and school enrollment) and the travel time from the production zone.

For destination zones containing special generators, the portions of the size variables attributable to the special generators are subtracted, since special generator trips are distributed separately. Peak or off-peak travel times are used depending on the time of day. The coefficients for the size and travel time variables for each trip purpose are inputs as a data matrix by the user.

Following the trip distribution, the special generator trips from the previous step are added to the non-special generator trips. The appropriate trip purpose for adding the special generator trips is determined by the primary trip purpose for the special generator, as defined by the user.

The total I-I person trip matrices are converted to origin-destination format by applying directional factors by trip purpose and time-of-day. Average vehicle occupancy rates by trip purpose are then used to convert the person trips to vehicle trips. The resulting hourly O-D vehicle trip matrices are stored as an array. The hourly vehicle person trip matrices are summed to create daily vehicle person trip matrices by trip purpose.

Table 19: Definition of Destination Choice Model Variables

Name	Description	Values*	Data Source
RETL____	Retail employment	N/A	1. Base year – ES202 data 2. Future – City, county staff and DEA consultants
SERV____	Service employment	N/A	1. Base year – ES202 data 2. Future – City, county staff and DEA consultants
OTHR.EMP	Other employment	N/A	N/A**
HH____	Households	N/A	1. Base year – Census data 2. Future – City, county staff and DEA consultants
SCHE____	School enrollment	N/A	1. Base year – School district 2. Future – City, county staff and DEA consultants
__.TIME	Peak and off-peak travel times	N/A	VISUM model assignments

* Discrete variables
** Calculated as: Other Employment = Total Employment – Retail Employment – Service Employment

CALIBRATED UTILITY FUNCTIONS

U_{HBW} = -0.3076*__.TIME + 0.02057*__.TIME^{2} + -0.00059*__.TIME^{3} + ln (RETL____ + 1.2115*SERV____ + 1.2969*OTHR.EMP)

U_{HBSCH} = ln (SCHE____)

U_{HBSHP} = -0.5831*__.TIME + 0.02665*__.TIME^{2} + -0.0005*__.TIME^{3} + ln (RETL____ + 0.0095*SERV____ + 0.0106*OTHR.EMP + 0.0286*HH____)

U_{HBRO} = -0.3977*__.TIME + 0.01607*__.TIME^{2} + -0.00037*__.TIME^{3} + ln (RETL____ + 1.4534*SERV____ + 0.5103*OTHR.EMP + 0.6123*HH____)

U_{NHB} = -0.5463*__.TIME + 0.03555*__.TIME^{2} + -0.001*__.TIME^{3} + ln (RETL____ + 0.3088*SERV____ + 0.1678*OTHR.EMP + 0.1967*HH____)

Table 20: Estimated DESTINATION CHOICE Variable Coefficients

Variable Name		HBW	HBSCH	HBSHP	HBRO	NHB
__.TIME	Coeff.	-.3076	0.0	-.5831	-.3977	-.5463
__.TIME ^{2}	Coeff.	.02057	0.0	.02665	.01607	.03555
__.TIME ^{3}	Coeff.	-.00059	0.0	-.0005	-.00037	-.001
RETL____	Coeff.	1.0	0.0	1.0	1.0	1.0
SERV____	Coeff.	1.2115	0.0	.0095	1.4534	.3088
OTHR.EMP	Coeff.	1.2969	0.0	.0106	.5103	.1678
HH____	Coeff.	0.0	0.0	.0286	.6123	.1967
SCHE____	Coeff.	0.0	1.0	0.0	0.0	0.0

As shown in Figure 8, in comparison of the OHAS survey with the Base Year 2010 Roseburg travel demand model trip length (travel time) frequency distribution, means and curves by five trip purposes (Home-Based Work, Home-Based School, Home-Based Shopping, Home-Based Recreational/Other and Non-Home Based) and daily vehicle trips. (Note here that Reference Scenario is Base Year 2010 itself), the model results show close matches with the OHAS survey results in terms of their distribution curves and average travel time by purpose.

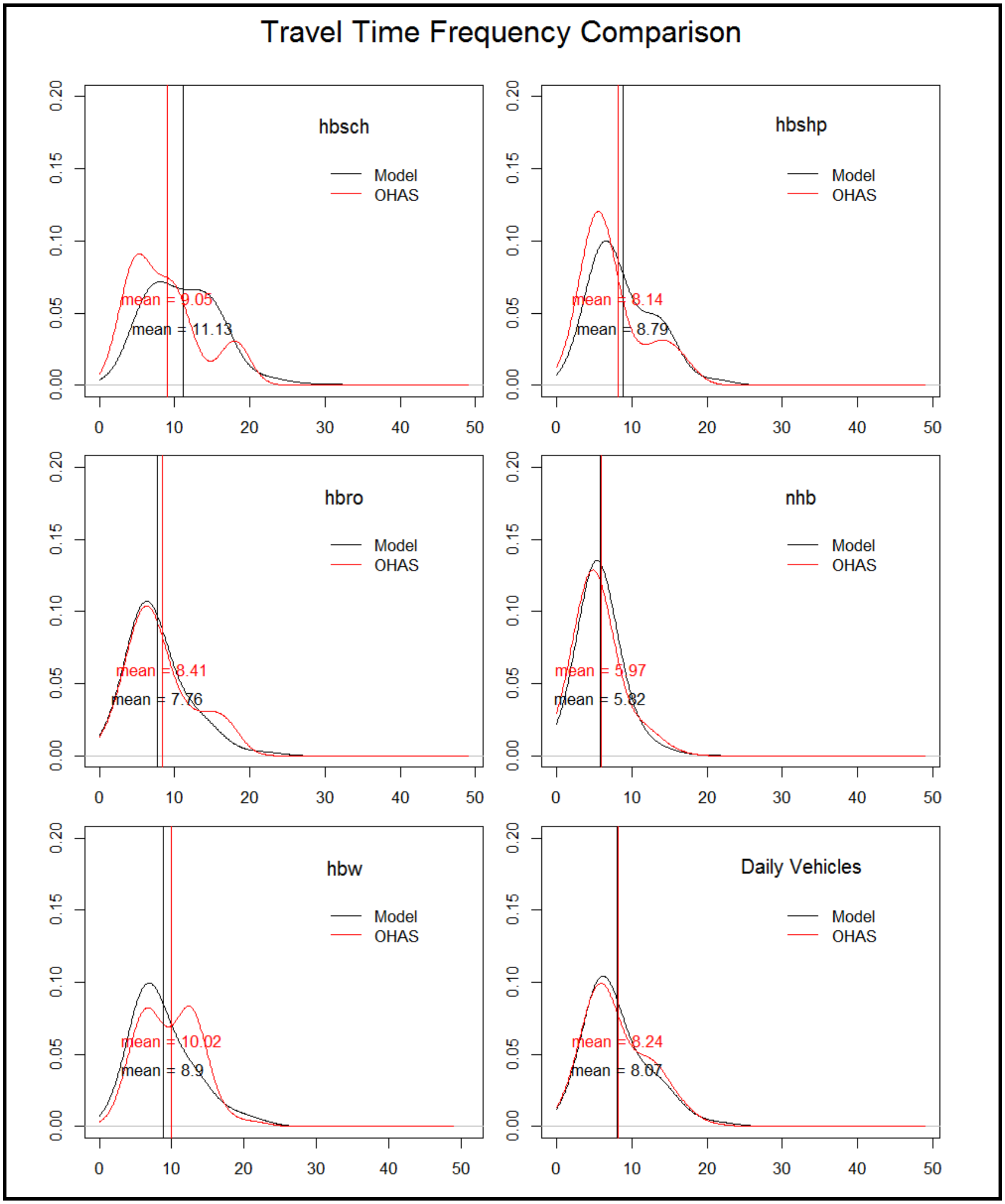


Figure 8: Base Year 2010 Roseburg Model vs. Survey Daily Trip Distribution

External-Internal and Internal-External Trip Distribution Models

The SWIM model distributes trips between internal zones and external stations. E-I trips are trips produced outside of the modeling area with destinations inside of the modeling area. The production ends of E-I trips are represented at external stations. I-E trips are the converse of E-I trips.

Within the SWIM model, external trips destined for special generators are estimated separately from trips with non-special generator destinations. The first step is to identify the number of external productions associated with each special generator. This is done by multiplying the special generator trip ends by the percentage of E-I special generator trips. These percentages are provided as a user input. (The derivation of the E-I, I-E, and E-E percentages of total traffic at the external stations is described by the "External Related Trips by SWIM" section on Pages 3-4 and Figure 5 on Page 9). The production ends of these trips are then allocated based on the ratio of the E-I trips at each external station to the sum of the E-I trips at all external stations.

Time-of-Day Factors

Time-of-day (diurnal) factors are used to estimate travel by hour of the day. Separate sets of factors are used for I-I trips and external trips. The I-I factors are broken down by trip purpose. They are applied to the daily trip productions output by the trip generation model. These factors were estimated from data collected in the 2009/2010 Oregon Household Activity Survey (OHAS) as shown in Table 21. The external factors are applied to the daily E-I, I-E, and E-E trips developed in the trip distribution step. They were estimated based on traffic counts and vary by external station as shown in Table 24 below.

Table 21: Internal-Internal Time-of-Day Factors

Hour	Trip Purpose				
	HBW	HBSCH	HBSHP	HBRO	NHB
1	0.0011	0.0000	0.0009	0.0005	0.0000
2	0.0058	0.0000	0.0000	0.0024	0.0010
3	0.0046	0.0000	0.0000	0.0000	0.0000
4	0.0025	0.0188	0.0030	0.0000	0.0050
5	0.0182	0.0000	0.0000	0.0071	0.0020
6	0.0294	0.0149	0.0000	0.0165	0.0037
7	0.0619	0.0369	0.0016	0.0193	0.0034
8	0.1074	0.1135	0.0005	0.0341	0.0147
9	0.0515	0.2011	0.0231	0.0510	0.0346
10	0.0578	0.0000	0.0835	0.0491	0.0482
11	0.0345	0.0000	0.1068	0.0637	0.0907
12	0.0417	0.0360	0.0849	0.0595	0.1038
13	0.0541	0.0024	0.0689	0.0707	0.0955
14	0.0718	0.0320	0.1149	0.0455	0.0768
15	0.0493	0.0769	0.0785	0.0596	0.0822
16	0.0694	0.2933	0.0958	0.0705	0.1077
17	0.0941	0.0486	0.0957	0.0831	0.0994
18	0.0851	0.0442	0.0866	0.0752	0.0898
19	0.0516	0.0346	0.0516	0.0819	0.0432
20	0.0341	0.0102	0.0392	0.0584	0.0331
21	0.0228	0.0143	0.0349	0.0746	0.0245
22	0.0147	0.0134	0.0242	0.0444	0.0138
23	0.0131	0.0091	0.0058	0.0266	0.0125
24	0.0242	0.0000	0.0004	0.0070	0.0153
Total	1.0000	1.0000	1.0000	1.0000	1.0000

Directional Factors

Within the trip distribution step, directional factors are used to convert the hourly internal-internal trips from P-A format to O-D format. These factors were estimated from data collected in the 1994/1995 Oregon Travel Behavior Survey. Directional factors, as such, are not used for the external (E-I, I-E, and E-E) trips. For the E-I and I-E trips, the daily P-A matrices are converted to O-D matrices by summing them with their transpose and dividing by two. The external time-of-day factors are then applied to produce hourly O-D matrices. Similarly for the E-E trips, the daily seed matrix provided by the user is in O-D format. Following rebalancing, this matrix is converted to hourly E-E trip matrices by applying the external time-of-day factors as shown in Table 22 below.

Table 22: Daily Production to Attraction and A-to-P Factors by Trip Purpose

Hour	Trip Purpose									
	HBW		HBSCH		HBSHP		HBRO		NHB	
	P-A	A-P	P-A	A-P	P-A	A-P	P-A	A-P	P-A	A-P
1	0.000	1.000	0.500	0.500	0.000	1.000	0.000	1.000	0.500	0.500
2	0.000	1.000	0.500	0.500	0.500	0.500	0.000	1.000	0.500	0.500
3	0.697	0.303	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500
4	0.286	0.714	1.000	0.000	0.000	1.000	0.500	0.500	0.500	0.500
5	0.829	0.171	0.500	0.500	0.500	0.500	1.000	0.000	0.500	0.500
6	1.000	0.000	1.000	0.000	0.500	0.500	0.974	0.026	0.500	0.500
7	0.959	0.041	0.707	0.293	1.000	0.000	0.963	0.037	0.500	0.500
8	0.967	0.033	0.916	0.084	1.000	0.000	0.841	0.159	0.500	0.500
9	0.988	0.012	0.776	0.224	0.794	0.206	0.827	0.173	0.500	0.500
10	0.778	0.222	0.500	0.500	0.703	0.297	0.727	0.273	0.500	0.500
11	0.665	0.335	0.500	0.500	0.542	0.458	0.663	0.337	0.500	0.500
12	0.625	0.375	0.083	0.917	0.418	0.582	0.541	0.459	0.500	0.500
13	0.564	0.436	1.000	0.000	0.430	0.570	0.577	0.423	0.500	0.500
14	0.739	0.261	0.333	0.667	0.551	0.449	0.655	0.345	0.500	0.500
15	0.494	0.506	0.736	0.264	0.224	0.776	0.461	0.539	0.500	0.500
16	0.248	0.752	0.297	0.703	0.305	0.695	0.393	0.607	0.500	0.500
17	0.120	0.880	0.095	0.905	0.213	0.787	0.332	0.668	0.500	0.500
18	0.047	0.953	0.000	1.000	0.162	0.838	0.472	0.528	0.500	0.500
19	0.064	0.936	0.438	0.562	0.324	0.676	0.648	0.352	0.500	0.500
20	0.124	0.876	1.000	0.000	0.416	0.584	0.376	0.624	0.500	0.500
21	0.157	0.843	0.398	0.602	0.190	0.810	0.150	0.850	0.500	0.500
22	0.000	1.000	0.000	1.000	0.189	0.811	0.115	0.885	0.500	0.500
23	0.547	0.453	0.000	1.000	0.151	0.849	0.102	0.898	0.500	0.500
24	0.166	0.834	0.500	0.500	0.000	1.000	0.115	0.885	0.500	0.500

Assignment

Trip assignment is the final step in the model chain in which zone-to-zone auto vehicle trips from the trip distribution step are assigned to the auto network. The output of trip assignment is directional link volumes or, optionally, intersection turning movement volumes for the time period associated with the input vehicle trip matrix.

An equilibrium, capacity constrained equilibrium assignment method is utilized within the VISUM software. The underlying principle of this technique is described as follows in the *VISUM Users Manual*:

> "Assignment of demand segments
> In all private transport assignment procedures (see 'User model Prt' on Page 231), demand segments of different PrT modes can be assigned simultaneously.
> - Tribut procedure, Stochastice or Dynamic stochastic assignment
>   Per iteration step, a route search is carried out for each transport system, because each transport system has a transport system-specific impedance function.
> - Incremental and Equilibrium assignment, Equilibrium_Lohse assignment
>   The search for each demand segment is carried out individually, using the same TSys-specific impedance function. This means, that volumes can be issued by DSeg. Adding the demand matrices prior to the assignment save calculating time.
> - DUE
>   Due to the parameterization by demand segment, the route search is always carried out by TSys."[10]

The specific type of equilibrium assignment that is used is a fixed demand, single-class assignment.

The volume-delay functions used within the assignment specify the relationship between the travel time on each link in the network and other attributes of the link, such as volume. The BPR form of volume-delay function is used, as given below:

$$t = t_0(1 + \alpha X^{\beta})$$

where:

t is the estimated link travel time;

t_0 is the free-flow travel time;

α and β are empirical coefficients; and

X is the volume-to-capacity ratio.

[10] PTV Group VISUM Version 14 (2014) Users' Manual: 3.1.1.3 Demand segments.

Link length, free flow speed, and capacity are the link attributes used within the volume-delay functions (VDF) for estimating travel time. The functions used to perform hourly traffic assignments are shown below:

VDF1 = (length*60 / Speed)*(1 + .05*(PrT / (Capacity))^10)

VDF2 = (length*60 / Speed)*(1 + .20*(PrT / (Capacity))^10)

VDF3 = length*60 / Speed

where:

length is the link length;

Speed is the free-flow speed;

PrT is the link volume;

Capacity is the link capacity.

The first volume-delay function is used for roadways with signalized intersections (for one-way streets with signalized intersections, all the one-way links should be coded VDF=1 because one-way links have less conflicting movements at intersections), while the second function is used for all other roadways. The third function, which does not contain a delay term, is used for centroid connectors only.

A second set of functions are used to perform daily traffic assignments. These are identical to the hourly functions, except that the hourly capacities are multiplied by 24.

VII. Model Calibration and Validation

Model calibration is a process to correct the model input data errors and to adjust factors to model functions so that the model output results statistically fit the reality checks, that include household travel surveys and on-the-ground traffic counts. In other words, model calibration serves the purpose of validating the existing condition demand forecasting model which would be used for forecasting future scenario travel demand.

Model validation is the assessment of a model's overall performance by comparison of the estimated volumes from the model assignment to observed volumes (i.e., traffic counts). Three primary types of comparisons were used for the Roseburg model validation. These are:

- link scatterplots;
- percent root mean square error; and
- vehicle miles traveled (VMT).

After eight rounds of model calibration processes, the model was validated separately for the daily and p.m. peak hour (4:00 – 5:00 p.m.) time periods. The model calibration processes are described as in the following with corresponding calibration input and evaluation file names given:

The results of the validation are presented in the sections below.

Daily Validation

Link scatterplots show the results of regressing assigned link traffic volumes on the corresponding link traffic counts. The scatterplot, together with the regression statistics, provides a measure of how well the model replicates overall traffic flows on the network. As shown in Figure 9, the model performs very well for the daily time period, with the slope of the regression line (1.02) near 1 and an R^2 (coefficient of determination) value of 0.92. As would be expected, the data points for the lower-volume links generally are more widely dispersed around the regression line than those for the higher-volume links, indicating the larger degree of model error for the lower-volume links.

In rough terms, the percent root mean square error (% RMSE) represents the average relative difference between the assigned traffic volumes and traffic counts. For the model validation, the % RMSE was calculated by functional class as shown in Table 23, and also by volume category as shown in Figure 10. In the Roseburg area, the highest volume category generally corresponds to freeway/principal arterials, the second category corresponds to principal arterials, the middle two categories correspond to principal/ minor arterials and minor arterials/collectors, and the lowest volume category corresponds to collectors/minor collectors. The % RMSE value of 24% for all links is close to the aggregate validation target of 30% suggested by the FHWA[11] and meets the ODOT's model validation target below 41%.

As to the daily VMT forecasts (as shown in Figure 10), the freeway and principal arterial show smaller differences from the observed VMT while minor arterial, collector and ramps (with less volumes) forecast higher negative differences from the observed VMT. The overall VMT% difference is -3% well within the FHWA recommended +-5% range.

Table 23: % RMSE Daily Validation

Link Volume Category*	% RMSE
≥ 16,000 vpd	7%
8,000 – 15,999 vpd	18%
4,000 – 7,999 vpd	23%
2,000 – 3,999 vpd	48%
1 – 1,999 vpd	36%
All Links	24%

**As defined for Oregon Travel Demand Models, by the Oregon Model Steering Committee (OMSC).*

[11] Travel Model Improvement Program, Model Validation and Reasonableness Checking Manual, (1997).

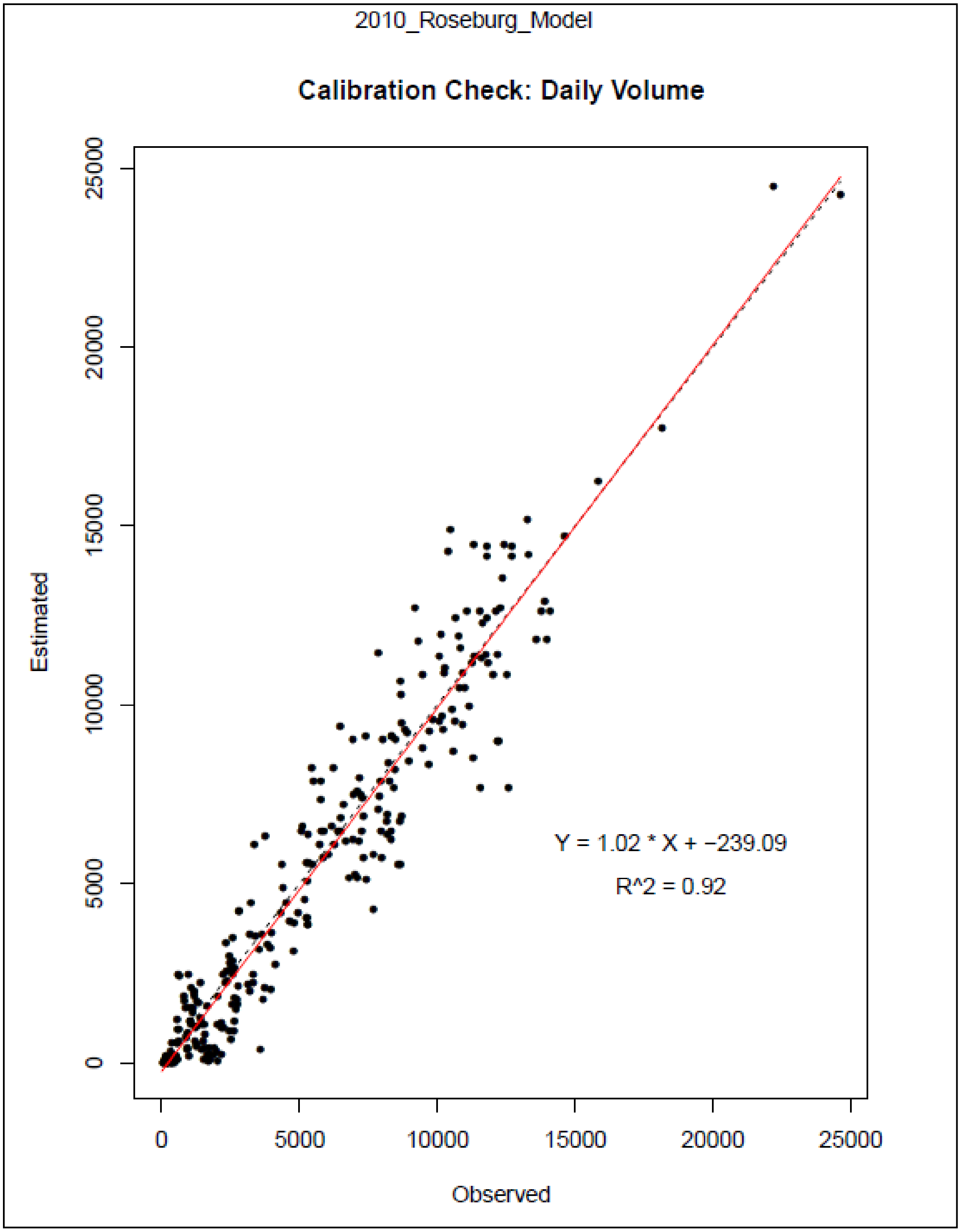


Figure 9: Link Scatterplot Daily Validation

RMSE BY VOLUME

Vol Range	%PEAK	Vol Range	%DAILY
<100	106	<1,000	126
100-250	61	1,000-2,500	60
250-500	27	2,500-5,000	36
500-1,000	21	5,000-10,000	20
1,000-2,500	12	10,000-25,000	15
2,500-5,000	-	25,000-50,000	-
<5,000	-	<50,000	-
TOTAL	26	TOTAL	24

VMT

FC	EST	OBS	DIF	%DIF
FREEWAY	27314	26957	357	1
PRIN ART	36049	35215	834	2
MIN ART	58947	62711	-3764	-6
COLLECTOR	3272	4129	-857	-21
RAMPS	2105	2208	-103	-5
TOTAL	127687	131220	-3533	-3

Figure 10: Base Year 2010 Roseburg Model RMSE by Daily and Peak Volume, and Daily VMT by Functional Class

PM Peak Hour Validation

The scatterplot for the p.m. peak hour assignment shown in Figure 11 is similar to that for daily time period. The slope of the regression line is 1.01, indicating the model is slightly over-estimated by 1% and the R^2 value of 0.91 meets the FHWA's suggested validation target of 0.88.[12]

In Table 24, the % RMSE value of 26% for the p.m. peak hour assignment meets the FHWA's suggested validation target of 30% as well as the ODOT's validation target below 41%.

In conclusion, the base year 2010 Roseburg travel demand forecasting model is well validated against the traffic counts ranging from 2010 to 2012; some variations of traffic counts could be up to plus or minus 15% due to economic and demographic changes.

Table 24: % RMSE PM Peak Hour Validation

Link Volume Category*	% RMSE
≥ 1,600 vph	7%
800 – 1,599 vph	21%
400 – 799 vph	23%
200 – 399 vph	41%
1 – 199 vph	41%
All Links	26%

**As defined for Oregon Travel Demand Models, by the Oregon Model Steering Committee (OMSC).*

[12] Travel Model Improvement Program, Model Validation and Reasonableness Checking Manual, (1997).

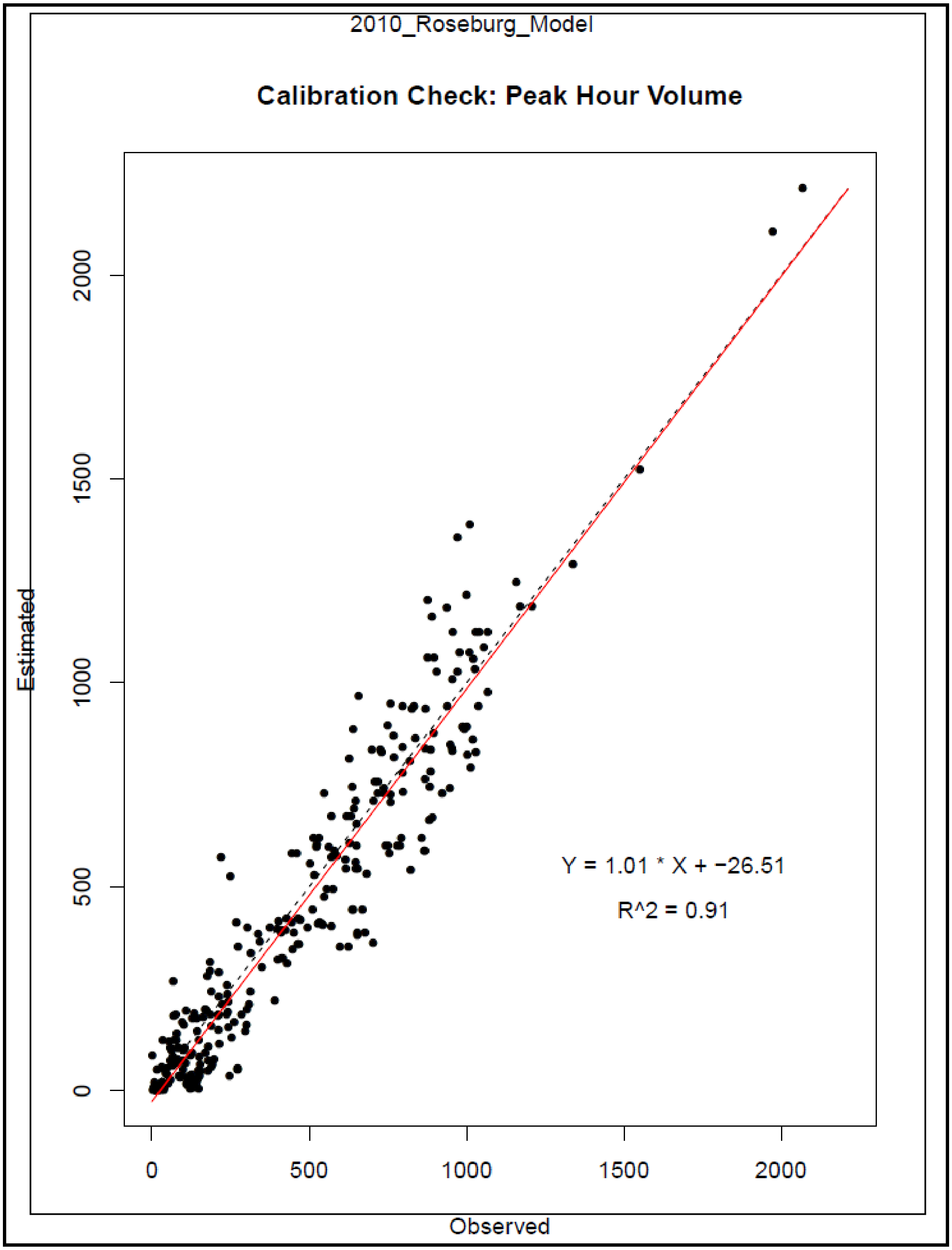


Figure 11: Link Scatterplot: P.M. Peak Hour Validation

VIII. 2035 Future Scenario Roseburg Model

The 2010 Base Year Roseburg travel demand model is used to build the 2035 Future Year Scenario model. The assumption is made that the current condition of travel characteristics or statistics will be carried on to the future modeling scenario except for the land use growth and network changes, as well as future external traffic growth and special generator updates. Therefore, in the 2035 Future Scenario Model development, what we updated is described in the following five sub-sections:

- Future Year 2035 Scenario Roseburg Model Area Land Use Growth by TAZ
- Future Year 2035 Scenario Roseburg Roadway Capacity Improvements
- Future Year 2035 Scenario Roseburg Model External Traffic Growth
- Future Year 2035 Scenario Roseburg Model Special Generators
- Future Year 2035 Scenario Roseburg Model Output Evaluation

Future Year 2035 Scenario Roseburg Model Area Land Use Growth by TAZ

The future year 2035 scenario land use forecasts were conducted by David Evans Associates, Inc. consultant for the Roseburg TSP update. Because the 2035 land use forecasts were projected starting from the 2010 base year land use, it was found that there are a number of TAZs that have growth employments by 2015 more than the 2035 forecasts. Therefore, these zones of employment numbers were used to replace the original 2035 forecasts while other zones were kept the same as the 2035 employment forecasts. The City of Roseburg concurred with such an approach to being applied to the future year 2035 scenario revisions.

In terms of employment growth by TAZ, the TPAU staff updated the 2010 base year model employment by sector (Agricultural, Education, Government, Industrial, Retail, Service and Other) by TAZ to most recently available “2015 QCEW (Quarterly Census of Employment and Wages)”.

Table 25 exhibits the 2010-2035 land use (household, and employment by seven sectors: Agriculture, Industry, Retail, Service, Education, Government and Other) growth forecasts in the Roseburg model area. Figure 12 graphically exhibits the 2010-2035 land use bar charts for the Roseburg model area. The overall household growth between Base Year 2010 and Future Year 2035 is estimated at the rate of about 52% while the overall employment growth is estimated at the rate of 45%.

Table 25: 2010-2035 Roseburg Model Area Land Use Growths

SCENARIO	Household	Employee	Agriculture	Industrial	Retail	Service	Education	Government	Other	School Enroll	College Enroll
Base 2010	19,651	24,315	511	2,604	4,971	9,835	1,454	2,103	2,837	8,325	3,000
Future 2035	29,778	35,263	751	4,244	6,590	15,003	2,084	2,494	4,090	12,852	3,000
10-35 Growth	10,127	10,948	240	1,640	1,619	5,168	630	391	1,253	4,527	0
10-35 %Growth	52%	45%	47%	63%	33%	53%	43%	19%	44%	54%	0%

.

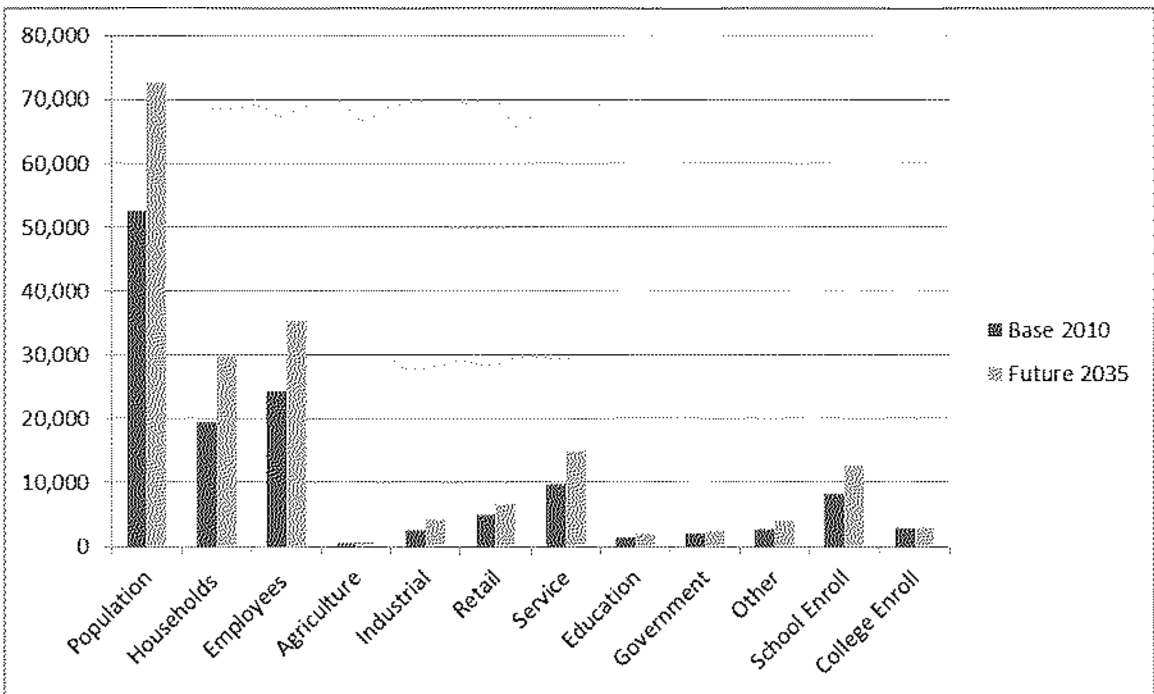


Figure 12: 2010-2035 Roseburg Model Household and Population Estimates

Figure 13 shows 2010-2035 Roseburg Model household growths by TAZ.
Figure 14 shows 2010-2035 Roseburg Model central area household growths by TAZ.
Figure 15 shows 2010-2035 Roseburg Model employment growths by TAZ.
Figure 16 shows 2010-2035 Roseburg Model central area employment growths by TAZ.

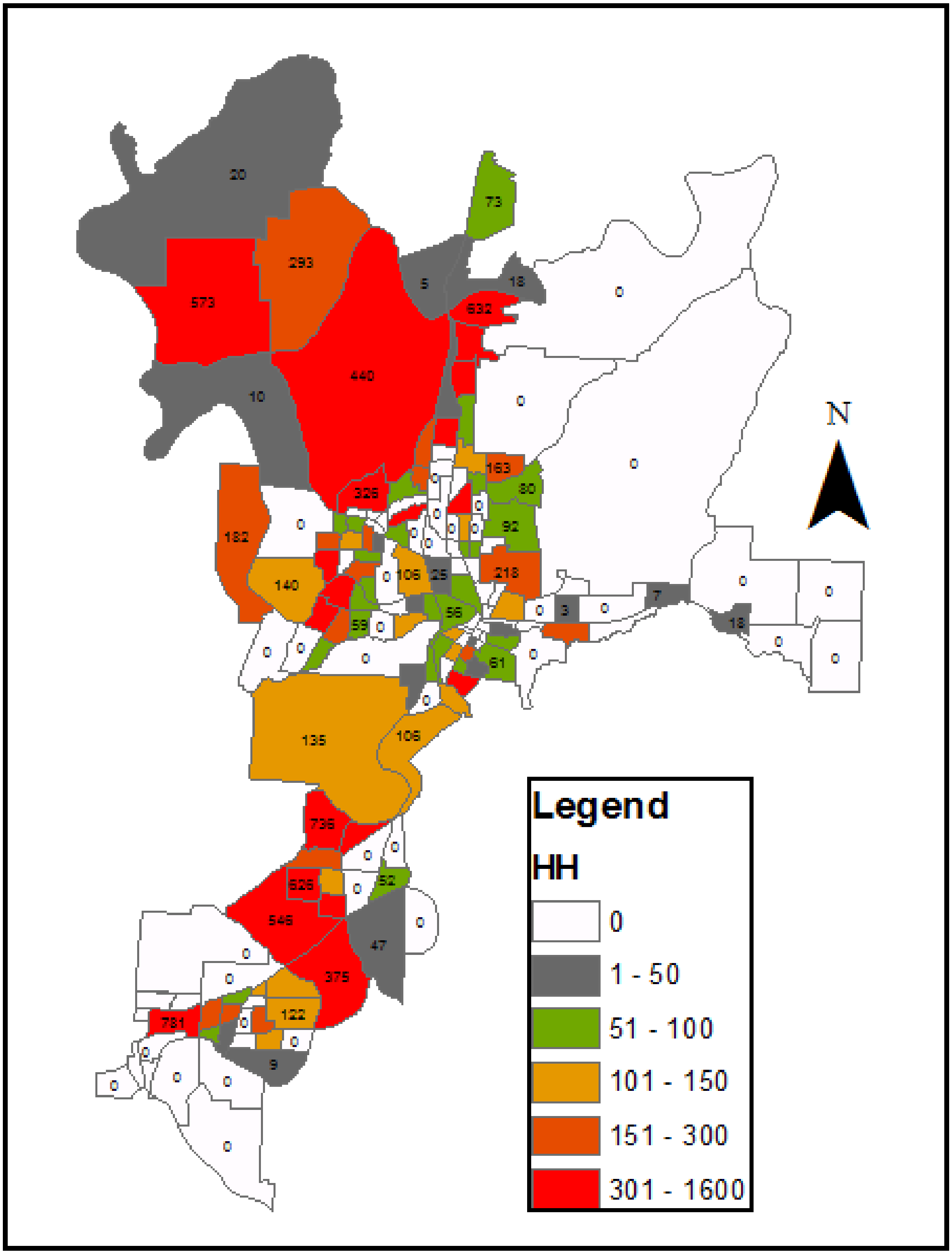


Figure 13: 2010 - 2035 Roseburg Model Household Growth by TAZ

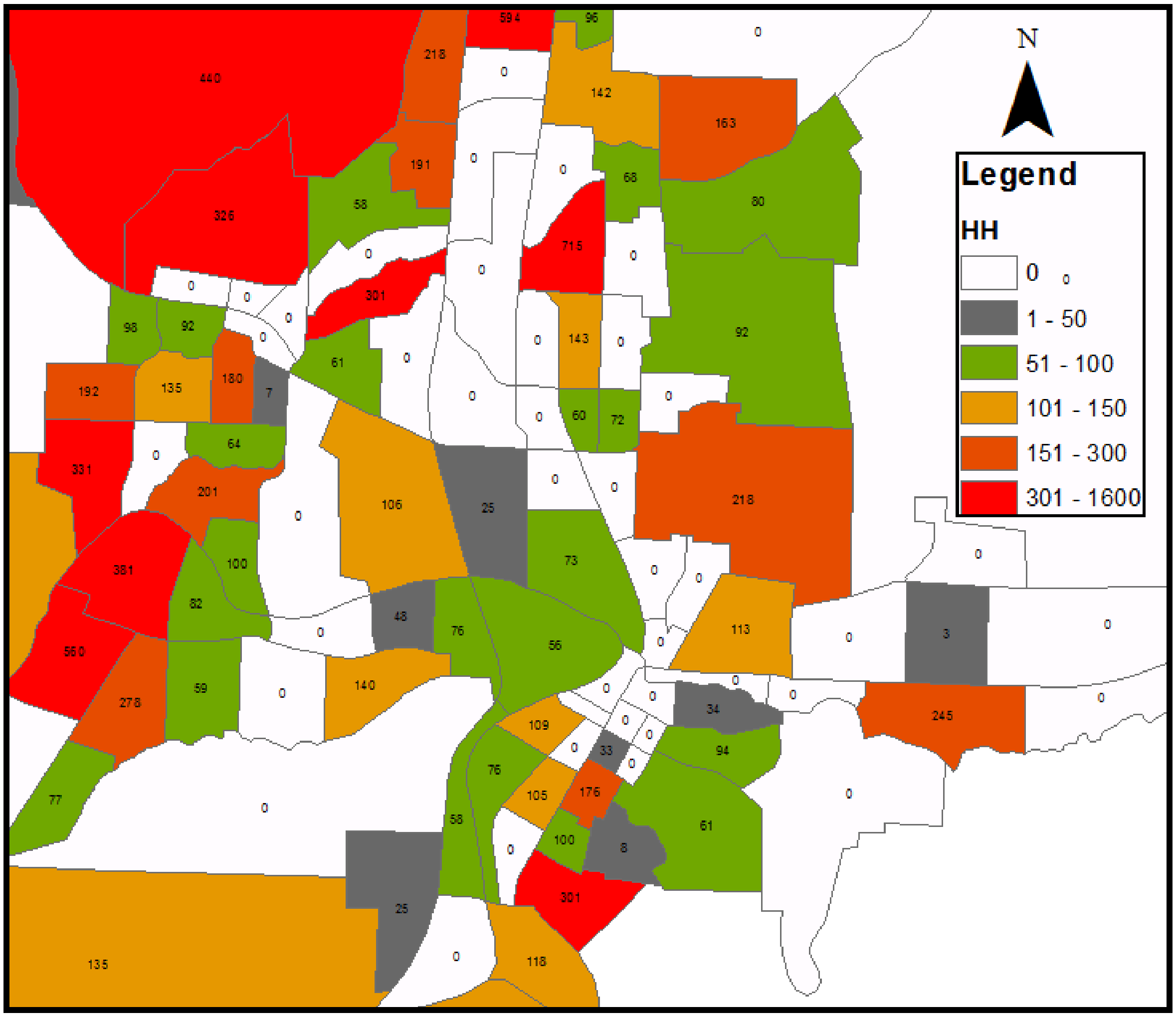


Figure 14: 2010 - 2035 Roseburg Model Central Area Household Growth by TAZ

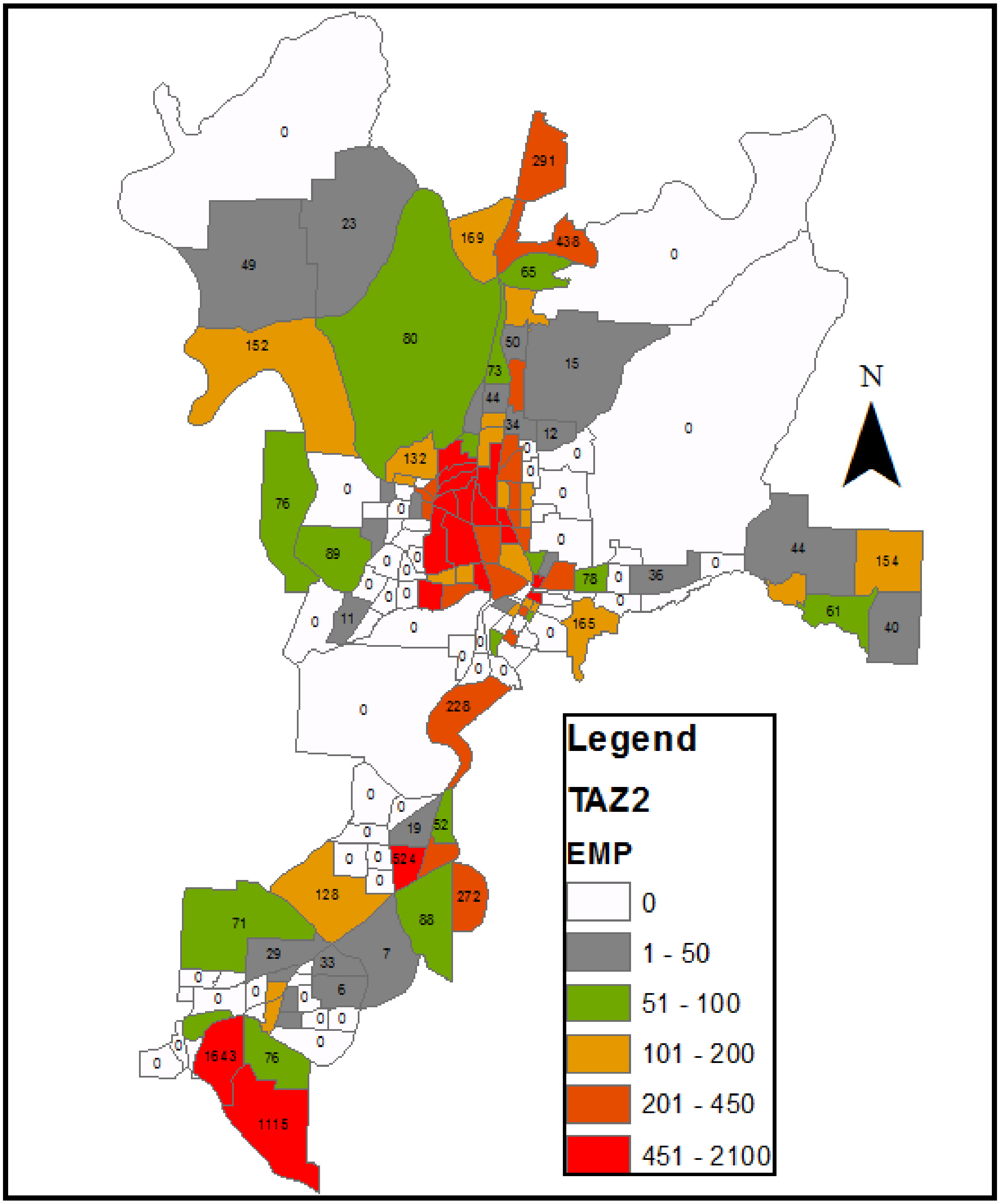


Figure 15: 2010 - 2035 Roseburg Model Area Employment Growth by TAZ

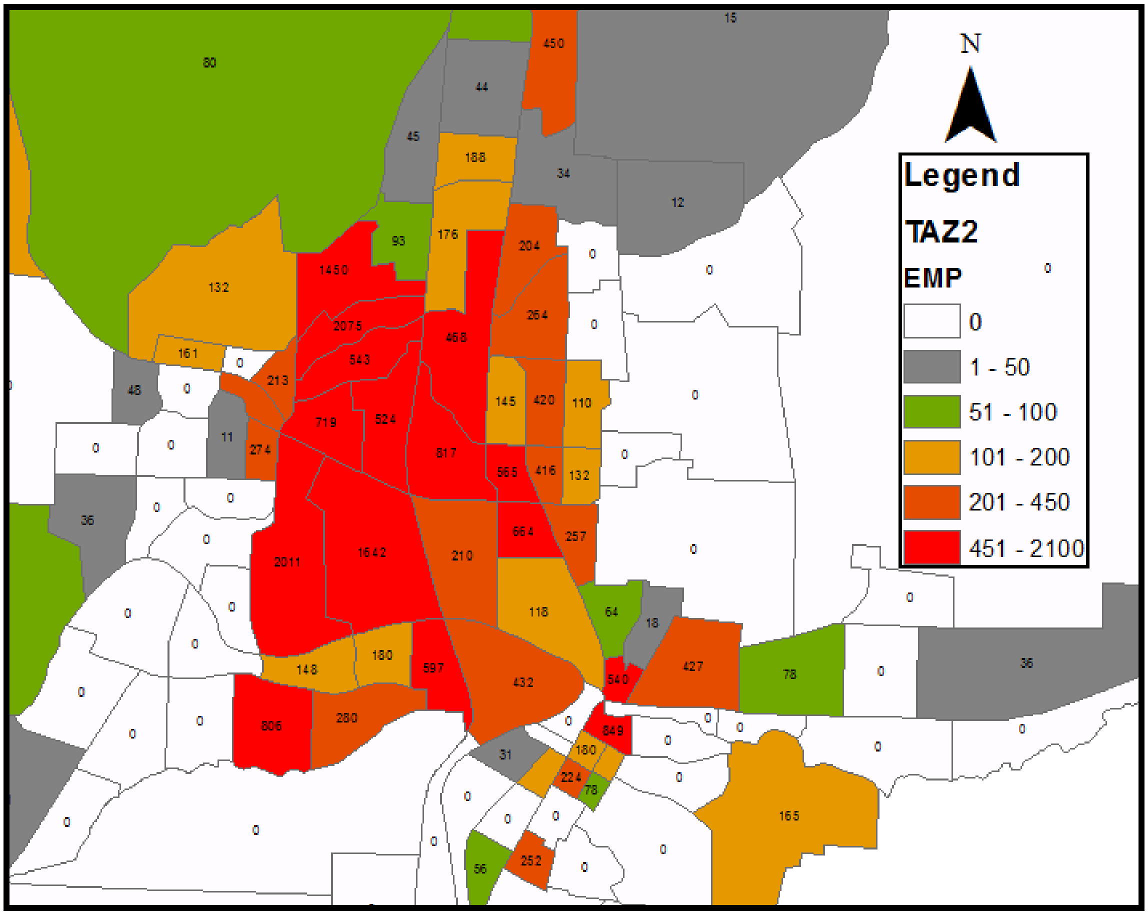


Figure 16: 2010 - 2035 Roseburg Model Central Area Employment Growth by TAZ

Future Year 2035 Scenario Roadway Projects

The following figures (Figures 17-21) show the 2035 Roseburg model network changes from Base Year 2010 Roseburg model network. The changes were provided by City of Roseburg and ODOT Region 3, and TPAU modelers made the network update to Future Year 2035 scenario model based on the 2010 calibrated Roseburg model network.

Figure 17: I-5 Exit 129 realignment
(2010 network on left, 2035 network on right)

Figure 18: Costco Signal Addition
(2010 network on left, 2035 network on right)

Figure 19: Page Rd Signal Addition
(2010 network on left, 2035 network on right)

Figure 20: Stewart Ave Widening and Realignment
(2010 network on left, 2035 network on right)

Figure 21: OR 138 E Realignment
(2010 network on left, 2035 network on right)

Future Year 2035 Scenario Roseburg Model External Traffic Growth

As shown in Table 26, the sixteen external traffic stations shows base year 2010 and future year 2035 average auto and truck weekday traffic. The 2010 to 2035 external traffic growth rate of 1% comes from comparing historic trends along with growth data from SWIM.

Table 26: 2010-2035 Roseburg External Station Traffic Growth Estimation

External TAZ	2010 Auto AWDT	2010 Truck AWDT	2010 Total Traffic	2035 Auto AWDT	2035 Truck AWDT	2035 Total Traffic
1	10,584	4,116	14,700	13,230	5,145	18,375
2	1,781	89	1,870	2,227	111	2,338
3	855	25	880	1,068	32	1,100
4	9,398	3,302	12,700	11,748	4,128	15,875
5	541	59	600	676	74	750
6	1,976	624	2,600	2,470	780	3,250
7	605	10	615	756	13	769
8	3,190	20	3,210	3,988	25	4,013
9	984	6	990	1,231	7	1,238
10	379	95	474	474	119	593
11	1,755	495	2,250	2,194	619	2,813
12	213	12	225	266	15	281
14	605	20	625	756	25	781
15	713	22	735	891	28	919
16	598	22	620	747	28	775
17	878	68	945	1,097	84	1,181

Future Year 2035 Scenario Roseburg Model Special Generators

The special generators (for vehicle trips) for the Future Year 2035 Scenario are estimated from larger retail, service or other employment sites, such as: shopping centers, supermarkets, large hospitals and colleges as shown in Table 27. Note that these special generators would replace the model estimated daily trips in the OSUM structure by the trip purpose specified in Table 29. The 2010-2035 special generator daily traffic growth is estimated at the rate of about 67.7% (86,098/51,355 – 1 = 67.7%).

Table 27: Future Year 2035 Scenario Roseburg Model Special Generator Forecasts

Special Generators	zone	type	trips	int.pct	retl.emp	serv.emp	othr.emp	hh	sch.enrl	ITE Codes
Hospital	30	hbro	6,494	0.75	0	1,443	7	58	0	610
AlbertsonShermsBig5	32	hbshp	19,286	0.7	652	1,293	10	0	0	854
FreyMeyer	63	hbshp	5,758	0.7	274	1,170	210	150	0	850
CityCountyGovLib	85	hbro	6,123	0.75	31	121	1,185	4	0	733
UmquaCCWineColl	145	hbw	2,994	0.8	0	8	457	170	0	861
ValleyMall	162	hbshp	5,424	0.7	98	115	0	0	0	820
Walmart	163	hbshp	14,185	0.7	329	228	0	382	0	854
JCPennyPetco	168	hbshp	12,314	0.7	586	130	18	112	0	850
JCPennyPetcoAdjacent	44	hbshp	6,557	0.7	312	197	41	64	0	850
Costco	26	hbshp	6,964	0.7	187	263	0	96	0	857
TOTAL			86,098		2,469	4,968	1,928	1,036	0	

Future Year 2035 Scenario Roseburg Model Outputs

Due to the land use growths and external traffic growths between Base Year 2010 and Future Year 2035 Scenario, the Roseburg model area shows corresponding demographic and traffic growths as are demonstrated in the travel demand modeling process of household sub- model (Fig. 22), trip generation (Fig. 23 & Fig. 24), trip distribution (Fig. 25), hourly trip distribution (Fig. 26) and trip assignments (Fig. 27).

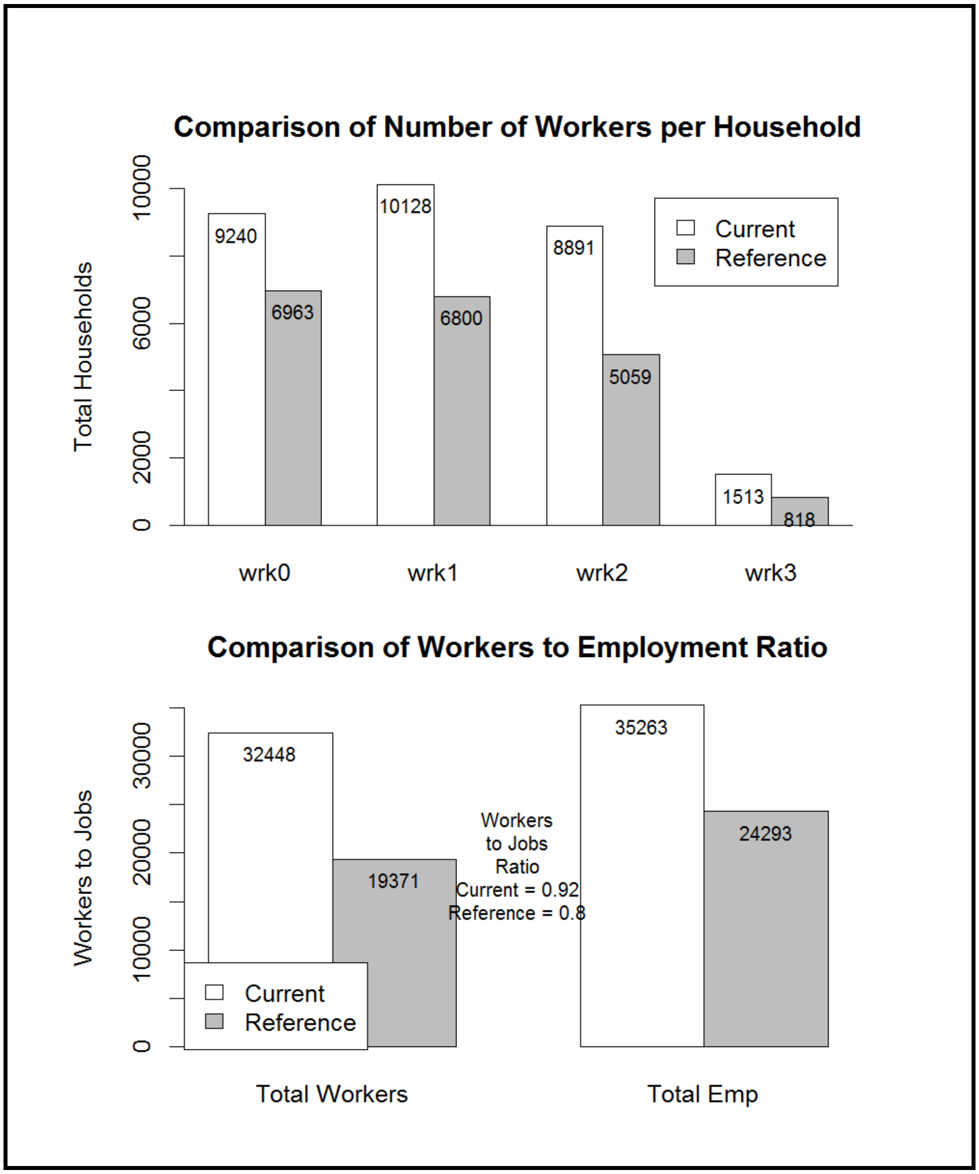


Figure 22: 2035 (Current) vs 2010 (Reference) Household/Worker/Employment Comparisons

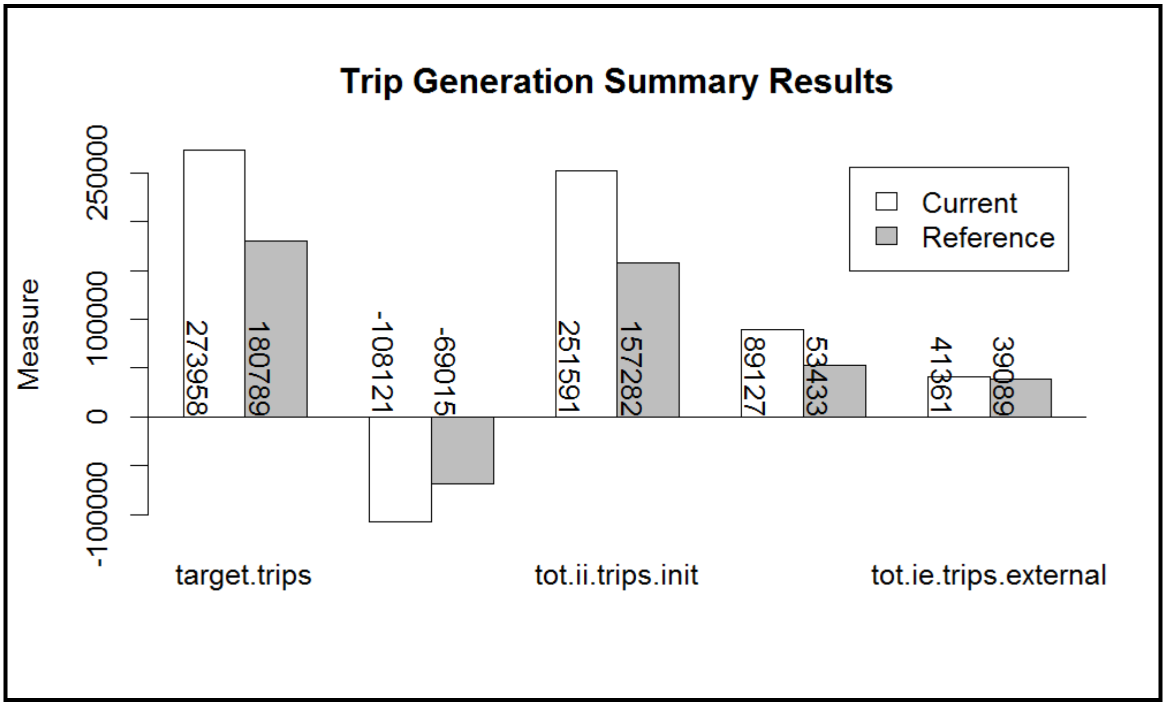


Figure 23**: 2035 (Current) vs 2010 (Reference) Trip Generation Comparison**

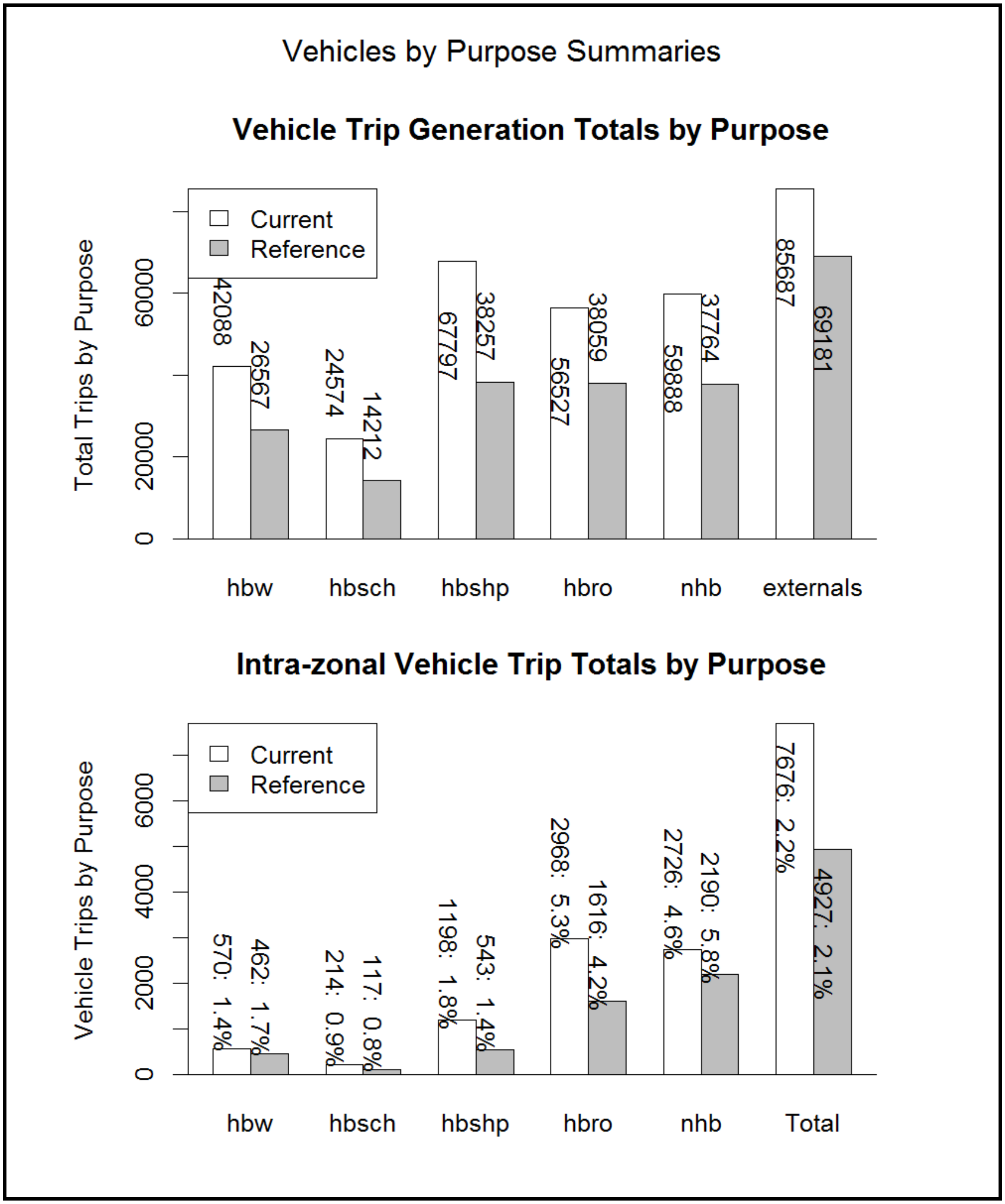


Figure 24: Comparison between 2035 (Current) and 2010 (Reference) Vehicle Trip/Intra-zonal Vehicle Trip Generation by Purpose

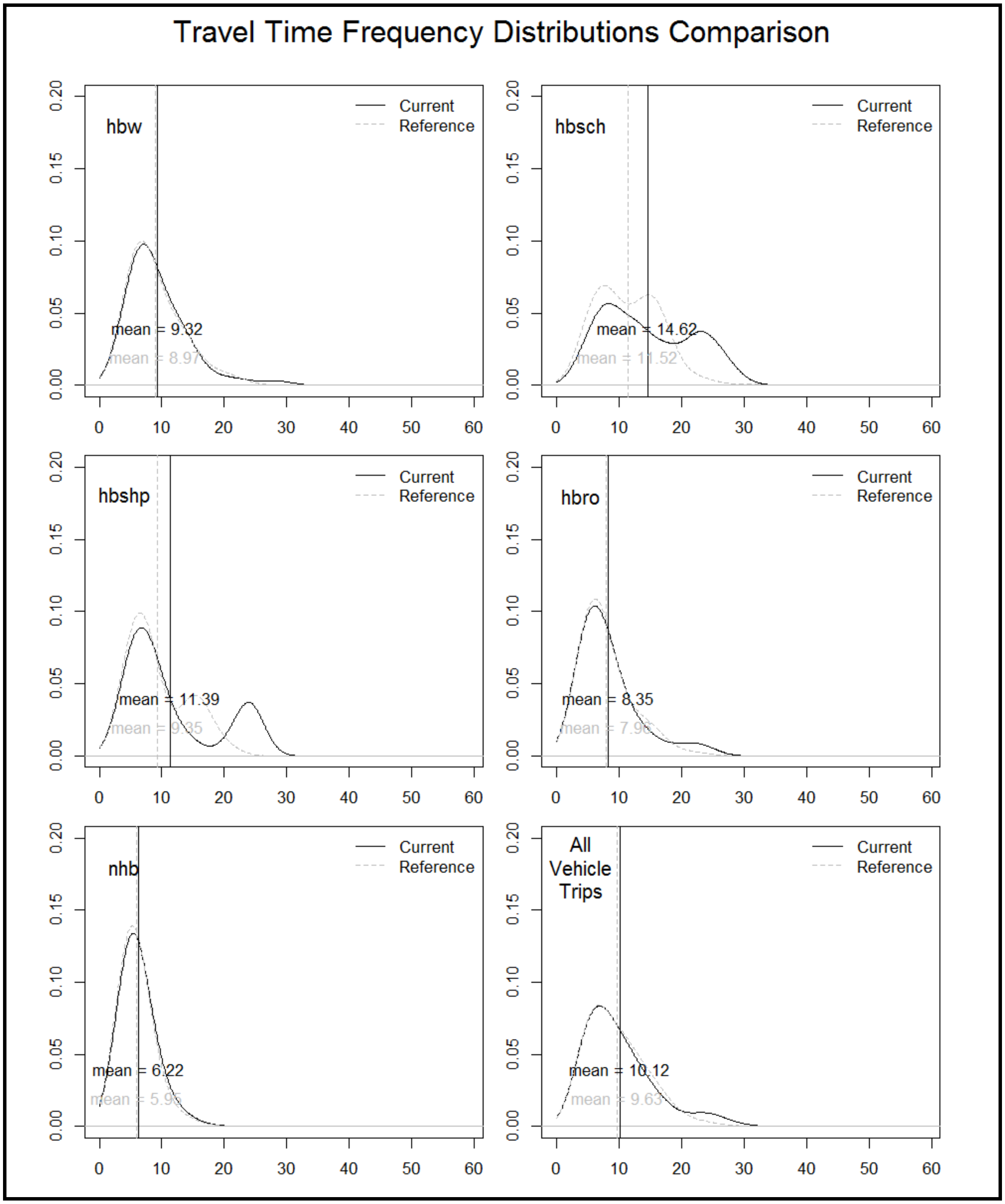


Figure 25: 2035 (Current) vs 2010 (Reference) Comparisons of Trip Length (Time in Minutes) Distribution Curves by Purpose and Overall

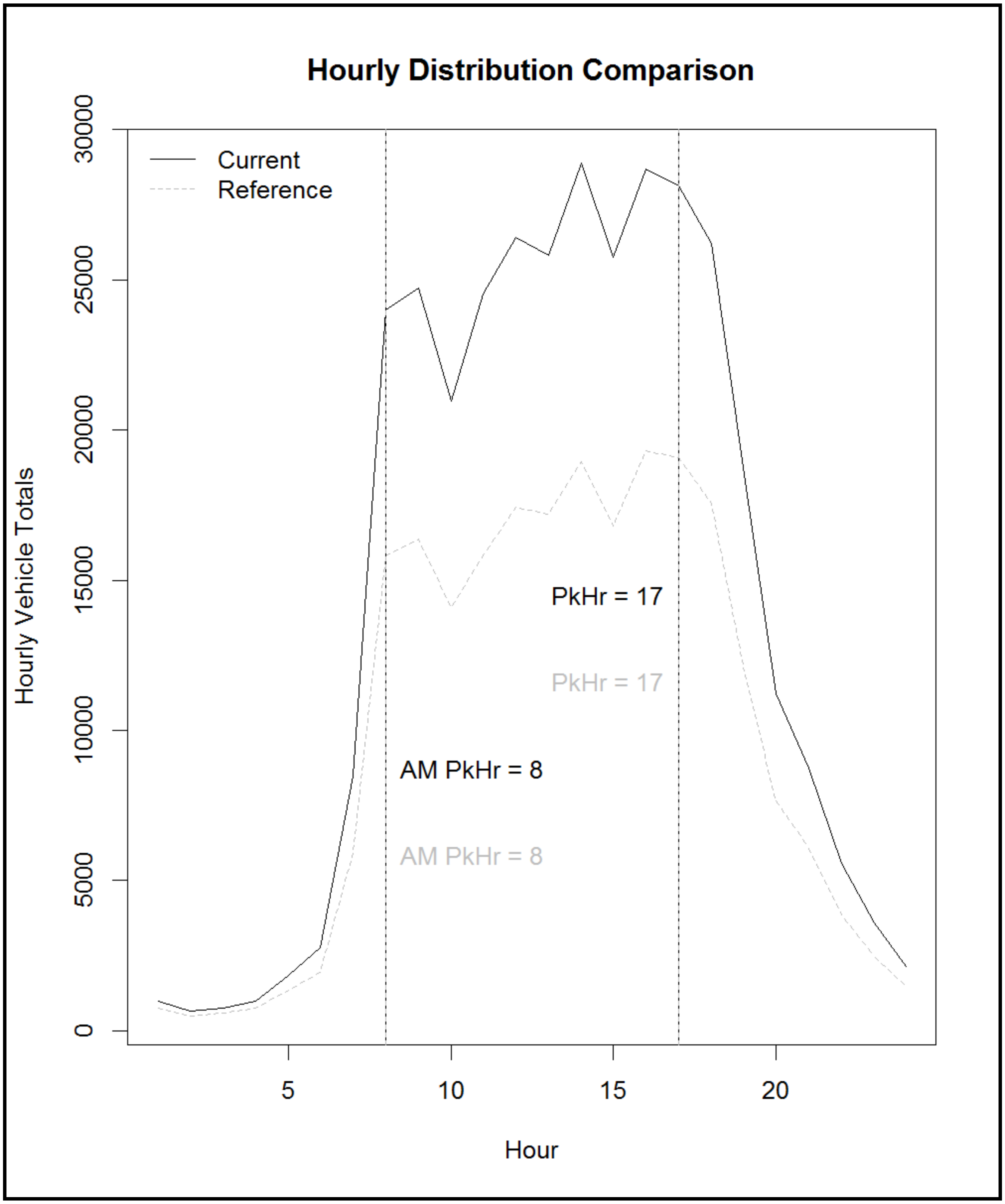


Figure 26: 2035 (Current) vs 2010 (Reference) Hourly Vehicle Trip Distribution Comparison

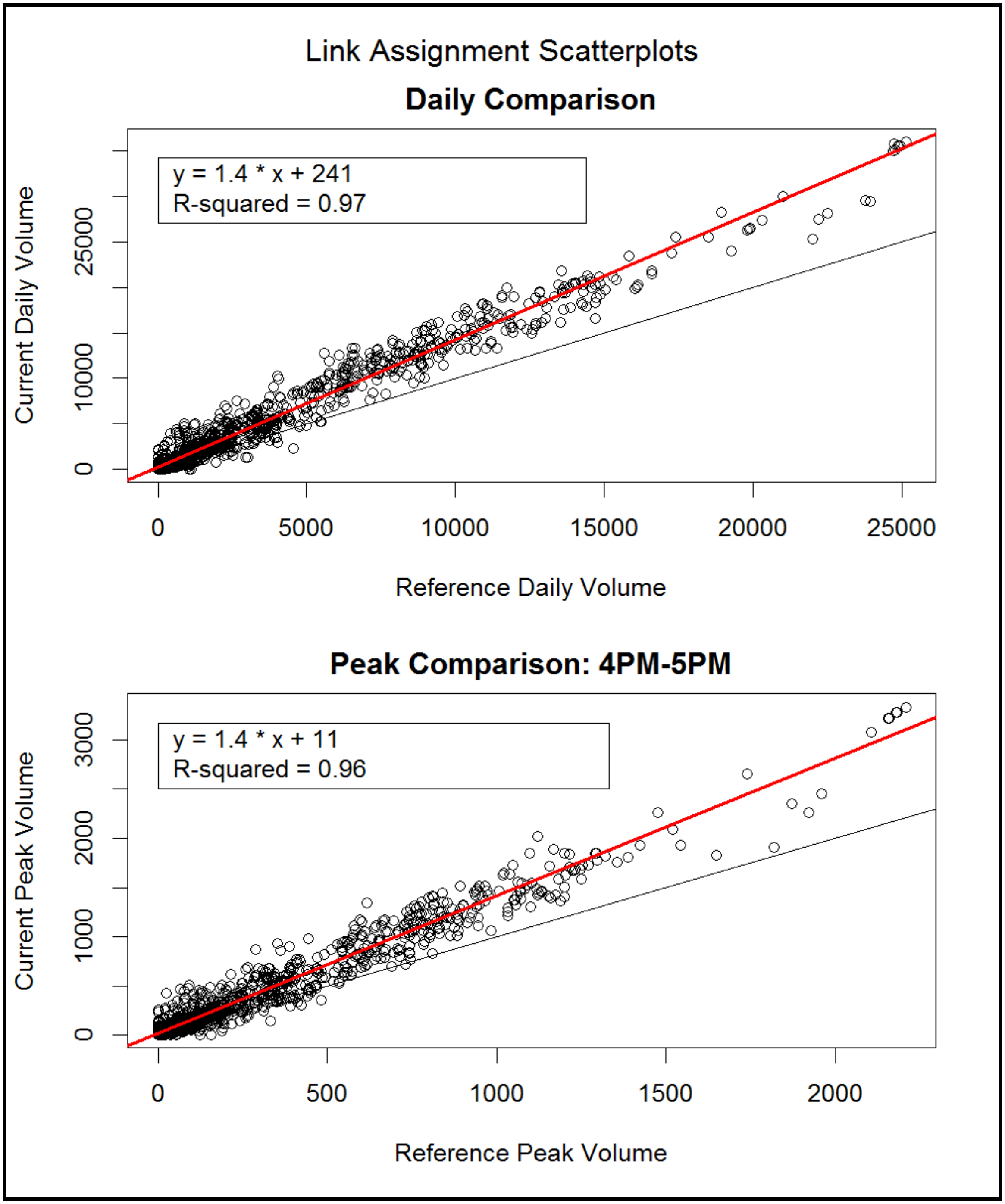


Figure 27: 2035 (Current) vs 2010 (Reference) Daily/Peak Link Volume Comparison

Figure 28 exhibits the Base Year 2010 to Future Year 2035 Scenario PM Peak hour link-level auto volume changes, and Figure 29 shows the corresponding percentage changes.

Roseburg central area, South area and Winston traffic congestion impacts of Future Year 2035 Scenario model are compared with Base Year 2010 model on Figs. 30-31. Fig. 30 exhibits the 2035 demand to capacity ratios (DCR) with red links indicating highly congested vs 2010 DCR in Fig. 31 in Roseburg central area. Figure 32 exhibits the 2035 DCR vs 2010 DCR in Figure 33. Apparently, there are quite a few more red links showing congestions in 2035 than in 2010 in the three modeling sub-areas identified.

Corresponding to the above sections about the 2010-2035 land use growths, special generator and external traffic growths, the link-level traffic growth plots reflect that the Future Year 2035 Scenario model has reasonable traffic growths for peak period in comparison with the Base Year 2010 model conditions.

In conclusion, the Future Year 2035 Scenario Roseburg model can be applied to measure the traffic performances, such as: congested and uncongested roadway lane miles, vehicle miles traveled and vehicle hours traveled in terms of DCR, and to compare with Base Year 2010 model system-wide areas, selected corridors, and roadway functional classes (freeways, major arterial, minor arterial and local streets).

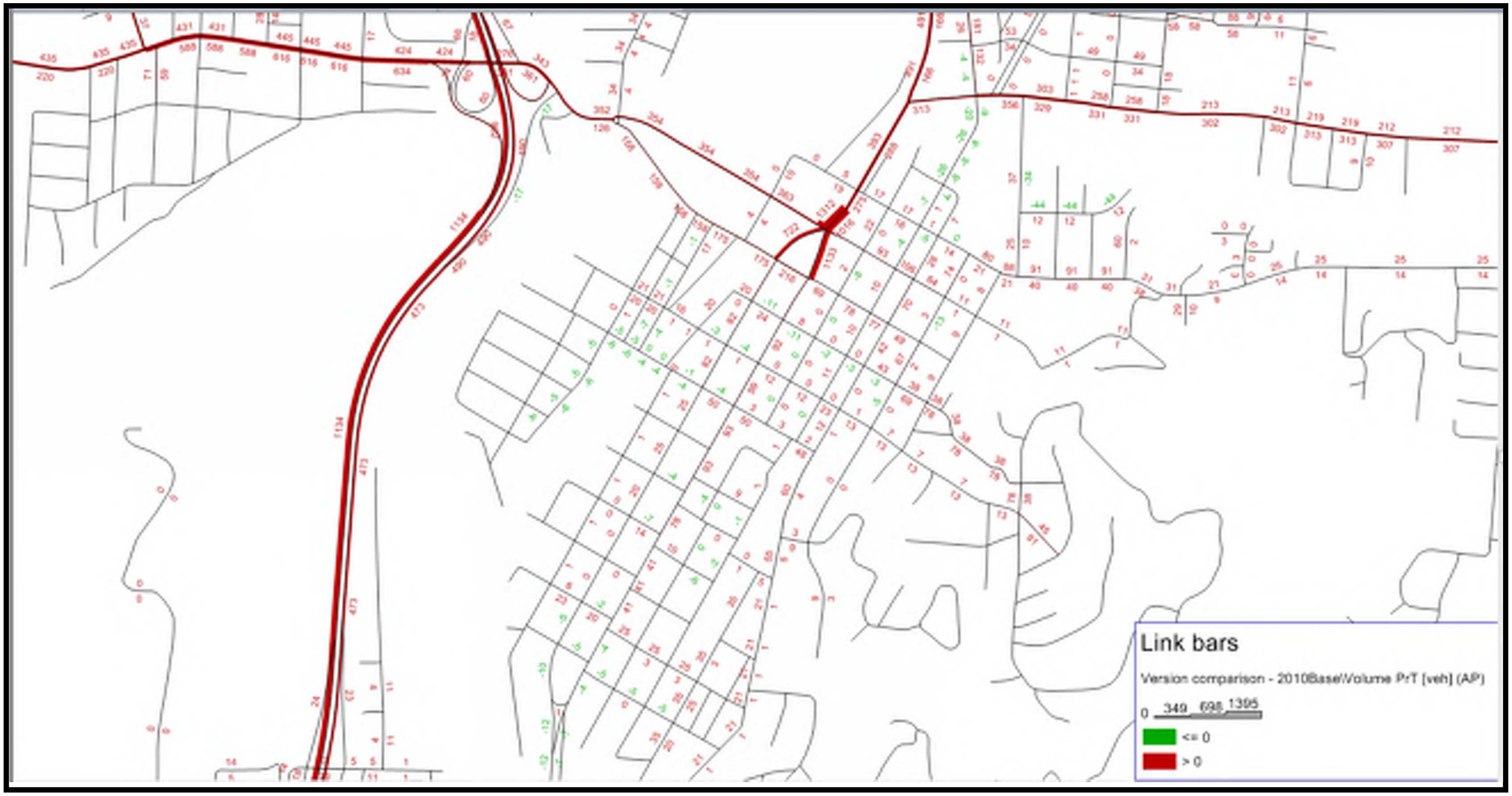


Figure 28: Roseburg Model Central Area PM Peak Hour Auto Volume Changes from 2010 to 2035

(Note: Changes in red indicate traffic increases and in green for traffic decreases)

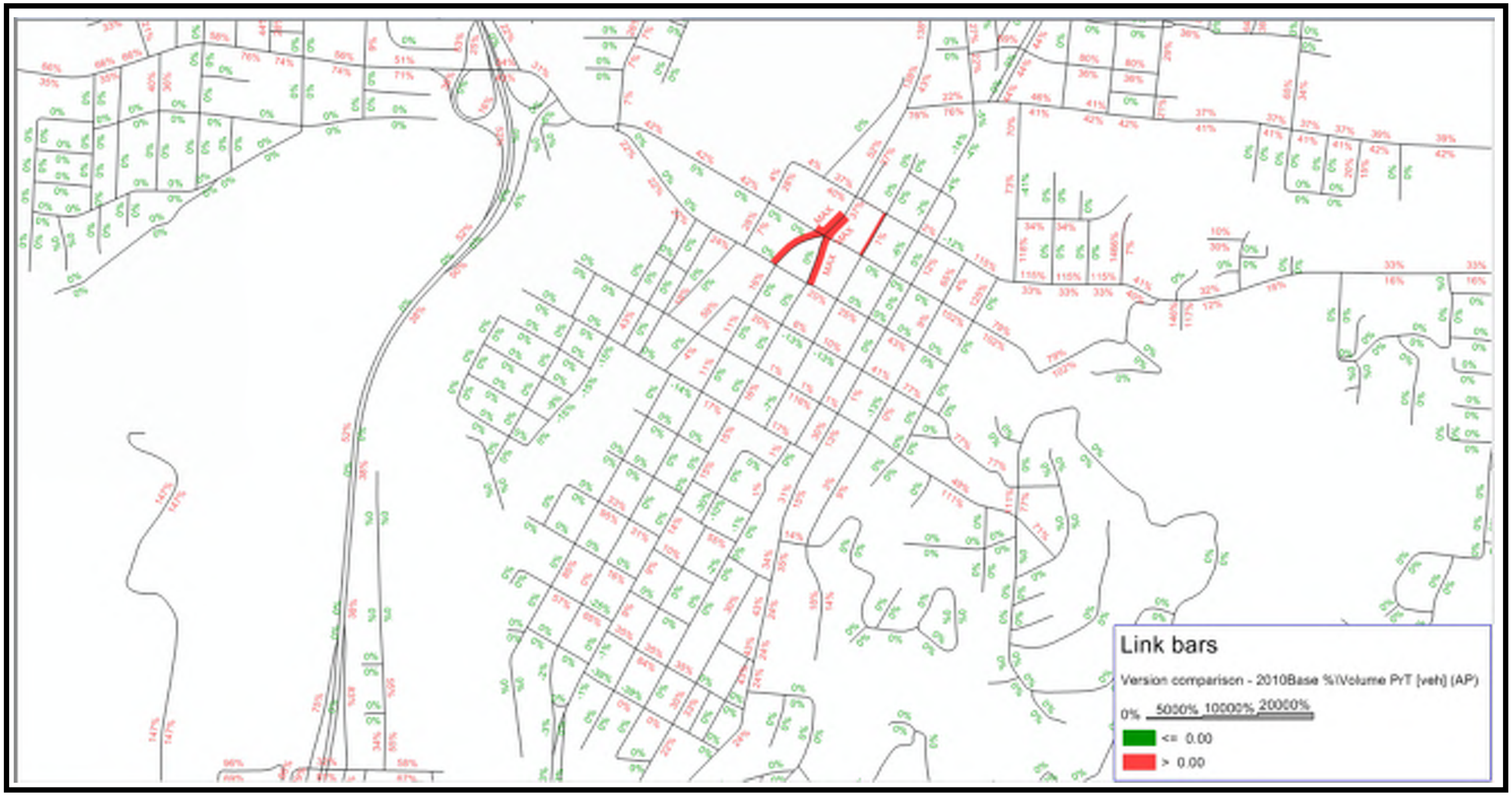


Figure 29: Roseburg Model Central Area PM Peak Hour % Auto Volume Changes from 2010 to 2035

(Note: red for increase and green for decrease; MAX indicates that there is no such roadway facility in the Base Year 2010)

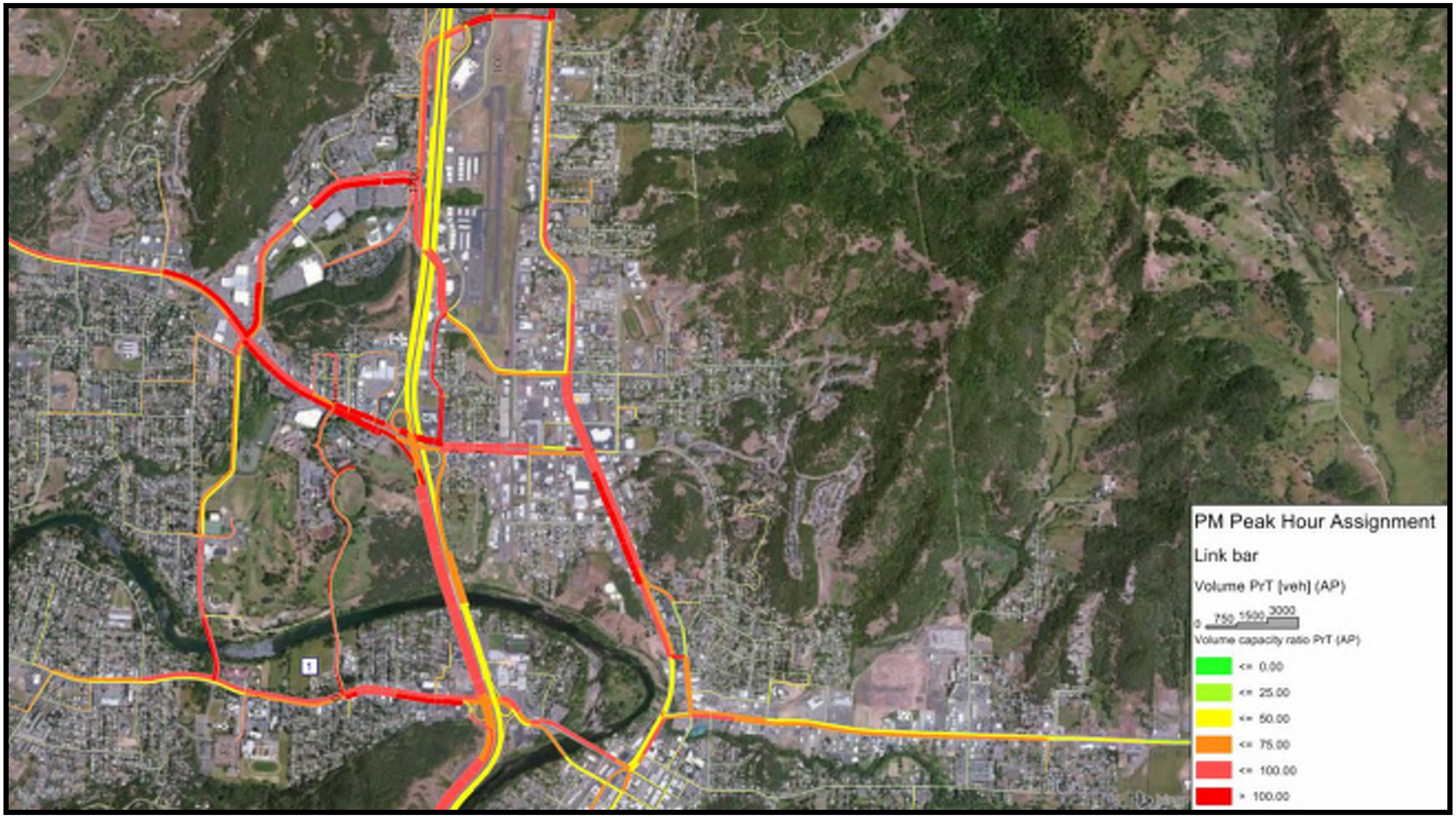


Figure 30: Future Year 2035 Scenario Roseburg Model Central Area PM Peak Hour DCR

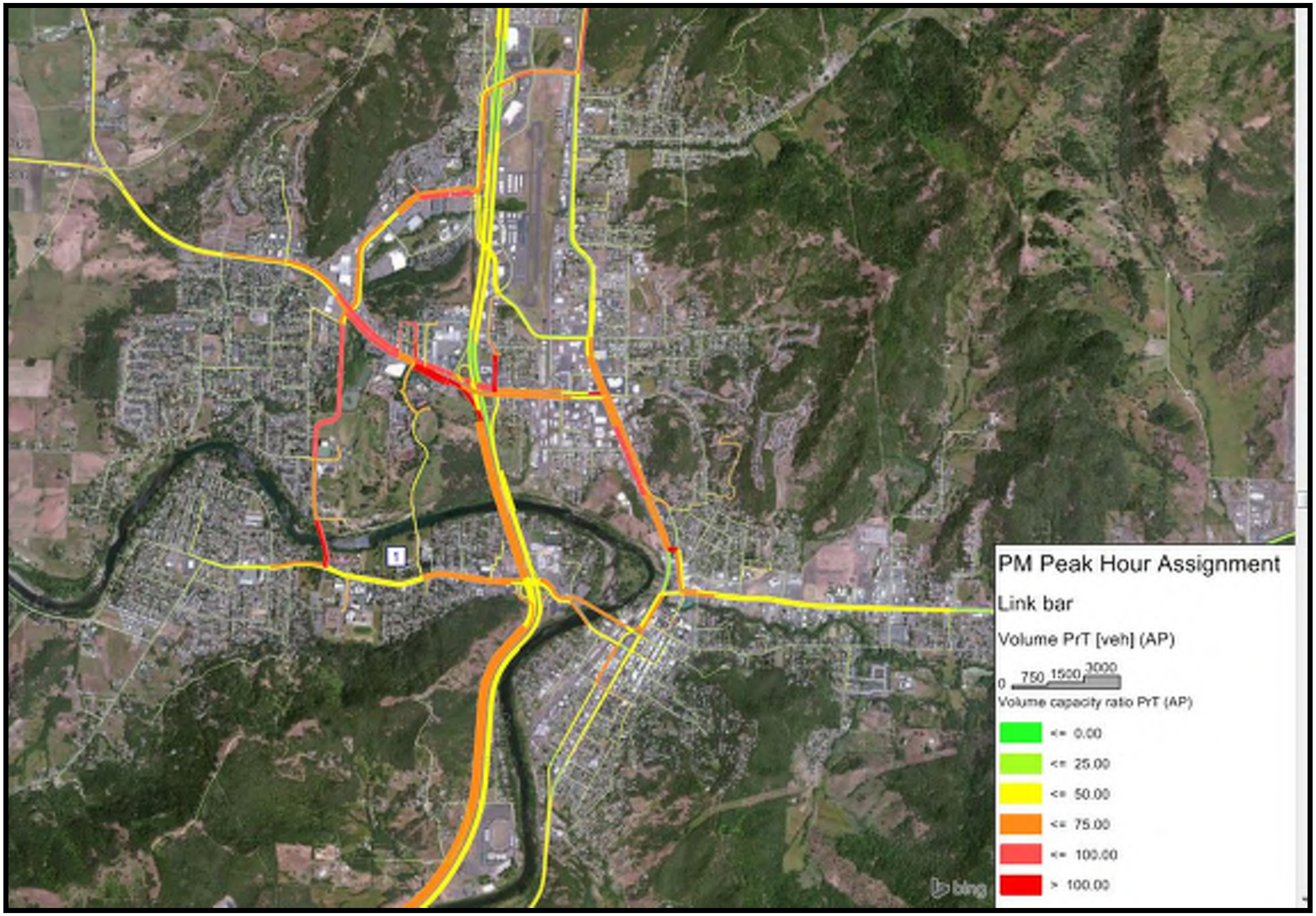


Figure 31: Base Year 2010 Roseburg Model Central Area PM Peak Hour DCR

Figure 32: Future Year 2035 Scenario South Roseburg and Winston Area PM Peak Hour DCR

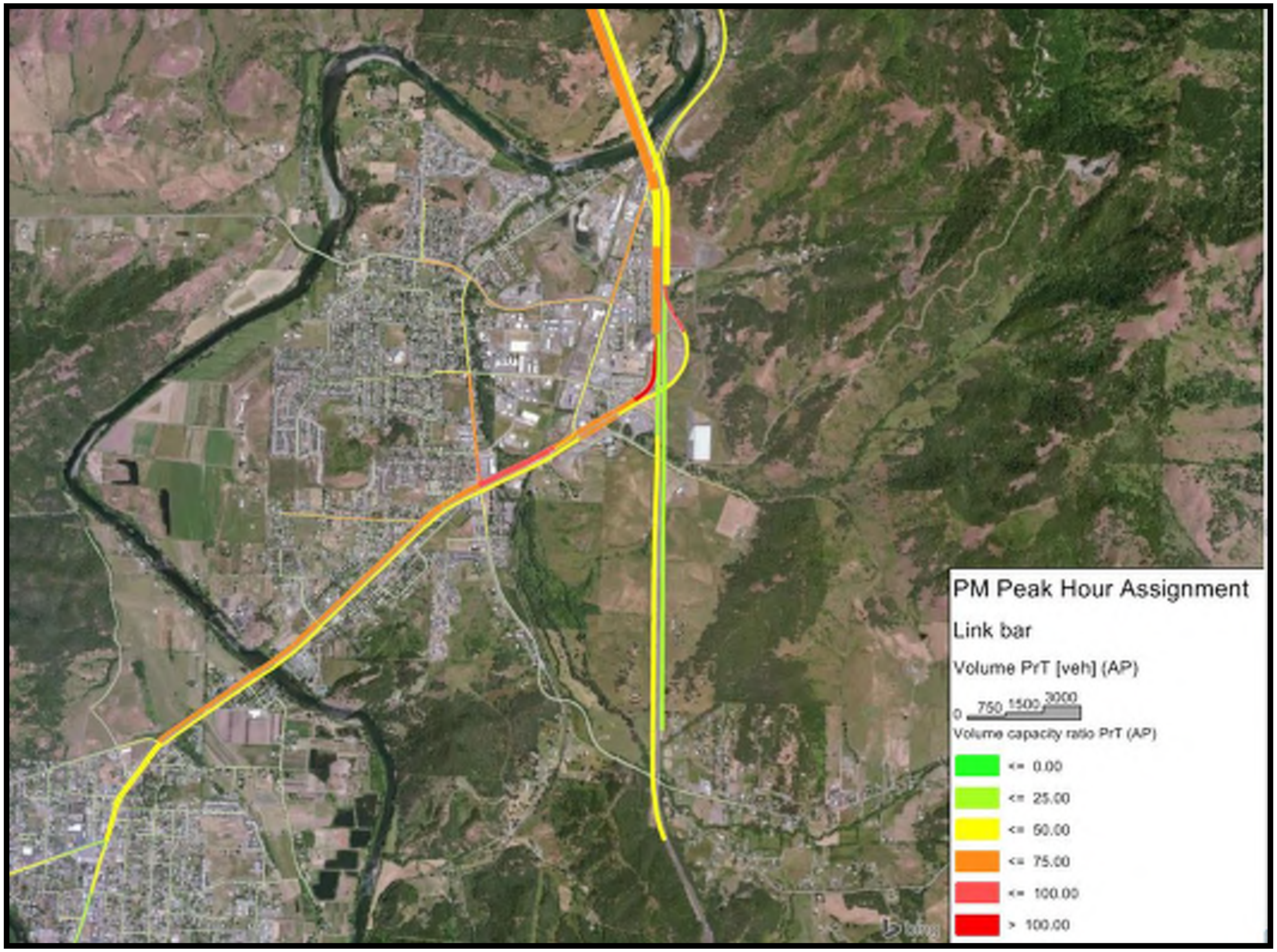


Figure 33: Base Year 2010 South Roseburg and Winston Area PM Peak Hour DCR

Appendix C

Vehicular Volume Development and Simulation Worksheets

Appendix C

Vehicular Volume Development and Simulation Worksheets

Existing Year 2016
Project Forecast Year 2040
Model Base Year 2010
Model Forecast Year 2035

Sidestreets not included in the regional model
Greater than 10% difference between difference and growth methods
Numbers adjusted from model to work with spreadsheet (0 growth = 1)
Previous study intersection

Road	From	To	Direction	Existing 30HV 2016	Model Assignment: Baseline Model 2010	Model Assignment: Future Ref Model 2035	Model Assignment: Interpolated Model 2016	Model Assignment: Forecasted Model 2040	2010-2035 Model Comparison: Total Growth	2010-2035 Model Comparison: Annual Growth	2016-2040 Model Comparison: Total Growth	2016-2040 Model Comparison: Volume Difference	Post Processed Volumes Future 2040 No Build Year: Volume Difference	Volume Growth	Absolute Difference	Average	Forecast Used	Method Used	Comments	Additional Comments
Edenbower Blvd	S of Stewart	Stewart	NB	305	400	459	414	471	14.8%	0.6%	13.7%	57	362	347	4%	354	354	Average of Difference and Growth		
	Stewart	S of Stewart	SB	160	127	208	146	224	63.8%	2.6%	53.1%	78	238	245	3%	241	241	Average of Difference and Growth		
	Stewart	N of Stewart	NB	900	1245	1594	1329	1664	28.0%	1.1%	25.2%	335	1235	1127	9%	1181	1235	Difference Method	Absolute difference >10% --> Used difference only	
	N of Stewart	Stewart	SB	580	638	801	677	834	25.5%	1.0%	23.1%	156	736	714	3%	725	736	Difference Method	Absolute difference >10% --> Used difference only	
	S of Broad	Broad	NB	850	1150	1484	1230	1551	29.0%	1.2%	26.1%	321	1171	1072	9%	1121	1171	Difference Method	Absolute difference >10% --> Used difference only	
	Broad	S of Broad	SB	580	617	780	656	813	26.4%	1.1%	23.8%	156	736	718	2%	727	736	Difference Method	Absolute difference >10% --> Used difference only	
	Broad	N of Broad	NB	825	1112	1441	1191	1507	29.6%	1.2%	26.5%	316	1141	1044	9%	1092	1141	Difference Method	Absolute difference >10% --> Used difference only	
	N of Broad	ON	SB	565	615	780	655	813	26.8%	1.1%	24.2%	158	723	702	3%	713	723	Difference Method	Absolute difference >10% --> Used difference only	
	W of Exit 127 SB Ramps	Exit 127 SB Ramps	EB	825	1112	1441	1191	1507	29.6%	1.2%	26.5%	316	1141	1044	9%	1092	1141	Difference Method	Absolute difference >10% --> Used difference only	
	Exit 127 SB Ramps	W of Exit 127 SB Ra	WB	565	615	780	655	813	26.8%	1.1%	24.2%	158	723	702	3%	713	723	Difference Method	Absolute difference >10% --> Used difference only	
	Exit 127 SB Ramps	E of Exit 127 SB Ran	EB	650	1079	1213	1111	1240	12.4%	0.5%	11.6%	129	779	725	7%	752	779	Difference Method	Absolute difference >10% --> Used difference only	
	E of Exit 127 SB Ramps	Exit 127 SB Ramps	WB	645	479	581	503	601	21.3%	0.9%	19.4%	98	743	770	4%	757	743	Difference Method	Absolute difference >10% --> Used difference only	
	W of Exit 127 NB Ramps	Exit 127 NB Ramps	EB	650	1079	1213	1111	1240	12.4%	0.5%	11.6%	129	779	725	7%	752	779	Difference Method	Absolute difference >10% --> Used difference only	
	Exit 127 NB Ramps	W of Exit 127 NB Ra	WB	645	479	581	503	601	21.3%	0.9%	19.4%	98	743	770	4%	757	743	Difference Method	Absolute difference >10% --> Used difference only	
	Exit 127 NB Ramps	E of Exit 127 NB Ran	EB	685	801	875	819	890	9.2%	0.4%	8.7%	71	756	744	2%	750	756	Difference Method	Absolute difference >10% --> Used difference only	
	E of Exit 127 NB Ramps	Exit 127 NB Ramps	WB	715	503	670	543	703	33.2%	1.3%	29.5%	160	875	926	6%	901	875	Difference Method	To be consistent with method used for opposing direction	
	W of Aviation	Aviation	EB	685	801	875	819	890	9.2%	0.4%	8.7%	71	756	744	2%	750	756	Difference Method	Absolute difference >10% --> Used difference only	
	Aviation	W of Aviation	WB	715	503	670	543	703	33.2%	1.3%	29.5%	160	875	926	6%	901	875	Difference Method	To be consistent with method used for opposing direction	
	Aviation	E of Aviation	EB	610	776	820	787	829	5.7%	0.2%	5.4%	42	652	643	1%	647	652	Difference Method	Absolute difference >10% --> Used difference only	
	E of Aviation	Aviation	WB	600	493	648	530	679	31.4%	1.3%	28.1%	149	749	768	3%	759	749	Difference Method	Absolute difference >10% --> Used difference only	
	W of Stephens	Stephens	EB	595	776	820	787	829	5.7%	0.2%	5.4%	42	637	627	2%	632	637	Difference Method	Absolute difference >10% --> Used difference only	
	Stephens	W of Stephens	WB	600	493	648	530	679	31.4%	1.3%	28.1%	149	749	768	3%	759	749	Difference Method	Absolute difference >10% --> Used difference only	
	Stephens	E of Stephens	EB	15	1	3	1	3	200.0%	8.0%	129.7%	2	17	34	68%	26	17	Difference Method	Absolute difference >10% --> Used difference only	
	E of Stephens	Stephens	WB	20	1	3	1	3	200.0%	8.0%	129.7%	2	22	46	71%	34	22	Difference Method	Absolute difference >10% --> Used difference only	
Stewart Pkwy	N of Harvard	Harvard	SB	745	743	864	772	888	16.3%	0.7%	15.0%	116	861	857	0%	859	859	Average of Difference and Growth		
	Harvard	N of Harvard	NB	795	559	682	589	707	22.0%	0.9%	20.1%	118	913	955	4%	934	934	Average of Difference and Growth		
	S of Harvard	Harvard	NB	40	1	1	1	1	0.0%	0.0%	0.0%	0	40	40	0%	40	40	Average of Difference and Growth		
	Harvard	S of Harvard	SB	7	1	1	1	1	0.0%	0.0%	0.0%	0	7	7	0%	7	7	Average of Difference and Growth		
	S of Harvey	Harvey	NB	695	378	547	419	581	44.7%	1.8%	38.8%	162	857	964	12%	911	857	Difference Method		
	Harvey	S of Harvey	SB	760	481	660	524	696	37.2%	1.5%	32.8%	172	932	1009	8%	971	932	Difference Method	To be consistent with method used for opposing direction	
	Harvey	N of Harvey	NB	560	552	699	587	728	26.6%	1.1%	24.0%	141	701	695	1%	698	698	Average of Difference and Growth		
	N of Harvey	Harvey	SB	705	657	797	691	825	21.3%	0.9%	19.5%	134	839	842	0%	841	841	Average of Difference and Growth		
	S of Valley View	Valley View	NB	540	657	699	667	707	6.4%	0.3%	6.0%	40	580	573	1%	576	576	Average of Difference and Growth		
	Valley View	S of Valley View	SB	685	552	797	611	846	44.4%	1.8%	38.5%	235	920	949	3%	934	934	Average of Difference and Growth		
	Valley View	Garden Valley	NB	585	672	878	721	919	30.7%	1.2%	27.4%	198	783	745	5%	764	764	Average of Difference and Growth		
	Garden Valley	Valley View	SB	795	884	1188	957	1249	34.4%	1.4%	30.5%	292	1087	1037	5%	1062	1062	Average of Difference and Growth		
180	Garden Valley	Roseburg Mall	NB	900	619	836	671	879	35.1%	1.4%	31.0%	208	1108	1179	6%	1144	1144	Average of Difference and Growth		
	Roseburg Mall	Garden Valley	SB	1170	1005	1370	1093	1443	36.3%	1.5%	32.1%	350	1520	1545	2%	1533	1533	Average of Difference and Growth		
	Roseburg Mall	N of Roseburg Mall	NB	780	644	859	696	902	33.4%	1.3%	29.7%	206	986	1011	3%	999	999	Average of Difference and Growth		
	N of Roseburg Mall	Roseburg Mall	SB	1030	872	1252	963	1328	43.6%	1.7%	37.9%	365	1395	1420	2%	1407	1407	Average of Difference and Growth		
	W of Edenbower	Edenbower	EB	1055	1555	2055	1675	2155	32.2%	1.3%	28.7%	480	1535	1357	12%	1446	1535	Difference Method	Absolute difference >10% --> Used difference only	
	Edenbower	W of Edenbower	WB	835	769	952	813	989	23.8%	1.0%	21.6%	176	1011	1015	0%	1013	1011	Difference Method	Absolute difference >10% --> Used difference only	
	Edenbower	E of Edenbower	EB	535	862	1135	928	1190	31.7%	1.3%	28.3%	262	797	686	15%	742	797	Difference Method	Absolute difference >10% --> Used difference only	
	E of Edenbower	Edenbower	WB	490	410	574	449	607	40.0%	1.6%	35.0%	157	647	662	2%	655	647	Difference Method	Absolute difference >10% --> Used difference only	
	W of Aviation	Aviation	EB	555	624	1331	794	1472	113.3%	4.5%	85.5%	679	1234	1030	18%	1132	1234	Difference Method	Absolute difference >10% --> Used difference only	
	Aviation	W of Aviation	WB	505	580	1102	705	1206	90.0%	3.6%	71.1%	501	1006	864	15%	935	1006	Difference Method	Absolute difference >10% --> Used difference only	
	Aviation	E of Aviation	EB	575	523	907	615	984	73.4%	2.9%	59.9%	369	944	920	3%	932	932	Average of Difference and Growth		
	E of Aviation	Aviation	WB	485	309	572	372	625	85.1%	3.4%	67.8%	252	737	814	10%	776	737	Difference Method		
	W of Airport	Airport	EB	615	570	984	669	1067	72.6%	2.9%	59.4%	397	1012	980	3%	996	996	Average of Difference and Growth		
	Airport	W of Airport	WB	470	342	617	408	672	80.4%	3.2%	64.7%	264	734	774	5%	754	754	Average of Difference and Growth		
	Airport	Stephens	EB	540	551	942	645	1020	71.0%	2.8%	58.2%	375	915	854	7%	885	885	Average of Difference and Growth		
	Stephens	Airport	WB	315	334	589	395	640	76.3%	3.1%	61.9%	245	560	510	9%	535	535	Average of Difference and Growth		
Diamond Lake Blvd	Stephens	Jackson	EB	690	413	726	488	789	75.8%	3.0%	61.6%	300	990	1115	12%	1053	990	Difference Method	Absolute difference >10% --> Used difference only	TPAU STUDIED THIS INTERSECTION
	Jackson	Stephens	WB	490	424	517	446	536	21.9%	0.9%	20.0%	89	579	588	1%	584	579	Difference Method	To be consistent with method used for opposing direction	TPAU STUDIED THIS INTERSECTION
	Jackson	E of Jackson	EB	965	842	1198	927	1269	42.3%	1.7%	36.8%	342	1307	1321	1%	1314	1314	Average of Difference and Growth		TPAU STUDIED THIS INTERSECTION
	E of Jackson	Jackson	WB	790	729	989	791	1041	35.7%	1.4%	31.5%	250	1040	1039	0%	1039	1039	Average of Difference and Growth		TPAU STUDIED THIS INTERSECTION
	W of Fulton	Fulton	EB	805	741	1043	813	1103	40.8%	1.6%	35.6%	290	1095	1092	0%	1093	1093	Average of Difference and Growth		
	Fulton	W of Fulton	WB	660	583	796	634	839	36.5%	1.5%	32.2%	204	864	873	1%	869	869	Average of Difference and Growth		
	Fulton	E of Fulton	EB	791	757	1070	832	1133	41.3%	1.7%	36.1%	300	1091	1077	1%	1084	1084	Average of Difference and Growth		
	E of Fulton	Fulton	WB	640	600	819	653	863	36.5%	1.5%	32.2%	210	850	846	0%	848	848	Average of Difference and Growth		
	W of Rifle Range	Rifle Range	EB	785	728	1035	802	1096	42.2%	1.7%	36.8%	295	1080	1074	1%	1077	1077	Average of Difference and Growth		
	Rifle Range	W of Rifle Range	WB	635	545	757	596	799	38.9%	1.6%	34.2%	204	839	852	2%	845	845	Average of Difference and Growth		
	Rifle Range	E of Rifle Range	EB	700	608	885	674	940	45.6%	1.8%	39.4%	266	966	976	1%	971	971	Average of Difference and Growth		
	E of Rifle Range	Rifle Range	WB	566	474	660	519	697	39.2%	1.6%	34.4%	179	745	761	2%	753	753	Average of Difference and Growth		
	W of Douglas	Douglas	EB	565	358	518	396	550	44.7%	1.8%	38.7%	154	719	784	9%	751	751	Average of Difference and Growth		
	Douglas	W of Douglas	WB	380	326	451	356	476	38.3%	1.5%	33.7%	120	500	508	2%	504	504	Average of Difference and Growth		
	Douglas	E of Douglas	EB	575	358	518	396	550	44.7%	1.8%	38.7%	154	729	798	9%	763	763	Average of Difference and Growth		
	E of Douglas	Douglas	WB	385	326	451	356	476	38.3%	1.5%	33.7%	120	505	515	2%	510	510	Average of Difference and Growth		
Jackson St	Diamond Lake	S of Diamond Lake	SB	220	182	162	177	158	-11.0%	-0.4%	-10.8%	-19	201	196	2%	198	198	Average of Difference and Growth		TPAU STUDIED THIS INTERSECTION
	S of Diamond Lake	Diamond Lake	NB	150	178	169	176	167	-5.1%	-0.2%	-4.9%	-9	141	143	1%	142	142	Average of Difference and Growth		TPAU STUDIED THIS INTERSECTION
	N of Douglas	Douglas	SB	220	293	286	291	285	-2.4%	-0.1%	-2.3%	-7	213	215	1%	214	214	Average of Difference and Growth		Link decrease due to OR138 improvements
	Douglas	N of Douglas	NB	105	33	35	33	35	6.1%	0.2%	5.7%	2	107	111	4%	109	109	Average of Difference and Growth		
	Douglas	Washington	SB	120	67	63	66	62	-6.0%	-0.2%	-5.8%	-4	116	113	3%	115	115	Average of Difference and Growth		Model shows volumes decrease so assume no growth
	Washington	Oak	SB	115	44	53	46	55	20.5%	0.8%	18.7%	9	124	137	10%	130	124	Difference Method	To be consistent with method used for opposing direction	
	Oak	S of Oak	SB	150	48	58	50	60	20.8%	0.8%	19.0%	10	160	179	11%	169	160	Difference Method	Absolute difference >10% --> Used difference only	
Kane St	Douglas	S of Douglas	SB	130	113	187	131	202	65.5%	2.6%	54.3%	71	201	201	0%	201	201	Average of Difference and Growth		
	S of Douglas	Douglas	NB	130	10	10	10	10	0.0%	0.0%	0.0%	0	130	130	0%	130	130	Average of Difference and Growth		
Washington Ave	Main	Jackson	WB	230	240	346	265	367	44.2%	1.8%	38.3%	102	332	318	4%	325	325	Average of Difference and Growth		
	Jackson	Rose	WB	235	263	356	285	375	35.4%	1.4%	31.3%	89	324	309	5%	316	316	Average of Difference and Growth		
Douglas Ave	W of Jackson	Jackson	EB	195	7	23	11	26	228.6%	9.1%	141.7%	15	210	471	77%	341	210	Difference Method	Absolute difference >10% --> Used difference only	
	Jackson	W of Jackson	WB	225	185	203	189	207	9.7%	0.4%	9.1%	17	242	246	1%	244	242	Difference Method	To be consistent with method used for opposing direction	
	Jackson	Main	EB	240	48	48	48	48	0.0%	0.0%	0.0%	0	240	240	0%	240	240	Average of Difference and Growth		
	Main	Jackson	WB	275	34	35	34	35	2.9%	0.1%	2.8%	1	276	283	2%	279	279	Average of Difference and Growth		
	Main	Kane	EB	240	148	162	151	165	9.5%	0.4%	8.9%	13	253	261	3%	257	253	Difference Method	To be consistent with method used for opposing direction	
	Kane	Main	WB	270	4	4	4	4	0.0%	0.0%	0.0%	0	270	270	0%	270	270	Difference Method	Absolute difference >10% --> Used difference only	Model shows volumes decrease so assume no growth

Existing Year 2016
Project Forecast Year 2040
Model Base Year 2010
Model Forecast Year 2035

Sidestreets not included in the regional model
Greater than 10% difference between difference and growth methods
Numbers adjusted from model to work with spreadsheet (0 growth = 1)
Previous study intersection

Road	From	To	Direction	Existing 30HV 2016	Model Assignment: Baseline Model 2010	Model Assignment: Future Ref Model 2035	Model Assignment: Interpolated Model 2016	Model Assignment: Forecasted Model 2040	2010-2035 Model Comparison: Total Growth	2010-2035 Model Comparison: Annual Growth	2016-2040 Model Comparison: Total Growth	2016-2040 Model Comparison: Volume Difference	Post Processed Volumes Future 2040 No Build Year: Volume Difference	Volume Growth	Absolute Difference	Average	Forecast Used	Method Used	Comments	Additional Comments
	Kane	Chadwick	EB	245	111	132	116	136	18.9%	0.8%	17.4%	20	265	288	8%	276	**265**	Difference Method	To be consistent with method used for opposing direction	
	Chadwick	Kane	WB	275	70	150	89	166	114.3%	4.6%	86.1%	77	352	512	37%	432	**352**	Difference Method	Absolute difference >10% --> Used difference only	
	W of Ramp	Ramp	EB	165	87	101	90	104	16.1%	0.6%	14.9%	13	178	190	6%	184	**184**	Average of Difference and Growth		
	Ramp	W of Ramp	WB	100	73	98	79	103	34.2%	1.4%	30.4%	24	124	130	5%	127	**127**	Average of Difference and Growth		
	Ramp	Rifle Range	EB	110	75	100	81	105	33.3%	1.3%	29.6%	24	134	143	6%	138	**138**	Average of Difference and Growth		
	Rifle Range	Ramp	WB	90	106	131	112	136	23.6%	0.9%	21.4%	24	114	109	4%	112	**112**	Average of Difference and Growth		
	Rifle Range	E of Rifle Range	EB	70	8	11	9	12	37.5%	1.5%	33.0%	3	73	93	24%	83	**73**	Difference Method	Absolute difference >10% --> Used difference only	
	E of Rifle Range	Rifle Range	WB	40	7	10	8	11	42.9%	1.7%	37.3%	3	43	55	25%	49	**43**	Difference Method	Absolute difference >10% --> Used difference only	
	Diamond Lake	S of Diamond Lake	SB	15	1	1	1	1	0.0%	0.0%	0.0%	0	15	15	0%	15	**15**	Average of Difference and Growth		
	S of Diamond Lake	Diamond Lake	NB	20	1	1	1	1	0.0%	0.0%	0.0%	0	20	20	0%	20	**20**	Average of Difference and Growth		
Fulton St	N of Diamond Lake	Diamond Lake	SB	46	16	27	19	29	68.8%	2.8%	56.7%	11	57	72	24%	64	**57**	Difference Method	Absolute difference >10% --> Used difference only	
	Diamond Lake	N of Diamond Lake	NB	36	17	23	18	24	35.3%	1.4%	31.2%	6	42	47	12%	45	**42**	Difference Method	Absolute difference >10% --> Used difference only	
	Diamond Lake	S of Diamond Lake	SB	11	14	17	15	18	20.9%	0.8%	19.1%	3	14	13	6%	13	**14**	Difference Method	To be consistent with method used for opposing direction	
	S of Diamond Lake	Diamond Lake	NB	7	23	27	24	27	14.3%	0.6%	13.3%	3	10	8	25%	9	**10**	Difference Method	Absolute difference >10% --> Used difference only	
Ramp Rd	Douglas	S of Douglas	SB	115	169	198	176	204	17.2%	0.7%	15.8%	28	143	133	7%	138	**143**	Difference Method	To be consistent with method used for opposing direction	
	S of Douglas	Douglas	NB	70	125	164	134	172	31.2%	1.2%	27.9%	37	107	90	18%	98	**107**	Difference Method	Absolute difference >10% --> Used difference only	
Rifle Range St	N of Diamond Lake	Diamond Lake	SB	40	38	54	42	57	42.1%	1.7%	36.7%	15	55	55	1%	55	**55**	Difference Method	To be consistent with method used for opposing direction	
	Diamond Lake	N of Diamond Lake	NB	41	56	76	61	80	35.7%	1.4%	31.6%	19	60	54	11%	57	**60**	Difference Method	Absolute difference >10% --> Used difference only	
	Diamond Lake	S of Diamond Lake	SB	100	99	121	104	125	22.2%	0.9%	20.3%	21	121	120	1%	121	**121**	Average of Difference and Growth		
	S of Diamond Lake	Diamond Lake	NB	85	67	89	72	93	32.8%	1.3%	29.2%	21	106	110	3%	108	**108**	Average of Difference and Growth		
	North of Douglas	Douglas	SB	80	99	121	104	125	22.2%	0.9%	20.3%	21	101	96	5%	99	**99**	Average of Difference and Growth		
	Douglas	N of Douglas	NB	70	67	89	72	93	32.8%	1.3%	29.2%	21	91	90	1%	91	**91**	Average of Difference and Growth		
Harvard Ave	W of Lookingglass	Lookingglass	EB	160	146	199	159	210	36.3%	1.5%	32.1%	51	211	211	0%	211	**211**	Average of Difference and Growth		
	Lookingglass	W of Lookingglass	WB	270	236	355	265	379	50.4%	2.0%	43.2%	114	384	387	1%	385	**385**	Average of Difference and Growth		
	Lookingglass	Broccoli	EB	335	242	383	276	411	58.3%	2.3%	49.1%	135	470	499	6%	485	**485**	Average of Difference and Growth		
	Broccoli	Lookingglass	WB	540	418	766	502	836	83.3%	3.3%	66.6%	334	874	900	3%	887	**887**	Average of Difference and Growth		
	Broccoli	E of Broccoli	EB	410	319	492	361	527	54.2%	2.2%	46.1%	166	576	599	4%	587	**587**	Average of Difference and Growth		
	E of Broccoli	Broccoli	WB	630	577	1025	685	1115	77.6%	3.1%	62.8%	430	1060	1026	3%	1043	**1043**	Average of Difference and Growth		
	W of Stewart	Stewart	EB	596	443	668	497	713	50.8%	2.0%	43.5%	216	812	855	5%	834	**834**	Average of Difference and Growth		
	Stewart	W of Stewart	WB	825	758	1310	890	1420	72.8%	2.9%	59.5%	530	1355	1316	3%	1335	**1335**	Average of Difference and Growth		
	Stewart	E of Stewart	EB	825	533	691	571	723	29.6%	1.2%	26.6%	152	977	1044	7%	1010	**977**	Difference Method	To be consistent with method used for opposing direction	
	E of Stewart	Stewart	WB	1071	664	1150	781	1247	73.2%	2.9%	59.8%	467	1538	1711	11%	1624	**1538**	Difference Method		
	W of Keady	Keady	EB	816	622	842	675	886	35.4%	1.4%	31.3%	211	1027	1071	4%	1049	**1049**	Average of Difference and Growth		
	Keady	W of Keady	WB	921	662	1097	766	1184	65.7%	2.6%	54.5%	418	1339	1423	6%	1381	**1381**	Average of Difference and Growth		
	Keady	E of Keady	EB	871	622	842	675	886	35.4%	1.4%	31.3%	211	1082	1144	6%	1113	**1113**	Average of Difference and Growth		
	E of Keady	Keady	WB	906	662	1097	766	1184	65.7%	2.6%	54.5%	418	1324	1400	6%	1362	**1362**	Average of Difference and Growth		
	W of Centennial	Centennial	EB	870	622	842	675	886	35.4%	1.4%	31.3%	211	1081	1142	5%	1112	**1112**	Average of Difference and Growth		
	Centennial	W of Centennial	WB	910	662	1097	766	1184	65.7%	2.6%	54.5%	418	1328	1406	6%	1367	**1367**	Average of Difference and Growth		
	Centennial	E of Centennial	EB	955	803	1419	951	1542	76.7%	3.1%	62.2%	591	1546	1549	0%	1548	**1548**	Average of Difference and Growth		
	E of Centennial	Centennial	WB	925	765	1217	873	1307	59.1%	2.4%	49.7%	434	1359	1385	2%	1372	**1372**	Average of Difference and Growth		
Lookingglass Rd	Harvard	S of Harvard	SB	285	193	426	249	473	120.7%	4.8%	89.9%	224	509	541	6%	525	**509**	Difference Method	To be consistent with method used for opposing direction	
	S of Harvard	Harvard	NB	190	107	198	129	216	85.0%	3.4%	67.8%	87	277	319	14%	298	**277**	Difference Method	Absolute difference >10% --> Used difference only	
Broccoli St	N of Harvard	Harvard	SB	75	27	40	30	43	49.4%	2.0%	42.4%	13	88	107	20%	97	**88**	Difference Method	Absolute difference >10% --> Used difference only	Model loads all onto Agate -- moved a third to Broccoli
	Harvard	N of Harvard	NB	66	30	43	33	46	46.1%	1.8%	39.8%	13	79	92	15%	86	**79**	Difference Method	Absolute difference >10% --> Used difference only	
	Harvard	S of Harvard	SB	75	159	258	183	278	62.3%	2.5%	52.0%	95	170	114	39%	142	**170**	Difference Method	Absolute difference >10% --> Used difference only	
	S of Harvard	Harvard	NB	48	77	109	85	115	41.6%	1.7%	36.3%	31	79	65	18%	72	**79**	Difference Method	Absolute difference >10% --> Used difference only	
Keady Ct	Harvard	S of Harvard	SB	61	61	61	61	61	0.0%	0.0%	0.0%	0	61	61	0%	61	**61**	Average of Difference and Growth		Serves as middle school access - growth negligable (0 in model)
	S of Harvard	Harvard	NB	131	131	131	131	131	0.0%	0.0%	0.0%	0	131	131	0%	131	**131**	Average of Difference and Growth		Serves as middle school access - growth negligable (0 in model)
Stewart Park Dr	N of Harvard	Harvard	SB	140	257	672	357	755	161.5%	6.5%	111.7%	398	538	296	58%	417	**538**	Difference Method	Absolute difference >10% --> Used difference only	
	Harvard	N of Harvard	NB	70	179	215	188	222	20.1%	0.8%	18.4%	35	105	83	23%	94	**105**	Difference Method	Absolute difference >10% --> Used difference only	
Garden Valley Blvd	N of Melrose	Melrose	SB	326	213	315	237	335	47.9%	1.9%	41.2%	98	424	460	8%	442	**442**	Average of Difference and Growth		
	Melrose	N of Melrose	NB	436	320	581	383	633	81.6%	3.3%	65.5%	251	687	722	5%	704	**704**	Average of Difference and Growth		
	Melrose	Troost	EB	450	393	541	429	571	37.7%	1.5%	33.2%	142	592	599	1%	596	**596**	Average of Difference and Growth		
	Troost	Melrose	WB	725	672	1051	763	1127	56.4%	2.3%	47.7%	364	1089	1071	2%	1080	**1080**	Average of Difference and Growth		
	Troost	E of Troost	EB	625	405	579	447	614	43.0%	1.7%	37.4%	167	792	859	8%	825	**825**	Average of Difference and Growth		
	E of Troost	Troost	WB	900	733	1146	832	1229	56.3%	2.3%	47.6%	396	1296	1329	2%	1313	**1313**	Average of Difference and Growth		
	W of Kline	Kline	EB	645	401	571	442	605	42.4%	1.7%	36.9%	163	808	883	9%	846	**846**	Average of Difference and Growth		
	Kline	W of Kline	WB	925	728	1133	825	1214	55.6%	2.2%	47.1%	389	1314	1361	4%	1337	**1337**	Average of Difference and Growth		
	Kline	E of Kline	EB	955	542	763	595	807	40.8%	1.6%	35.7%	212	1167	1296	10%	1231	**1167**	Difference Method	Absolute difference >10% --> Used difference only	
	E of Kline	Kline	WB	1120	976	1421	1083	1510	45.6%	1.8%	39.5%	427	1547	1562	1%	1555	**1547**	Difference Method	Absolute difference >10% --> Used difference only	
	W of Roseburg Mall	Roseburg Mall	EB	955	589	816	643	861	38.5%	1.5%	33.9%	218	1173	1278	9%	1226	**1226**	Average of Difference and Growth		
	Roseburg Mall	W of Roseburg Mall	WB	1120	1008	1455	1115	1544	44.3%	1.8%	38.5%	429	1549	1551	0%	1550	**1550**	Average of Difference and Growth		
	Roseburg Mall	Stewart	EB	955	816	1184	904	1258	45.1%	1.8%	39.1%	353	1308	1328	2%	1318	**1318**	Average of Difference and Growth		
	Stewart	Roseburg Mall	WB	1175	1075	1548	1189	1643	44.0%	1.8%	38.2%	454	1629	1624	0%	1626	**1626**	Average of Difference and Growth		
	Stewart	Goetz/Duck Pond	EB	1180	1106	1499	1200	1578	35.5%	1.4%	31.4%	377	1557	1551	0%	1554	**1554**	Average of Difference and Growth		
	Goetz/Duck Pond	Stewart	WB	1415	1192	1376	1236	1413	15.4%	0.6%	14.3%	177	1592	1617	2%	1604	**1604**	Average of Difference and Growth		
	Goetz/Duck Pond	E of Goetz/Duck Pon	EB	1150	1106	1499	1200	1578	35.5%	1.4%	31.4%	377	1527	1511	1%	1519	**1519**	Average of Difference and Growth		
	E of Goetz/Duck Pond	Goetz/Duck Pond	WB	1340	1192	1376	1236	1413	15.4%	0.6%	14.3%	177	1517	1531	1%	1524	**1524**	Average of Difference and Growth		
	W of Walnut	Walnut	EB	915	807	1031	861	1076	27.8%	1.1%	25.0%	215	1130	1144	1%	1137	**1137**	Average of Difference and Growth		
	Walnut	W of Walnut	WB	920	696	843	731	872	21.1%	0.8%	19.3%	141	1061	1098	3%	1079	**1079**	Average of Difference and Growth		
	Walnut	E of Walnut	EB	880	807	1031	861	1076	27.8%	1.1%	25.0%	215	1095	1100	0%	1097	**1097**	Average of Difference and Growth		
	E of Walnut	Walnut	WB	840	696	843	731	872	21.1%	0.8%	19.3%	141	981	1002	2%	992	**992**	Average of Difference and Growth		
	W of Rocky Ridge	Rocky Ridge	EB	245	4	36	12	42	800.0%	32.0%	263.0%	31	276	889	105%	583	**276**	Difference Method	Absolute difference >10% --> Used difference only	
	Rocky Ridge	W of Rocky Ridge	WB	130	2	2	2	2	0.0%	0.0%	0.0%	0	130	130	0%	130	**130**	Difference Method	To be consistent with method used for opposing direction	
	Rocky Ridge	E of Rocky Ridge	EB	170	4	36	12	42	800.0%	32.0%	263.0%	31	201	617	102%	409	**201**	Difference Method	Absolute difference >10% --> Used difference only	
	E of Rocky Ridge	Rocky Ridge	WB	95	2	2.0	2	2	0.0%	0.0%	0.0%	0	95	95	0%	95	**95**	Difference Method	To be consistent with method used for opposing direction	
Calkins Ave	W of Troost	Troost	EB	35	50	77	56	82	54.0%	2.2%	45.9%	26	61	51	18%	56	**61**	Difference Method	Absolute difference >10% --> Used difference only	
	Troost	W of Troost	WB	56	105	190	125	207	81.0%	3.2%	65.1%	82	138	92	39%	115	**138**	Difference Method	Absolute difference >10% --> Used difference only	
	Troost	E of Troost	EB	65	81	131	93	141	61.7%	2.5%	51.6%	48	113	99	14%	106	**113**	Difference Method	Absolute difference >10% --> Used difference only	
	E of Troost	Troost	WB	110	162	345	206	382	113.0%	4.5%	85.3%	176	286	204	33%	245	**286**	Difference Method	Absolute difference >10% --> Used difference only	
	W of Keasey	Keasey	EB	90	25	39	29	41	52.6%	2.1%	44.9%	13	103	130	24%	117	**103**	Difference Method	Absolute difference >10% --> Used difference only	Model routes onto Beaumont instead of Calkins
	Keasey	W of Keasey	WB	130	45	100	58	111	123.1%	4.9%	91.2%	53	183	249	31%	216	**183**	Difference Method	Absolute difference >10% --> Used difference only	Model routes onto Beaumont instead of Calkins
Keasey St	N of Calkins	Calkins	SB	130	53	69	57	72	30.2%	1.2%	27.0%	15	145	165	13%	155	**145**	Difference Method	Absolute difference >10% --> Used difference only	
	Calkins	N of Calkins	NB	70	36	65	43	71	80.6%	3.2%	64.8%	28	98	115	16%	107	**98**	Difference Method	Absolute difference >10% --> Used difference only	
	Calkins	S of Calkins	SB	155	63	103	73	111	63.5%	2.5%	52.9%	38	193	237	20%	215	**193**	Difference Method	Absolute difference >10% --> Used difference only	

Existing Year 2016
Project Forecast Year 2040
Model Base Year 2010
Model Forecast Year 2035

Sidestreets not included in the regional model
Greater than 10% difference between difference and growth methods
Numbers adjusted from model to work with spreadsheet (0 growth = 1)
Previous study intersection

Road	From	To	Direction	Existing 30HV 2016	Model Assignment: Baseline Model 2010	Future Ref Model 2035	Interpolated Model 2016	Forecasted Model 2040	2010-2035 Model Comparison: Total Growth	Annual Growth	2016-2040 Model Comparison: Total Growth	Volume Difference	Post Processed Volumes Future 2040 No Build Year: Volume Difference	Volume Growth	Absolute Difference	Average	Forecast Used	Method Used	Comments	Additional Comments
	S of Calkins	Calkins	NB	135	36	65	43	71	80.6%	3.2%	64.8%	28	163	222	31%	193	163	Difference Method	Absolute difference >10% --> Used difference only	
Troost St	N of Garden Valley	Garden Valley	SB	50	3	7	4	8	133.3%	5.3%	97.0%	4	54	98	59%	76	54	Difference Method	Absolute difference >10% --> Used difference only	Model routes onto Newcastle instead of Troost
	Garden Valley	N of Garden Valley	NB	21	2	4	2	4	100.0%	4.0%	77.4%	2	23	37	48%	30	23	Difference Method	Absolute difference >10% --> Used difference only	Model routes onto Newcastle instead of Troost
	Garden Valley	S of Garden Valley	SB	220	114	156	124	164	36.8%	1.5%	32.5%	40	260	291	11%	276	260	Difference Method	To be consistent with method used for opposing direction	
	S of Garden Valley	Garden Valley	NB	191	64	98	72	105	53.1%	2.1%	45.2%	33	224	277	21%	251	224	Difference Method	Absolute difference >10% --> Used difference only	
	N of Calkins	Calkins	SB	125	34	47	37	50	38.2%	1.5%	33.6%	12	137	167	19%	152	137	Difference Method	Absolute difference >10% --> Used difference only	
	Calkins	N of Calkins	NB	95	52	99	63	108	90.4%	3.6%	71.3%	45	140	163	15%	151	140	Difference Method	Absolute difference >10% --> Used difference only	
	Calkins	S of Calkins	SB	110	36	102	52	115	183.3%	7.3%	122.2%	63	173	244	34%	209	173	Difference Method	Absolute difference >10% --> Used difference only	
	S of Calkins	Calkins	NB	56	27	53	33	58	96.3%	3.9%	75.1%	25	81	98	19%	90	81	Difference Method	Absolute difference >10% --> Used difference only	
Lincoln St	N of Malheur	Malheur	SB	100	62	62	62	62	0.0%	0.0%	0.0%	0	100	100	0%	100	100	Average of Difference and Growth		TAZ should not decrease
	Malheur	N of Malheur	NB	51	154	154	154	154	0.0%	0.0%	0.0%	0	51	51	0%	51	51	Average of Difference and Growth		TAZ should not decrease
	Malheur	S of Malheur	SB	58	1	1.5	1	2	50.0%	2.0%	42.9%	0	58	83	34%	71	58	Difference Method	Absolute difference >10% --> Used difference only	TAZ should not decrease
	S of Malheur	Malheur	NB	32	1	1.5	1	2	50.0%	2.0%	42.9%	0	32	46	34%	39	32	Difference Method	Absolute difference >10% --> Used difference only	TAZ should not decrease
Malheur Ave	W of Lincoln	Lincoln	EB	7	154	154	154	154	0.0%	0.0%	0.0%	0	7	7	0%	7	7	Average of Difference and Growth	Absolute difference >10% --> Used difference only	TAZ should not decrease
	Lincoln	W of Lincoln	WB	9	62	62	62	62	0.0%	0.0%	0.0%	0	9	9	0%	9	9	Average of Difference and Growth	Absolute difference >10% --> Used difference only	TAZ should not decrease
	Lincoln	E of Lincoln	EB	50	50	53	51	54	6.0%	0.2%	5.7%	3	53	53	0%	53	53	Average of Difference and Growth	Absolute difference >10% --> Used difference only	TAZ should not decrease
	E of Lincoln	Lincoln	WB	29	29	29	29	29	0.0%	0.0%	0.0%	0	29	29	0%	29	29	Average of Difference and Growth	To be consistent with method used for opposing direction	TAZ should not decrease
Duck Pond St/Goetz St	N of Garden Valley	Garden Valley	SB	21	21	21	21	21	0.0%	0.0%	0.0%	0	21	21	0%	21	21	Average of Difference and Growth		Dead end street - assume negligable growth (model shows 0)
	Garden Valley	N of Garden Valley	NB	55	55	55	55	55	0.0%	0.0%	0.0%	0	55	55	0%	55	55	Average of Difference and Growth		Dead end street - assume negligable growth (model shows 0)
	Garden Valley	S of Garden Valley	SB	86	86	86	86	86	0.0%	0.0%	0.0%	0	86	86	0%	86	86	Average of Difference and Growth		Fred Meyer Access - assume negligable growth (model shows 0)
	S of Garden Valley	Garden Valley	NB	165	165	165	165	165	0.0%	0.0%	0.0%	0	165	165	0%	165	165	Average of Difference and Growth		Fred Meyer Access - assume negligable growth (model shows 0)
Kline St	N of Garden Valley	Garden Valley	SB	285	154	220	170	233	42.9%	1.7%	37.3%	63	348	391	12%	370	370	Average of Difference and Growth		
	Garden Valley	N of Garden Valley	NB	220	241	305	256	318	26.6%	1.1%	24.0%	61	281	273	3%	277	277	Average of Difference and Growth		
	Garden Valley	S of Garden Valley	SB	130	92	86	91	85	-6.5%	-0.3%	-6.4%	-6	124	122	2%	123	123	Average of Difference and Growth		
	S of Garden Valley	Garden Valley	NB	180	72	74	72	74	2.8%	0.1%	2.6%	2	182	185	2%	183	183	Average of Difference and Growth		
Melrose Rd	W of Garden Valley	Garden Valley	EB	241	210	260	222	270	23.8%	1.0%	21.6%	48	289	293	1%	291	291	Average of Difference and Growth		
	Garden Valley	W of Garden Valley	WB	401	382	499	410	522	30.6%	1.2%	27.4%	112	513	511	0%	512	512	Average of Difference and Growth		
	Garden Valley	E of Garden Valley	EB	12	7	12	8	13	71.4%	2.9%	58.5%	5	17	19	12%	18	18	Average of Difference and Growth		
	E of Garden Valley	Garden Valley	WB	7	8	6	8	6	-25.0%	-1.0%	-25.5%	-2	5	5	3%	5	5	Average of Difference and Growth		
Roseburg Mall/Walmart	W of Stewart	Stewart	EB	100	76	99	82	104	30.3%	1.2%	27.1%	22	122	127	4%	125	122	Difference Method	To be consistent with method used for opposing direction	
	Stewart	W of Stewart	WB	80	35	81	46	90	131.4%	5.3%	95.9%	44	124	157	23%	140	124	Difference Method		
Walmart	Stewart	E of Stewart	EB	250	52	75	58	80	44.2%	1.8%	38.4%	22	272	346	24%	309	272	Difference Method		Existing Wal-Mart driveway - Assume minimal growth
	E of Stewart	Stewart	WB	250	169	200	176	206	18.3%	0.7%	16.9%	30	280	292	4%	286	280	Difference Method		Existing Wal-Mart driveway - Assume minimal growth
Roseburg Mall	N of Garden Valley	Garden Valley	SB	35	246	279	254	286	13.4%	0.5%	12.5%	32	67	39	52%	53	67	Difference Method		
	Garden Valley	N of Garden Valley	NB	90	102	102	102	102	0.0%	0.0%	0.0%	0	90	90	0%	90	90	Average of Difference and Growth		Existing Mall driveway - Assume minimal growth
Valley View Dr	W of Stewart	Stewart	EB	160	134	221	155	238	64.9%	2.6%	53.9%	84	244	246	1%	245	245	Average of Difference and Growth		
	Stewart	W of Stewart	WB	225	242	437	289	476	80.6%	3.2%	64.8%	187	412	371	11%	392	392	Average of Difference and Growth		
Walnut St	N of Garden Valley	Garden Valley	SB	16	16	16	16	16	0.0%	0.0%	0.0%	0	16	16	0%	16	16	Average of Difference and Growth		No Link volume in model - driveway
	Garden Valley	N of Garden Valley	NB	50	16	16	16	16	0.0%	0.0%	0.0%	0	50	50	0%	50	50	Average of Difference and Growth		No Link volume in model - driveway
	Garden Valley	S of Garden Valley	SB	86	36	39	37	40	8.3%	0.3%	7.8%	3	89	93	4%	91	91	Average of Difference and Growth		Model routes all to Cedar instead of Walnut
	S of Garden Valley	Garden Valley	NB	165	61.5	61.5	62	62	0.0%	0.0%	0.0%	0	165	165	0%	165	165	Average of Difference and Growth		Model routes all to Cedar instead of Walnut
Rocky Ridge Dr	N of Garden Valley	Garden Valley	SB	45	1	1	1	1	0.0%	0.0%	0.0%	0	45	45	0%	45	45	Average of Difference and Growth		TAZ should not decrease
	Garden Valley	N of Garden Valley	NB	85	1	1	1	1	0.0%	0.0%	0.0%	0	85	85	0%	85	85	Average of Difference and Growth		TAZ should not decrease
Cedar St	N of Chestnut	Chestnut	SB	70	53	75	58	79	41.5%	1.7%	36.2%	21	91	95	5%	93	93	Average of Difference and Growth		
	Chestnut	N of Chestnut	NB	65	55	66	58	68	20.0%	0.8%	18.3%	11	76	77	2%	76	76	Average of Difference and Growth		
	Chestnut	S of Chestnut	SB	17	16	14	16	14	-14.6%	-0.6%	-14.6%	-2	15	15	1%	15	15	Average of Difference and Growth		Model routes all to Post instead of Cedar
	S of Chestnut	Chestnut	NB	20	16	17	16	18	10.1%	0.4%	9.5%	2	22	22	2%	22	22	Average of Difference and Growth		Model routes all to Post instead of Cedar
Harvey Ave	W of Stewart	Stewart	EB	165	136	224	157	242	64.7%	2.6%	53.8%	84	249	254	2%	252	252	Average of Difference and Growth		
	Stewart	W of Stewart	WB	260	247	407	285	439	64.8%	2.6%	53.8%	154	414	400	3%	407	407	Average of Difference and Growth		
	Stewart	E of Stewart	EB	110	222	207	218	204	-6.8%	-0.3%	-6.6%	-14	96	103	7%	99	96	Difference Method	To be consistent with method used for opposing direction	
	E of Sewart	Stewart	WB	125	332	403	349	417	21.4%	0.9%	19.5%	68	193	149	26%	171	193	Difference Method	Absolute difference >10% --> Used difference only	
Alameda Ave	Stephens	Vine	EB	120	67	159	89	177	137.3%	5.5%	99.1%	88	208	239	14%	224	208	Difference Method	Absolute difference >10% --> Used difference only	
	Vine	Stephens	WB	115	65	149	85	166	129.2%	5.2%	94.7%	81	196	224	13%	210	196	Difference Method	Absolute difference >10% --> Used difference only	
	Vine	E of Vine	EB	135	85	137	97	147	61.2%	2.4%	51.2%	50	185	204	10%	195	195	Average of Difference and Growth		
	E of Vine	Vine	WB	90	98	155	112	166	58.2%	2.3%	49.0%	55	145	134	8%	139	139	Average of Difference and Growth		
Vine St	N of Alameda	Alameda	SB	100	9	18	11	20	100.0%	4.0%	77.4%	9	109	177	48%	143	143	Average of Difference and Growth		
	Alameda	N of Alameda	NB	70	7	13	8	14	85.7%	3.4%	68.2%	6	76	118	43%	97	97	Average of Difference and Growth		
	Alameda	S of Alameda	SB	120	92	156	107	169	69.6%	2.8%	57.2%	61	181	189	4%	185	181	Difference Method	To be consistent with method used for opposing direction	
	S of Alameda	Alameda	NB	130	74	124	86	134	67.6%	2.7%	55.8%	48	178	203	13%	190	178	Difference Method	Absolute difference >10% --> Used difference only	
Airport Rd	N of Stewart	Stewart	SB	185	37	40	38	41	8.1%	0.3%	7.6%	3	188	199	6%	194	194	Average of Difference and Growth		
	Stewart	N of Stewart	NB	80	37	36	37	36	-2.7%	-0.1%	-2.6%	-1	79	78	1%	78	78	Average of Difference and Growth		
	Stewart	S of Stewart	SB	160	29	38	31	40	31.0%	1.2%	27.7%	9	169	204	19%	187	169	Difference Method	Absolute difference >10% --> Used difference only	
	S of Stewart	Stewart	NB	135	18	20	18	20	11.1%	0.4%	10.4%	2	137	149	8%	143	137	Difference Method	To be consistent with method used for opposing direction	
Broad St	W of Edenbower	Edenbower	EB	55	30	40	32	42	33.3%	1.3%	29.6%	10	65	71	10%	68	65	Difference Method	Absolute difference >10% --> Used difference only	
	Edenbower	W of Edenbower	WB	65	66	84	70	88	27.3%	1.1%	24.6%	17	82	81	2%	82	82	Difference Method	To be consistent with method used for opposing direction	
Exit 127 SB Ramps (Off)	N of Edenbower	Edenbower	SB	290	286	413	316	438	44.4%	1.8%	38.5%	122	412	402	3%	407	412	Difference Method	To be consistent with method used for opposing direction	
Exit 127 SB Ramps (On)	Edenbower	S of Edenbower	SB	545	184	442	246	494	140.2%	5.6%	100.7%	248	793	1094	32%	943	793	Difference Method	Absolute difference >10% --> Used difference only	
Exit 127 NB Ramps (Off)	S of Edenbower	Edenbower	NB	285	130	178	142	188	36.9%	1.5%	32.6%	46	331	378	13%	354	331	Difference Method	Absolute difference >10% --> Used difference only	
Exit 127 NB Ramps (On)	Edenbower	North of Edenbower	NB	115	432	605	474	640	40.0%	1.6%	35.1%	166	281	155	58%	218	281	Difference Method	To be consistent with method used for opposing direction	
Exit 123 SB Ramps (Off)	N of Heritage	Heritage	SB	66	32	55	38	60	71.9%	2.9%	58.8%	22	88	105	17%	96	88	Difference Method		
Exit 123 SB Ramps (On)	Heritage	S of Heritage	SB	21	11	24	14	27	118.2%	4.7%	88.4%	12	33	40	17%	37	33	Difference Method		
Exit 123 NB Ramps (Off)	S of Portland	Portland	NB	25	4	6	4	6	50.0%	2.0%	42.9%	2	27	36	28%	31	27	Difference Method	To be consistent with method used for opposing direction	
Exit 123 NB Ramps (On)	Portland	N of Portland	NB	45	27	50	33	55	85.2%	3.4%	67.9%	22	67	76	12%	71	67	Difference Method	Absolute difference >10% --> Used difference only	
Heritage Way/Portland Av	W of Exit 123 SB Ramps	Exit 123 SB Ramps	EB	25	18	37	23	41	105.6%	4.2%	80.9%	18	43	45	4%	44	43	Difference Method	To be consistent with method used for opposing direction	
	Exit 123 SB Ramps	W of Exit 123 SB Ra	WB	50	15	30	19	33	100.0%	4.0%	77.4%	14	64	89	32%	77	64	Difference Method	Absolute difference >10% --> Used difference only	
	Exit 123 SB Ramps	Exit 123 NB Ramps	EB	45	36	64	43	70	77.8%	3.1%	62.9%	27	72	73	2%	73	73	Average of Difference and Growth		
	Exit 123 NB Ramps	Exit 123 SB Ramps	WB	25	13	18	14	19	38.5%	1.5%	33.8%	5	30	33	12%	32	32	Average of Difference and Growth		
	Exit 123 NB Ramps	E of Exit 123 NB Ra	EB	35	20	32	23	34	60.0%	2.4%	50.3%	12	47	53	12%	50	47	Difference Method	Absolute difference >10% --> Used difference only	
	E of Exit 123 NB Ramps	Exit 123 NB Ramps	WB	35	13	18	14	19	38.5%	1.5%	33.8%	5	40	47	16%	43	40	Difference Method	Absolute difference >10% --> Used difference only	
Aviation Dr	N of Edenbower	Edenbower	SB	250	74	103	81	109	39.2%	1.6%	34.4%	28	278	336	19%	307	278	Difference Method	Absolute difference >10% --> Used difference only	
	Edenbower	N of Edenbower	NB	200	152	259	178	280	70.4%	2.8%	57.8%	103	303	316	4%	309	303	Difference Method	To be consistent with method used for opposing direction	
	Edenbower	S of Edenbower	SB	145	23	31	25	33	34.8%	1.4%	30.8%	8	153	190	22%	171	153	Difference Method	Absolute difference >10% --> Used difference only	
	S of Edenbower	Edenbower	NB	135	86	155	103	169	80.2%	3.2%	64.6%	66	201	222	10%	212	201	Difference Method	Absolute difference >10% --> Used difference only	
	N of Stewart	Stewart	SB	130	196	235	205	243	19.9%	0.8%	18.2%	37	167	154	9%	161	161	Average of Difference and Growth		
	Stewart	N of Stewart	NB	85	141	160	146	164	13.5%	0.5%	12.5%	18	103	96	8%	99	99	Average of Difference and Growth		

Existing Year 2016
Project Forecast Year 2040
Model Base Year 2010
Model Forecast Year 2035

Sidestreets not included in the regional model
Greater than 10% difference between difference and growth methods
Numbers adjusted from model to work with spreadsheet (0 growth = 1)
Previous study intersection

Road	From	To	Direction	Existing 30HV 2016	Model Assignment: Baseline Model 2010	Future Ref Model 2035	Interpolated Model 2016	Forecasted Model 2040	2010-2035 Model Comparison: Total Growth	Annual Growth	2016-2040 Model Comparison: Total Growth	Volume Difference	Post Processed Volumes Future 2040 No Build Year: Volume Difference	Volume Growth	Absolute Difference	Average	Forecast Used	Method Used	Comments	Additional Comments
Mulholland	Stewart	S of Stewart	SB	220	168	492	246	557	192.9%	7.7%	126.6%	311	531	498	6%	515	531	Difference Method	Absolute difference >10% --> Used difference only	
	S of Stewart	Stewart	NB	215	282	522	340	570	85.1%	3.4%	67.8%	230	445	361	21%	403	445	Difference Method	To be consistent with method used for opposing direction	
Stephens St (OR 99)	N of Wilbur	Wilbur	SB	140	133	166	141	173	24.8%	1.0%	22.5%	32	172	171	0%	172	172	Average of Difference and Growth		
	Wilbur	N of Wilbur	NB	245	153	191	162	199	24.8%	1.0%	22.5%	36	281	300	6%	291	291	Average of Difference and Growth		
	Wilbur	Bank	SB	125	132	165	140	172	25.0%	1.0%	22.6%	32	157	153	2%	155	155	Average of Difference and Growth		
	Bank	Wilbur	NB	230	151	190	160	198	25.8%	1.0%	23.3%	37	267	284	6%	276	276	Average of Difference and Growth		
	Bank	S of Bank	SB	130	93	117	99	122	25.8%	1.0%	23.3%	23	153	160	5%	157	157	Average of Difference and Growth		
	S of Bank	Bank	NB	250	117	143	123	148	22.2%	0.9%	20.3%	25	275	301	9%	288	288	Average of Difference and Growth		
	N of Exit 129 NB Ramps	Exit 129 NB Ramps	SB	240	335	335	335	335	0.0%	0.0%	0.0%	0	240	240	0%	240	240	Difference Method	Absolute difference >10% --> Used difference only	Interchange reconstructed between 2010 and 2040
	Exit 129 NB Ramps	N of Exit 129 NB Ran	NB	250	218	218	218	218	0.0%	0.0%	0.0%	0	250	250	0%	250	250	Difference Method	To be consistent with method used for opposing direction	Interchange reconstructed between 2010 and 2040
	Exit 129 NB Ramps	Umpqua College Rd	SB	365	359	457	383	477	27.3%	1.1%	24.6%	94	459	455	1%	457	457	Average of Difference and Growth		Interchange reconstructed between 2010 and 2040
	Umpqua College Rd	Exit 129 NB Ramps	NB	300	152	152	152	152	0.0%	0.0%	0.0%	0	300	300	0%	300	300	Average of Difference and Growth		Interchange reconstructed between 2010 and 2040
	Umpqua College Rd	S of Umpqua College	SB	295	203	450	262	499	121.7%	4.9%	90.4%	237	532	562	5%	547	547	Average of Difference and Growth		Interchange reconstructed between 2010 and 2040
	S of Umpqua College Rd	Umpqua College Rd	NB	325	195	195	195	195	0.0%	0.0%	0.0%	0	325	325	0%	325	325	Difference Method	Absolute difference >10% --> Used difference only	Interchange reconstructed between 2010 and 2040
	N of Kenneth Ford Dr	Kenneth Ford Dr	SB	435	374	524	410	554	40.1%	1.6%	35.1%	144	579	588	2%	583	579	Difference Method	To be consistent with method used for opposing direction	
	Kenneth Ford Dr	N of Kenneth Ford Dr	NB	645	622	845	676	890	35.9%	1.4%	31.7%	214	859	849	1%	854	854	Average of Difference and Growth		
	Kenneth Ford Dr	S of Kenneth Ford Dr	SB	615	374	524	410	554	40.1%	1.6%	35.1%	144	759	831	9%	795	795	Average of Difference and Growth		
	S of Kenneth Ford Dr	Kenneth Ford Dr	NB	610	622	845	676	890	35.9%	1.4%	31.7%	214	824	803	3%	814	814	Average of Difference and Growth		
	N of Edenbower	Edenbower	SB	565	389	721	469	787	85.3%	3.4%	68.0%	319	884	949	7%	916	916	Average of Difference and Growth		
	Edenbower	N of Edenbower	NB	825	657	926	722	980	40.9%	1.6%	35.8%	258	1083	1120	3%	1102	1102	Average of Difference and Growth		
	Edenbower	S of Edenbower	SB	580	381	564	425	601	48.0%	1.9%	41.3%	176	756	820	8%	788	788	Average of Difference and Growth		
	S of Edenbower	Edenbower	NB	850	566	596	573	602	5.3%	0.2%	5.0%	29	879	893	2%	886	886	Average of Difference and Growth		
	N of Newton Creek Rd	Newton Creek Rd	SB	626	304	539	360	586	77.3%	3.1%	62.6%	226	852	1018	18%	935	852	Difference Method	Absolute difference >10% --> Used difference only	
	Newton Creek Rd	N of Newton Creek R	NB	700	541	856	617	919	58.2%	2.3%	49.0%	302	1002	1043	4%	1023	1002	Difference Method	To be consistent with method used for opposing direction	
	Newton Creek Rd	S of Newton Creek R	SB	655	335	575	393	623	71.6%	2.9%	58.7%	230	885	1039	16%	962	885	Difference Method	Absolute difference >10% --> Used difference only	
	S of Newton Creek Rd	Newton Creek Rd	NB	730	630	984	715	1055	56.2%	2.2%	47.5%	340	1070	1077	1%	1073	1070	Difference Method	To be consistent with method used for opposing direction	
	N of Stewart/Alameda																			
	Stewart/Alameda																			
	Stewart/Alameda																			
	S of Stewart/Alameda																			
	N of Chestnut	Chestnut	SB	1170	1295	1756	1406	1848	35.6%	1.4%	31.5%	443	1613	1538	5%	1575	1575	Average of Difference and Growth		
	Chestnut	N of Chestnut	NB	1090	1065	1467	1161	1547	37.7%	1.5%	33.2%	386	1476	1452	2%	1464	1464	Average of Difference and Growth		
	Chestnut	Winchester	SB	1285	1318	1799	1433	1895	36.5%	1.5%	32.2%	462	1747	1699	3%	1723	1723	Average of Difference and Growth		
	Winchester	Chestnut	NB	1205	1081	1481	1177	1561	37.0%	1.5%	32.6%	384	1589	1598	1%	1594	1594	Average of Difference and Growth		
	Winchester	S of Winchester	SB	760	852	1330	967	1426	56.1%	2.2%	47.5%	459	1219	1121	8%	1170	1170	Average of Difference and Growth		
	S of Winchester	Winchester	NB	685	886	1016	917	1042	14.7%	0.6%	13.6%	125	810	778	4%	794	794	Average of Difference and Growth		
	N of Diamond Lake Blvd	Diamond Lake Blvd	SB	655	356	847	474	945	137.9%	5.5%	99.5%	471	1126	1307	15%	1216	1126	Difference Method	Absolute difference >10% --> Used difference only	
	Diamond Lake Blvd	N of Diamond Lake B	NB	580	385	551	425	584	43.1%	1.7%	37.5%	159	739	798	8%	768	739	Difference Method	To be consistent with method used for opposing direction	
	Diamond Lake Blvd	S of Diamond Lake B	SB	855	763	1156	857	1235	51.5%	2.1%	44.0%	377	1232	1231	0%	1232	1232	Average of Difference and Growth		
	S of Diamond Lake Blvd	Diamond Lake Blvd	NB	980	781	1069	850	1127	36.9%	1.5%	32.5%	276	1256	1299	3%	1278	1278	Average of Difference and Growth		
	Mosher	N of Mosher	NB	730	619	718	643	738	16.0%	0.6%	14.8%	95	825	838	2%	831	831	Average of Difference and Growth		
	S of Mosher	Mosher	NB	685	611	704	633	723	15.2%	0.6%	14.1%	89	774	782	1%	778	778	Average of Difference and Growth		
	N of S Gate Shopping Ctr	S Gate Shopping Ctr	SB	581	431	431	431	431	0.0%	0.0%	0.0%	0	581	581	0%	581	581	Average of Difference and Growth		No explanation for decrease - no growth
	S Gate Shopping Ctr	N of S Gate Shopping	NB	480	397	397	397	397	0.0%	0.0%	0.0%	0	480	480	0%	480	480	Average of Difference and Growth		No explanation for decrease - no growth
	S Gate Shopping Ctr	S of S Gate Shopping	SB	536	431	431	431	431	0.0%	0.0%	0.0%	0	536	536	0%	536	536	Average of Difference and Growth		No explanation for decrease - no growth
	S of S Gate Shopping Ctr	S Gate Shopping Ctr	NB	482	397	397	397	397	0.0%	0.0%	0.0%	0	482	482	0%	482	482	Average of Difference and Growth		No explanation for decrease - no growth
S Gate Shopping Ctr	W of Stephens	Stephens	EB	7	1	1	1	1	0.0%	0.0%	0.0%	0	7	7	0%	7	7	Average of Difference and Growth		No Link volume in model - driveway
	Stephens	W of Stephens	WB	4	1	1	1	1	0.0%	0.0%	0.0%	0	4	4	0%	4	4	Average of Difference and Growth		No Link volume in model - driveway
	Stephens	E of Stephens	WB	116	1	1	1	1	0.0%	0.0%	0.0%	0	116	116	0%	116	116	Average of Difference and Growth		No Link volume in model - driveway
	E of Stephens	Stephens	EB	66	1	1	1	1	0.0%	0.0%	0.0%	0	66	66	0%	66	66	Average of Difference and Growth		No Link volume in model - driveway
Pine St	N of Mosher	Mosher	SB	715	757	839	777	855	10.8%	0.4%	10.1%	79	794	787	1%	791	791	Average of Difference and Growth		
	Mosher	S of Mosher	SB	680	463	488	469	493	5.4%	0.2%	5.1%	24	704	715	2%	709	709	Average of Difference and Growth		
Mosher Ave	E of Stephens	Stephens	WB	60	15	18	16	19	20.0%	0.8%	18.3%	3	63	71	12%	67	63	Difference Method	Absolute difference >10% --> Used difference only	
	Stephens	E of Stephens	EB	70	295	345	307	355	16.9%	0.7%	15.6%	48	118	81	37%	99	118	Difference Method	To be consistent with method used for opposing direction	
	Stephens	Pine	WB	50	8	4	7	3	-50.0%	-2.0%	-54.5%	-4	46	23	68%	34	46	Difference Method	Absolute difference >10% --> Used difference only	
	Pine	Stephens	EB	105	296	345	308	355	16.6%	0.7%	15.3%	47	152	121	23%	137	152	Difference Method	To be consistent with method used for opposing direction	
	Pine	W of Pine	WB	55	35	35	35	35	0.0%	0.0%	0.0%	0	55	55	0%	55	55	Average of Difference and Growth		
	W of Pine	Pine	EB	75	29	25	28	24	-13.8%	-0.6%	-13.7%	-4	71	65	9%	68	68	Average of Difference and Growth		
Wilbur Rd	Stephens	W of Stephens	WB	35	1	1	1	1	0.0%	0.0%	0.0%	0	35	35	0%	35	35	Average of Difference and Growth		
	W of Stephens	Stephens	EB	35	2	2	2	2	0.0%	0.0%	0.0%	0	35	35	0%	35	35	Average of Difference and Growth		
Winchester St	Stephens	E of Stephens	EB	530	466	469	467	470	0.6%	0.0%	0.6%	3	533	533	0%	533	533	Difference Method	Absolute difference >10% --> Used difference only	
	E of Stephens	Stephens	WB	525	196	466	261	520	137.8%	5.5%	99.4%	259	784	1047	29%	915	784	Difference Method	To be consistent with method used for opposing direction	
	N of Diamond Lake Blvd	Diamond Lake Blvd	SB	580	733	729	732	728	-0.5%	0.0%	-0.5%	-4	576	577	0%	577	577	Average of Difference and Growth		TPAU STUDIED THIS INTERSECTION
	Diamond Lake Blvd	S of Diamond Lake B	NB	535	604	736	636	762	21.9%	0.9%	19.9%	127	662	642	3%	652	652	Average of Difference and Growth		TPAU STUDIED THIS INTERSECTION
North Bank Rd	Stephens	E of Stephens	EB	60	39	49	41	51	25.6%	1.0%	23.2%	10	70	74	6%	72	72	Average of Difference and Growth		
	E of Stephens	Stephens	WB	45	34	47	37	50	38.2%	1.5%	33.6%	12	57	60	5%	59	59	Average of Difference and Growth		
Exit 129 NB Ramps	Stephens	W of Stephens	WB	145	105	105	105	105	0.0%	0.0%	0.0%	0	145	145	0%	145	145	Average of Difference and Growth		Interchange reconstructed between 2010 and 2040
	W of Stephens	Stephens	EB	220	195	449	256	500	130.3%	5.2%	95.3%	244	464	430	8%	447	447	Average of Difference and Growth		
Exit 129 SB Ramps	N of Del Rio Rd	Del Rio Rd	SB	90	89	181	111	199	103.4%	4.1%	79.5%	88	178	162	10%	170	170	Average of Difference and Growth		
	Del Rio Rd	N of Del Rio rd	NB	240	215	284	232	298	32.1%	1.3%	28.6%	66	306	309	1%	307	307	Average of Difference and Growth		
Umpqua College Rd/Del R	Stephens	Exit 129 SB Ramps	WB	350	312	312	312	312	0.0%	0.0%	0.0%	0	350	350	0%	350	350	Average of Difference and Growth		
	Exit 129 SB Ramps	Stephens	EB	150	113	219	138	240	93.8%	3.8%	73.5%	102	252	260	3%	256	256	Average of Difference and Growth		
	E of Stephens	Stephens	WB	280	200	213	203	216	6.5%	0.3%	6.1%	12	292	297	2%	295	295	Average of Difference and Growth		Interchange reconstructed between 2010 and 2040
	Stephens	E of Stephens	EB	175	84	118	92	125	40.5%	1.6%	35.4%	33	208	237	13%	222	222	Average of Difference and Growth		Interchange reconstructed between 2010 and 2040
	Exit 129 SB Ramps	W of Exit 129 SB Ra	WB	160	125	125	125	125	0.0%	0.0%	0.0%	0	160	160	0%	160	160	Difference Method	Absolute difference >10% --> Used difference only	Interchange reconstructed between 2010 and 2040
	W of Exit 129 SB Ramps	Exit 129 SB Ramps	EB	110	53	78	59	83	47.2%	1.9%	40.7%	24	134	155	14%	144	134	Difference Method	To be consistent with method used for opposing direction	
Kenneth Ford Dr	Stephens	E of Stephens	EB	140	2	14	5	17	537.0%	21.5%	225.2%	12	152	455	100%	303	152	Difference Method		Costco not included in 2010 model - adjust links appropriately
	E of Stephens	Stephens	WB	355	3	9	4	10	240.0%	9.6%	146.2%	6	361	874	83%	617	361	Difference Method		Costco not included in 2010 model - adjust links appropriately
Chestnut Ave	Stephens	W of Stephens	WB	150	54	52	54	52	-3.7%	-0.1%	-3.6%	-2	148	145	2%	146	148	Difference Method	Absolute difference >10% --> Used difference only	
	W of Stephens	Stephens	EB	150	61	81	66	85	32.8%	1.3%	29.2%	19	169	194	14%	181	169	Difference Method	To be consistent with method used for opposing direction	
	E of Cedar	Cedar	WB	76	59	62	60	63	5.1%	0.2%	4.8%	3	79	80	1%	79	79	Average of Difference and Growth		
	Cedar	E of Cedar	EB	80	67	80	70	83	19.4%	0.8%	17.8%	12	92	94	2%	93	93	Average of Difference and Growth		
	Cedar	W of Cedar	WB	60	31	56	37	61	80.6%	3.2%	64.9%	24	84	99	16%	91	84	Difference Method	Absolute difference >10% --> Used difference only	
	W of Cedar	Cedar	EB	56	41	66	47	71	61.0%	2.4%	51.1%	24	80	85	6%	82	80	Difference Method	To be consistent with method used for opposing direction	
Newton Creek Rd	W of Stephens	Stephens	EB	31	1	1	1	1	0.0%	0.0%	0.0%	0	31	31	0%	31	31	Average of Difference and Growth		No Link volume in model - driveway

Existing Year 2016
Project Forecast Year 2040
Model Base Year 2010
Model Forecast Year 2035

Sidestreets not included in the regional model
Greater than 10% difference between difference and growth methods
Numbers adjusted from model to work with spreadsheet (0 growth = 1)
Previous study intersection

Road	From	To	Direction	Existing 30HV 2016	Model Assignment: Baseline Model 2010	Model Assignment: Future Ref Model 2035	Model Assignment: Interpolated Model 2016	Model Assignment: Forecasted Model 2040	2010-2035 Model Comparison: Total Growth	2010-2035 Model Comparison: Annual Growth	2016-2040 Model Comparison: Total Growth	2016-2040 Model Comparison: Volume Difference	Post Processed Volumes Future 2040 No Build Year: Volume Difference	Volume Growth	Absolute Difference	Average	Forecast Used	Method Used	Comments	Additional Comments
	Stephens	W of Stephens	WB	12	1	1	1	1	0.0%	0.0%	0.0%	0	12	12	0%	12	**12**	Average of Difference and Growth		No Link volume in model - driveway
	Stephens	E of Stephens	EB	161	89	128	98	136	43.8%	1.8%	38.1%	37	198	222	11%	210	**210**	Average of Difference and Growth		
	E of Stephens	Stephens	WB	141	32	35	33	36	9.4%	0.4%	8.8%	3	144	153	6%	149	**149**	Average of Difference and Growth		
Oak Ave	Rose St	Jackson St	EB	230	312	389	330	404	24.7%	1.0%	22.4%	74	304	281	8%	293	**293**	Average of Difference and Growth		
	Jackson St	Main St	EB	195	308	385	326	400	25.0%	1.0%	22.6%	74	269	239	12%	254	**254**	Average of Difference and Growth		

N-S ID	Synchro ID	Intersection	Direction	Movement	Int ID	2016 Balanced Volumes PM Peak	2040 NCHRP 255-Base Unbalanced Future Baseline	2040 NCHRP 255-Base Rounded Future Baseline	2040 NCHRP 255-Base Volume Balancing Adjustments	240 NCHRP 255-Base Balanced Future Baseline
1	10	OR 99 @ Wilbur Rd.		EBL	1	30	30	30	0	30
	10		EB	EBT	1	0	0	0	0	0
	10	Count Date: 6/15/2015		EBR	1	5	5	5	0	5
	10			WBL	1	0	0	0	0	0
	10		WB	WBT	1	0	0	0	0	0
	10			WBR	1	0	0	0	0	0
	10	PM Peak Hour: 4:30 PM-5:30 PM		NBL	1	15	14	15	0	15
	10	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	1	215	261	260	0	260
	10			NBR	1	0	0	0	0	0
	10			SBL	1	0	0	0	0	0
	10	PHF:	SB	SBT	1	120	150	150	0	150
	10	0.89		SBR	1	20	21	20	0	20
			TEV	**TEV**	**1**	**405**	**481**	**480**	**0**	**480**
2	20	OR 99 @ N. Bank Rd.		EBL	2	0	0	0	0	0
	20		EB	EBT	2	0	0	0	0	0
	20	Count Date: 6/15/2015		EBR	2	0	0	0	0	0
	20			WBL	2	20	23	25	0	25
	20		WB	WBT	2	0	0	0	0	0
	20			WBR	2	25	36	35	0	35
	20	PM Peak Hour: 4:30 PM-5:30 PM		NBL	2	0	0	0	0	0
	20	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	2	205	240	240	0	240
	20			NBR	2	45	50	50	0	50
	20			SBL	2	15	22	20	0	20
	20	PHF:	SB	SBT	2	110	134	135	0	135
	20	0.94		SBR	2	0	0	0	0	0
			TEV	**TEV**	**2**	**420**	**504**	**505**	**0**	**505**
3	30	I-5 Exit 129 @ NB On/Off Ramps/OR 99		EBL	3	85	127	125	0	125
	30		EB	EBT	3	0	0	0	0	0
	30	Count Date: 5/11/2015		EBR	3	135	259	260	0	260
	30			WBL	3	0	0	0	0	0
	30		WB	WBT	3	0	0	0	0	0
	30			WBR	3	0	0	0	0	0
	30	PM Peak Hour: 4:30 PM-5:30 PM		NBL	3	135	136	135	10	145
	30	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	3	165	123	125	50	175
	30			NBR	3	0	0	0	0	0
	30			SBL	3	0	0	0	0	0
	30	PHF:	SB	SBT	3	230	198	200	40	240
	30	0.96		SBR	3	10	9	10	5	15
			TEV	**TEV**	**3**	**760**	**852**	**855**	**105**	**960**
4	40	I-5 Exit 129 @ SB On/Off Ramps/Del Rio Rd.		EBL	4	25	37	35	0	35
	40		EB	EBT	4	85	111	110	0	110
	40	Count Date: 5/11/2015		EBR	4	0	0	0	0	0
	40			WBL	4	0	0	0	0	0
	40		WB	WBT	4	135	117	115	20	135
	40			WBR2	4	215	270	270	0	270
	40	PM Peak Hour: 4:00 PM-5:00 PM		NBL	4	0	0	0	0	0
	40	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	4	0	0	0	0	0
	40			NBR	4	0	0	0	0	0
	40			SBL	4	65	145	145	0	145
	40	PHF:	SB	SBT	4	0	0	0	0	0
	40	0.85		SBR	4	25	43	45	0	45
			TEV	**TEV**	**4**	**550**	**723**	**720**	**20**	**740**
5	50	OR 99 @ Del Rio Rd. /Umpqua College Rd.		EBL	5	45	55	55	0	55
	50		EB	EBT	5	35	54	55	0	55
	50	Count Date: 6/3/2015		EBR	5	70	164	165	-20	145
	50			WBL	5	85	137	135	0	135
	50		WB	WBT	5	140	131	130	35	165
	50			WBR	5	55	46	45	20	65
	50	PM Peak Hour: 4:30 PM-5:30 PM		NBL	5	70	77	75	15	90
	50	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	5	200	199	200	0	200
	50			NBR	5	55	70	70	0	70
	50			SBL	5	85	99	100	5	105
	50	PHF:	SB	SBT	5	140	246	245	0	245
	50	0.91		SBR	5	140	142	140	10	150
			TEV	**TEV**	**5**	**1120**	**1419**	**1415**	**65**	**1480**
6	60	NE Stephens St. @ Kenneth Ford Dr.		EBL	6	0	0	0	0	0
	60		EB	EBT	6	0	0	0	0	0
	60	Count Date: 6/15/2015		EBR	6	0	0	0	0	0
	60			WBL	6	250	271	270	0	270
	60		WB	WBT	6	0	0	0	0	0
	60			WBR	6	105	99	100	15	115
	60	PM Peak Hour: 4:30 PM-5:30 PM		NBL	6	0	0	0	0	0
	60	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	6	540	755	755	0	755

N-S ID	Synchro ID	Intersection	Direction	Movement	Int ID	2016 Balanced Volumes PM Peak	2040 NCHRP 255-Base Unbalanced Future Baseline	2040 NCHRP 255-Base Rounded Future Baseline	2040 NCHRP 255-Base Volume Balancing Adjustments	240 NCHRP 255-Base Balanced Future Baseline
	60			NBR	6	70	80	80	0	80
	60			SBL	6	70	72	70	10	80
	60	PHF:	SB	SBT	6	365	524	525	0	525
	60	0.96		SBR	6	0	0	0	0	0
			TEV	**TEV**	**6**	**1400**	**1801**	**1800**	**25**	**1825**
7	70	NW Edenbower Blvd. @ NW Broad St.(Draft IAMP 1		EBL	7	25		35	35	35
	70		EB	EBT	7	0		0	0	0
	70	Count Date: 6/11/2015		EBR	7	30		35	35	35
	70			WBL	7	0		0	0	0
	70	**Signalized**	WB	WBT	7	0		0	0	0
	70			WBR	7	0		0	0	0
	70	PM Peak Hour: 4:30 PM-5:30 PM		NBL	7	50		60	60	60
	70	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	7	800		1040	1040	1040
	70			NBR	7	0		0	0	0
	70			SBL	7	0		0	0	0
	70	PHF:	SB	SBT	7	550		685	685	685
	70	0.99		SBR	7	15		20	20	20
			TEV	**TEV**	**7**	**1470**	**0**	**1875**	**1875**	**1875**
8	80	I-5 Exit 127 @ SB On/Off Ramps/NW Edenbower Bl		EBL	8	0		0	0	0
	80		EB	EBT	8	550		645	645	645
	80	Count Date: 6/11/2012		EBR	8	275		430	430	430
	80			WBL	8	270		345	345	345
	80		WB	WBT	8	375		405	405	405
	80			WBR	8	0		0	0	0
	80	PM Peak Hour: 4:30 PM-5:30 PM		NBL	8	0		0	0	0
	80	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	8	0		0	0	0
	80			NBR	8	0		0	0	0
	80			SBL	8	100		100	100	100
	80	PHF:	SB	SBT	8	0		0	0	0
	80	0.93		SBR	8	190		300	300	300
			TEV	**TEV**	**8**	**1760**	**0**	**2225**	**2225**	**2225**
9	90	I-5 Exit 127 @ NB On/Off Ramps/NW Edenbower Bl		EBL	9	0		0	0	0
	90		EB	EBT	9	445		470	470	470
	90	Count Date: 6/11/2012		EBR	9	205		275	275	275
	90			WBL	9	0		0	0	0
	90		WB	WBT	9	600		700	700	700
	90			WBR	9	115		195	195	195
	90	PM Peak Hour: 4:30 PM-5:30 PM		NBL	9	45		50	50	50
	90	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	9	0		5	5	5
	90			NBR	9	240		275	275	275
	90			SBL	9	0		0	0	0
	90	PHF:	SB	SBT	9	0		0	0	0
	90	0.92		SBR	9	0		0	0	0
			TEV	**TEV**	**9**	**1650**	**0**	**1970**	**1970**	**1970**
10	100	NW Edenbower Blvd. @ NW Aviation Dr.(Draft IAMF		EBL	10	100		140	140	140
	100		EB	EBT	10	510		525	525	525
	100	Count Date: 6/11/2012		EBR	10	75		80	80	80
	100			WBL	10	30		30	30	30
	100		WB	WBT	10	495		615	615	615
	100			WBR	10	75		110	110	110
	100	PM Peak Hour: 6:00 PM-7:00 PM		NBL	10	65		95	95	95
	100	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	10	25		45	45	45
	100			NBR	10	45		60	60	60
	100			SBL	10	55		55	55	55
	100	PHF:	SB	SBT	10	40		40	40	40
	100	0.93		SBR	10	155		185	185	185
			TEV	**TEV**	**10**	**1670**	**0**	**1980**	**1980**	**1980**
11	110	NW Edenbower Blvd @ NE Stephens St.(Draft IAMF		EBL	11	340		340	340	340
	110		EB	EBT	11	5		10	10	10
	110	Count Date: 6/11/2015		EBR	11	250		285	285	285
	110			WBL	11	5		5	5	5
	110		WB	WBT	11	10		15	15	15
	110			WBR	11	5		5	5	5
	110	PM Peak Hour: 4:30 PM-5:30 PM		NBL	11	295		385	385	385
	110	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	11	395		435	435	435
	110			NBR	11	5		5	5	5
	110			SBL	11	5		5	5	5
	110	PHF:	SB	SBT	11	375		435	435	435
	110	0.94		SBR	11	295		355	355	355
			TEV	**TEV**	**11**	**1985**	**0**	**2280**	**2280**	**2280**
12	120	NE Stephens St. @ NE Newton Creek Rd.		EBL	12	15	14	15	0	15
	120		EB	EBT	12	1	1	0	1	1

Project: Roseburg TSP Update
Job #: ODOT 00000888
Subject: *PM Turning Movement Volumes*

11/3/2017

N-S ID	Synchro ID	Intersection	Direction	Movement	Int ID	2016 Balanced Volumes PM Peak	2040 NCHRP 255-Base Unbalanced Future Baseline	2040 NCHRP 255-Base Rounded Future Baseline	2040 NCHRP 255-Base Volume Balancing Adjustments	240 NCHRP 255-Base Balanced Future Baseline
	120	Count Date: 5/14/2015		EBR	12	15	16	15	0	15
	120			WBL	12	75	84	85	0	85
	120		WB	WBT	12	1	1	0	1	1
	120			WBR	12	65	65	65	0	65
	120	PM Peak Hour: 4:00 PM-5:00 PM		NBL	12	10	10	10	0	10
	120	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	12	620	923	925	0	925
	120			NBR	12	100	139	140	0	140
	120			SBL	12	60	70	70	0	70
	120	PHF:	SB	SBT	12	565	786	785	0	785
	120	0.97		SBR	12	1	1	0	1	1
			TEV	**TEV**	**12**	**1528**	**2110**	**2110**	**3**	**2113**
13	130	NW Stewart Pkwy. @ NW Edenbower Blvd.(Draft IA		EBL	13	665		890	890	890
	130		EB	EBT	13	375		570	570	570
	130	Count Date: 6/12/2012		EBR	13	15		25	25	25
	130			WBL	13	85		130	130	130
	130		WB	WBT	13	335		415	415	415
	130			WBR	13	70		85	85	85
	130	PM Peak Hour: 4:30 PM-5:30 PM		NBL	13	35		35	35	35
	130	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	13	165		175	175	175
	130			NBR	13	105		130	130	130
	130			SBL	13	55		80	80	80
	130	PHF:	SB	SBT	13	60		90	90	90
	130	0.93		SBR	13	465		545	545	545
			TEV	**TEV**	**13**	**2430**	**0**	**3170**	**3170**	**3170**
14	140	NW Garden Valley Blvd. @ Melrose Rd.		EBL	14	55	69	70	0	70
	140		EB	EBT	14	1	1	0	1	1
	140	Count Date: 5/18/2015		EBR	14	185	223	225	0	225
	140			WBL	14	5	4	5	5	10
	140		WB	WBT	14	1	1	0	1	1
	140			WBR	14	1	1	0	1	1
	140	PM Peak Hour: 4:45 PM-5:45 PM		NBL	14	335	437	435	0	435
	140	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	14	380	634	635	-5	630
	140			NBR	14	10	15	15	0	15
	140			SBL	14	1	1	0	5	5
	140	PHF:	SB	SBT	14	260	369	370	0	370
	140	0.97		SBR	14	65	75	75	0	75
			TEV	**TEV**	**14**	**1299**	**1830**	**1830**	**8**	**1838**
15	150	NW Garden Valley Blvd. @ NW Troost St.		EBL	15	5	4	5	0	5
	150		EB	EBT	15	420	577	575	0	575
	150	Count Date: 5/18/2015		EBR	15	25	21	20	5	25
	150			WBL	15	190	235	235	0	235
	150		WB	WBT	15	695	1,052	1050	0	1050
	150			WBR	15	15	18	20	0	20
	150	PM Peak Hour: 4:45 PM-5:45 PM		NBL	15	25	23	25	0	25
	150	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	15	1	1	0	1	1
	150			NBR	15	165	202	200	0	200
	150			SBL	15	40	46	45	0	45
	150	PHF:	SB	SBT	15	5	4	5	0	5
	150	0.96		SBR	15	5	4	5	0	5
			TEV	**TEV**	**15**	**1591**	**2188**	**2185**	**6**	**2191**
16	160	NW Garden Valley Blvd. @ NW Kline St.		EBL	16	10	17	15	0	15
	160		EB	EBT	16	600	772	770	0	770
	160	Count Date: 5/18/2015		EBR	16	35	39	40	0	40
	160			WBL	16	75	63	65	0	65
	160		WB	WBT	16	855	1,233	1235	0	1235
	160			WBR	16	190	238	240	0	240
	160	PM Peak Hour: 4:30 PM-5:30 PM		NBL	16	45	58	60	0	60
	160	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	16	20	22	20	0	20
	160			NBR	16	115	100	100	0	100
	160			SBL	16	240	295	295	0	295
	160	PHF:	SB	SBT	16	20	21	20	0	20
	160	0.94		SBR	16	25	46	45	0	45
			TEV	**TEV**	**16**	**2230**	**2905**	**2905**	**0**	**2905**
17	170	NW Garden Valley Blvd. @ Roseburg Valley Mall (M		EBL	17	15	8	10	20	30
	170		EB	EBT	17	940	1,277	1275	-90	1185
	170	Count Date: 5/19/2015		EBR	17	0	0	0	0	0
	170			WBL	17	0	0	0	0	0
	170		WB	WBT	17	1100	1,523	1525	-10	1515
	170			WBR	17	75	82	80	10	90
	170	PM Peak Hour: 4:30 PM-5:30 PM		NBL	17	0	0	0	0	0
	170	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	17	0	0	0	0	0
	170			NBR	17	0	0	0	0	0
	170			SBL	17	15	41	40	0	40

N-S ID	Synchro ID	Intersection	Direction	Movement	Int ID	2016 Balanced Volumes PM Peak	2040 NCHRP 255-Base Unbalanced Future Baseline	2040 NCHRP 255-Base Rounded Future Baseline	2040 NCHRP 255-Base Volume Balancing Adjustments	240 NCHRP 255-Base Balanced Future Baseline
	170	PHF:	SB	SBT	17	0	0	0	0	0
	170	0.92		SBR	17	20	27	25	0	25
			TEV	**TEV**	**17**	**2165**	**2958**	**2955**	**-70**	**2885**
18	180	NW Stewart Pkwy. @ Roseburg Mall Entrance/Walm		EBL	18	50	64	65	0	65
	180		EB	EBT	18	20	21	20	0	20
	180	Count Date: 5/19/2015		EBR	18	30	36	35	0	35
	180			WBL	18	185	201	200	0	200
	180		WB	WBT	18	10	14	15	0	15
	180			WBR	18	55	63	65	0	65
	180	PM Peak Hour: 4:45 PM-5:45 PM		NBL	18	50	77	75	0	75
	180	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	18	675	872	870	0	870
	180			NBR	18	175	186	185	0	185
	180			SBL	18	55	65	65	0	65
	180	PHF:	SB	SBT	18	955	1,296	1295	0	1295
	180	0.93		SBR	18	20	34	35	0	35
			TEV	**TEV**	**18**	**2280**	**2928**	**2925**	**0**	**2925**
19	190	NW Stewart Pkwy. @ NW Aviation Dr. /NW Mullholla		EBL	19	20	43	45	0	45
	190		EB	EBT	19	445	820	820	0	820
	190	Count Date: 2/27/2013		EBR	19	90	363	365	0	365
	190			WBL	19	80	96	95	0	95
	190		WB	WBT	19	370	620	620	0	620
	190			WBR	19	35	22	20	15	35
	190	PM Peak Hour: 5:15 PM-6:15 PM		NBL	19	110	336	335	0	335
	190	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	19	30	35	35	0	35
	190			NBR	19	75	75	75	0	75
	190			SBL	19	55	37	35	20	55
	190	PHF:	SB	SBT	19	50	73	75	0	75
	190	0.85		SBR	19	25	51	50	0	50
			TEV	**TEV**	**19**	**1385**	**2568**	**2570**	**35**	**2605**
20	200	NW Garden Valley Blvd. @ NW Stewart Pkwy.(Draft		EBL	20	300	450	450	450	450
	200		EB	EBT	20	545	725	725	725	725
	200	Count Date: 9/27/2012		EBR	20	65	95	95	95	95
	200			WBL	20	330	390	390	390	390
	200		WB	WBT	20	830	1040	1040	1040	1040
	200			WBR	20	295	335	335	335	335
	200	PM Peak Hour: 4:30 PM-5:30 PM		NBL	20	105	150	150	150	150
	200	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	20	310	400	400	400	400
	200			NBR	20	195	240	240	240	240
	200			SBL	20	440	420	420	420	420
	200	PHF:	SB	SBT	20	365	400	400	400	400
	200	0.93		SBR	20	360	435	435	435	435
			TEV	**TEV**	**20**	**4140**	**5080**	**5080**	**5080**	**5080**
21	210	NW Stewart Pkwy. @ NW Valley View Dr.		EBL	21	80	128	130	0	130
	210		EB	EBT	21	0	0	0	0	0
	210	Count Date: 6/10/2015		EBR	21	80	116	115	0	115
	210			WBL	21	0	0	0	0	0
	210		WB	WBT	21	0	0	0	0	0
	210			WBR	21	0	0	0	0	0
	210	PM Peak Hour: 4:45 PM-5:45 PM		NBL	21	35	59	60	0	60
	210	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	21	505	636	635	0	635
	210			NBR	21	0	0	0	0	0
	210			SBL	21	0	0	0	0	0
	210	PHF:	SB	SBT	21	605	725	725	0	725
	210	0.91		SBR	21	190	333	335	0	335
			TEV	**TEV**	**21**	**1495**	**1996**	**2000**	**0**	**2000**
22	220	NW Stewart Pkwy. @ NE Airport Rd.		EBL	22	50	59	60	0	60
	220		EB	EBT	22	480	833	835	0	835
	220	Count Date: 5/21/2015		EBR	22	85	112	110	0	110
	220			WBL	22	30	28	30	0	30
	220		WB	WBT	22	280	514	515	0	515
	220			WBR	22	5	4	5	0	5
	220	PM Peak Hour: 4:15 PM-5:15 PM		NBL	22	65	85	85	0	85
	220	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	22	25	15	15	0	15
	220			NBR	22	45	39	40	0	40
	220			SBL	22	15	13	15	0	15
	220	PHF:	SB	SBT	22	45	29	30	0	30
	220	0.88		SBR	22	125	156	155	0	155
			TEV	**TEV**	**22**	**1250**	**1886**	**1895**	**0**	**1895**
22.5	225	NW Stewart Pkwy. @ NE Stephens St.		EBL	22.5	225				360
	225		EB	EBT	22.5	40				70
	225	Count Date:		EBR	22.5	275				460
	225			WBL	22.5	60				100

N-S ID	Synchro ID	Intersection	Direction	Movement	Int ID	2016 Balanced Volumes PM Peak	2040 NCHRP 255-Base Unbalanced Future Baseline	2040 NCHRP 255-Base Rounded Future Baseline	2040 NCHRP 255-Base Volume Balancing Adjustments	240 NCHRP 255-Base Balanced Future Baseline
	225		WB	WBT	22.5	40				70
	225			WBR	22.5	15				25
	225	PM Peak Hour: 3:00 PM-4:00 PM		NBL	22.5	260				400
	225	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	22.5	800				900
	225			NBR	22.5	40				70
	225			SBL	22.5	40				65
	225	PHF:	SB	SBT	22.5	580				590
	225	#DIV/0!		SBR	22.5	15				75
			TEV	**TEV**	**22.5**	**2390**	**0**	**0**	**0**	**3185**
23	230	NE Vine St. @ NE Alameda Ave.		EBL	23	15	27	25	0	25
	230		EB	EBT	23	70	116	115	0	115
	230	Count Date: 6/8/2015		EBR	23	35	65	65	0	65
	230			WBL	23	25	33	35	0	35
	230		WB	WBT	23	55	93	95	0	95
	230			WBR	23	10	13	15	0	15
	230	PM Peak Hour: 4:30 PM-5:30 PM		NBL	23	40	67	65	0	65
	230	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	23	45	57	55	0	55
	230			NBR	23	45	53	55	0	55
	230			SBL	23	20	25	25	0	25
	230	PHF:	SB	SBT	23	60	83	85	0	85
	230	0.93		SBR	23	20	35	35	0	35
			TEV	**TEV**	**23**	**440**	**668**	**670**	**0**	**670**
24	240	NW Troost St. @ NW Calkins Rd.		EBL	24	25	34	35	0	35
	240		EB	EBT	24	10	26	25	0	25
	240	Count Date: 5/19/2015		EBR	24	0	0	0	5	5
	240			WBL	24	50	122	120	0	120
	240		WB	WBT	24	25	95	95	0	95
	240			WBR	24	35	68	70	0	70
	240	PM Peak Hour: 4:15 PM-5:15 PM		NBL	24	1	2	0	5	5
	240	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	24	35	38	40	0	40
	240			NBR	24	20	41	40	0	40
	240			SBL	24	35	46	45	0	45
	240	PHF:	SB	SBT	24	60	51	50	10	60
	240	0.84		SBR	24	30	40	40	0	40
			TEV	**TEV**	**24**	**326**	**564**	**560**	**20**	**580**
25	250	NW Keasey St. @ NW Calkins Rd.		EBL	25	20	29	30	0	30
	250		EB	EBT	25	0	0	0	0	0
	250	Count Date: 6/9/2015		EBR	25	70	89	90	0	90
	250			WBL	25	0	0	0	0	0
	250		WB	WBT	25	0	0	0	0	0
	250			WBR	25	0	0	0	0	0
	250	PM Peak Hour: 5:15 PM-6:15 PM		NBL	25	85	119	120	0	120
	250	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	25	50	69	70	0	70
	250			NBR	25	0	0	0	0	0
	250			SBL	25	0	0	0	0	0
	250	PHF:	SB	SBT	25	85	104	105	0	105
	250	0.93		SBR	25	45	64	65	0	65
			TEV	**TEV**	**25**	**355**	**474**	**480**	**0**	**480**
26	260	NW Garden Valley Blvd. @ NW Goetz Street/Duck F		EBL	26	40	42	40	0	40
	260		EB	EBT	26	1090	1,459	1460	0	1460
	260	Count Date: 4/25/2016		EBR	26	50	53	55	0	55
	260			WBL	26	35	32	30	5	35
	260		WB	WBT	26	1295	1,484	1485	0	1485
	260			WBR	26	10	9	10	0	10
	260	PM Peak Hour: 4:30 PM-5:30 PM		NBL	26	110	111	110	0	110
	260	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	26	5	4	5	0	5
	260			NBR	26	50	50	50	0	50
	260			SBL	26	10	10	10	0	10
	260	PHF:	SB	SBT	26	1	1	0	5	5
	260	0.97		SBR	26	10	10	10	0	10
			TEV	**TEV**	**26**	**2706**	**3265**	**3265**	**10**	**3275**
27	270	NW Garden Valley Blvd. @ Centennial Dr./NE Estel		EBL	27	15				30
	270		EB	EBT	27	1100				1215
	270	Count Date: 10/8/2014		EBR	27	35				100
	270			WBL	27	35				70
	270		WB	WBT	27	1215				1280
	270			WBR	27	15				25
	270	PM Peak Hour: 4:30 PM-5:30 PM		NBL	27	85				160
	270	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	27	5				5
	270			NBR	27	155				235
	270			SBL	27	25				40
	270	PHF:	SB	SBT	27	1				1
	270	0.95		SBR	27	40				65

N-S ID	Synchro ID	Intersection	Direction	Movement	Int ID	2016 Balanced Volumes PM Peak	2040 NCHRP 255-Base Unbalanced Future Baseline	2040 NCHRP 255-Base Rounded Future Baseline	2040 NCHRP 255-Base Volume Balancing Adjustments	240 NCHRP 255-Base Balanced Future Baseline
			TEV	**TEV**	**27**	**2726**	**0**	**0**	**0**	**3226**
28	280	NW Garden Valley Blvd. @ Garden Valley Shopping		EBL	28	160				235
	280		EB	EBT	28	1120				1270
	280	Count Date:		EBR	28	5				5
	280			WBL	28	5				5
	280		WB	WBT	28	1070				1275
	280			WBR	28	55				55
	280	PM Peak Hour: 3:00 PM-4:00 PM		NBL	28	15				25
	280	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	28	5				5
	280			NBR	28	25				25
	280			SBL	28	305				315
	280	PHF:	SB	SBT	28	1				1
	280	#DIV/0!		SBR	28	145				305
			TEV	**TEV**	**28**	**2911**	**0**	**0**	**0**	**3521**
29	290	I-5 Exit 125 @ SB On-Ramp/NW Garden Valley Blvd		EBL	29	0		0	0	0
	290		EB	EBT	29	1625		1875	1875	1875
	290	Count Date: 10/1/2012		EBR	29	605		630	630	630
	290			WBL	29	0		0	0	0
	290		WB	WBT	29	1385		1570	1570	1570
	290			WBR	29	290		530	530	530
	290	PM Peak Hour: 4:30 PM-5:30 PM		NBL	29	0		0	0	0
	290	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	29	0		0	0	0
	290			NBR	29	0		0	0	0
	290			SBL	29	100		145	145	145
	290	PHF:	SB	SBT	29	0		0	0	0
	290	0.92		SBR	29	140		190	190	190
			TEV	**TEV**	**29**	**4145**	**0**	**4940**	**4940**	**4940**
30	300	I-5 Exit 125 @ NB Off-Ramp/NW Garden Valley Blvd		EBL	30	50		65	65	65
	300		EB	EBT	30	825		955	955	955
	300	Count Date: 10/1/2012		EBR	30	160		230	230	230
	300			WBL	30	**130**		**165**	165	165
	300		WB	WBT	30	1080		1355	1355	1355
	300			WBR	30	25		40	40	40
	300	PM Peak Hour: 4:30 PM-5:30 PM		NBL	30	485		560	560	560
	300	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	30	160		225	225	225
	300			NBR	30	245		315	315	315
	300			SBL	30	35		45	45	45
	300	PHF:	SB	SBT	30	0		0	0	0
	300	0.96		SBR	30	240		265	265	265
			TEV	**TEV**	**30**	**3435**	**0**	**4220**	**4220**	**4220**
31	310	NE Garden Valley Blvd. @ NE Airport Rd./NE Cedar		EBL	31	115		130	130	130
	310		EB	EBT	31	825		970	970	970
	310	Count Date: 9/27/2012		EBR	31	75		105	105	105
	310			WBL	31	40		50	50	50
	310		WB	WBT	31	855		1055	1055	1055
	310			WBR	31	30		30	30	30
	310	PM Peak Hour: 4:15 PM-5:15 PM		NBL	31	95		130	130	130
	310	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	31	40		45	45	45
	310			NBR	31	40		50	50	50
	310			SBL	31	55		60	60	60
	310	PHF:	SB	SBT	31	60		75	75	75
	310	0.98		SBR	31	75		90	90	90
			TEV	**TEV**	**31**	**2305**	**0**	**2790**	**2790**	**2790**
32	320	NE Garden Valley Blvd. @ NE Walnut Street		EBL	32	40	41	40	0	40
	320		EB	EBT	32	825	1,043	1045	0	1045
	320	Count Date: 4/25/2016		EBR	32	50	55	55	0	55
	320			WBL	32	35	35	35	0	35
	320		WB	WBT	32	800	957	955	0	955
	320			WBR	32	5	5	5	0	5
	320	PM Peak Hour: 4:30 PM-5:30 PM		NBL	32	110	112	110	0	110
	320	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	32	5	4	5	0	5
	320			NBR	32	50	49	50	0	50
	320			SBL	32	5	5	5	0	5
	320	PHF:	SB	SBT	32	1	1	0	1	1
	320	0.96		SBR	32	10	10	10	0	10
			TEV	**TEV**	**32**	**1936**	**2318**	**2315**	**1**	**2316**
33	330	***NE Garden Valley Blvd. @ NE Stephens St.(Draf***		EBL	33	225		280	280	280
	330		EB	EBT	33	210		285	285	285
	330	Count Date: 9/27/2012		EBR	33	325		340	340	340
	330			WBL	33	255		325	325	325
	330		WB	WBT	33	220		300	300	300
	330			WBR	33	35		50	50	50

Project: Roseburg TSP Update
Job #: ODOT 00000888
Subject: *PM Turning Movement Volumes*

11/3/2017

N-S ID	Synchro ID	Intersection	Direction	Movement	Int ID	2016 Balanced Volumes PM Peak	2040 NCHRP 255-Base Unbalanced Future Baseline	2040 NCHRP 255-Base Rounded Future Baseline	2040 NCHRP 255-Base Volume Balancing Adjustments	240 NCHRP 255-Base Balanced Future Baseline
	330	PM Peak Hour: 4:45 PM-5:45 PM		NBL	33	525		595	595	595
	330	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	33	875		1075	1075	1075
	330			NBR	33	45		60	60	60
	330			SBL	33	30		45	45	45
	330	PHF:	SB	SBT	33	705		865	865	865
	330	0.84		SBR	33	180		240	240	240
			TEV	**TEV**	**33**	**3630**	**0**	**4460**	**4460**	**4460**
34	340	NE Garden Valley Blvd. @ NE Rocky Ridge Dr.		EBL	34	80	80	80	0	80
	340		EB	EBT	34	165	195	195	0	195
	340	Count Date: 6/9/2015		EBR	34	0	0	0	0	0
	340			WBL	34	0	0	0	0	0
	340		WB	WBT	34	90	90	90	0	90
	340			WBR	34	5	5	5	0	5
	340	PM Peak Hour: 4:00 PM-5:00 PM		NBL	34	0	0	0	0	0
	340	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	34	0	0	0	0	0
	340			NBR	34	0	0	0	0	0
	340			SBL	34	5	5	5	0	5
	340	PHF:	SB	SBT	34	0	0	0	0	0
	340	0.72		SBR	34	40	40	40	0	40
			TEV	**TEV**	**34**	**385**	**416**	**415**	**0**	**415**
35	350	NW Stewart Pkwy. @ NW Harvey Ave.		EBL	35	25	49	50	0	50
	350		EB	EBT	35	20	22	20	0	20
	350	Count Date: 5/19/2015		EBR	35	120	179	180	0	180
	350			WBL	35	45	56	55	0	55
	350		WB	WBT	35	15	31	30	0	30
	350			WBR	35	65	106	105	0	105
	350	PM Peak Hour: 4:45 PM-5:45 PM		NBL	35	205	299	300	0	300
	350	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	35	470	543	545	0	545
	350			NBR	35	20	13	15	0	15
	350			SBL	35	70	61	60	0	60
	350	PHF:	SB	SBT	35	595	697	695	0	695
	350	0.88		SBR	35	40	77	75	0	75
			TEV	**TEV**	**35**	**1690**	**2132**	**2130**	**0**	**2130**
36	360	NE Chestnut Ave. @ NE Cedar St.		EBL	36	20	34	35	0	35
	360		EB	EBT	36	35	43	45	0	45
	360	Count Date: 6/9/2015		EBR	36	1	1	0	1	1
	360			WBL	36	1	0	0	1	1
	360		WB	WBT	36	40	46	45	0	45
	360			WBR	36	35	31	30	5	35
	360	PM Peak Hour: 4:15 PM-5:15 PM		NBL	36	5	7	5	5	10
	360	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	36	10	11	10	0	10
	360			NBR	36	5	4	5	0	5
	360			SBL	36	40	47	45	0	45
	360	PHF:	SB	SBT	36	15	13	15	0	15
	360	0.72		SBR	36	15	31	30	0	30
			TEV	**TEV**	**36**	**222**	**268**	**265**	**12**	**277**
37	370	NE Stephens St. @ NE Chestnut Ave.		EBL	37	10	10	10	0	10
	370		EB	EBT	37	0	0	0	1	1
	370	Count Date: 5/20/2015		EBR	37	140	160	160	0	160
	370			WBL	37	0	0	0	1	1
	370		WB	WBT	37	0	0	0	1	1
	370			WBR	37	0	0	0	1	1
	370	PM Peak Hour: 4:45 PM-5:45 PM		NBL	37	125	126	125	0	125
	370	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	37	1080	1,454	1455	0	1455
	370			NBR	37	0	0	0	1	1
	370			SBL	37	0	0	0	1	1
	370	PHF:	SB	SBT	37	1145	1,563	1565	0	1565
	370	0.90		SBR	37	25	22	20	0	20
			TEV	**TEV**	**37**	**2525**	**3335**	**3335**	**6**	**3341**
38	380	NE Stephens St. @ NE Winchester St.		EBL	38	0	0	0	0	0
	380		EB	EBT	38	0	0	0	0	0
	380	Count Date: 5/20/2015		EBR	38	0	0	0	0	0
	380			WBL	38	0	0	0	0	0
	380		WB	WBT	38	0	0	0	0	0
	380			WBR	38	525	794	795	0	795
	380	PM Peak Hour: 4:15 PM-5:15 PM		NBL	38	0	0	0	0	0
	380	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	38	680	800	800	0	800
	380			NBR	38	5	3	5	0	5
	380			SBL	38	525	529	530	0	530
	380	PHF:	SB	SBT	38	760	1,170	1170	0	1170
	380	0.89		SBR	38	0	0	0	0	0
			TEV	**TEV**	**38**	**2495**	**3296**	**3300**	**0**	**3300**

N-S ID	Synchro ID	Intersection	Direction	Movement	Int ID	2016 Balanced Volumes PM Peak	2040 NCHRP 255-Base Unbalanced Future Baseline	2040 NCHRP 255-Base Rounded Future Baseline	2040 NCHRP 255-Base Volume Balancing Adjustments	240 NCHRP 255-Base Balanced Future Baseline
39	390	NE Lincoln St. @ NE Malheur Ave.		EBL	39	1	1	0	1	1
	390		EB	EBT	39	5	5	5	0	5
	390	Count Date: 6/16/2015		EBR	39	1	1	0	1	1
	390			WBL	39	2	2	0	5	5
	390		WB	WBT	39	2	2	0	5	5
	390			WBR	39	25	25	25	0	25
	390	PM Peak Hour: 4:30 PM-5:30 PM		NBL	39	2	2	0	5	5
	390	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	39	25	25	25	0	25
	390			NBR	39	5	6	5	0	5
	390			SBL	39	40	42	40	5	45
	390	PHF:	SB	SBT	39	55	55	55	0	55
	390	0.72		SBR	39	5	5	5	0	5
			TEV	**TEV**	**39**	**168**	**171**	**160**	**22**	**182**
40	400	W. Harvard Ave. @ Lookingglass Rd.		EBL	40	0	0	0	0	0
	400		EB	EBT	40	155	211	210	5	215
	400	Count Date: 5/14/2015		EBR	40	5	5	5	5	10
	400			WBL	40	280	504	505	0	505
	400		WB	WBT	40	260	376	375	5	380
	400			WBR	40	0	0	0	0	0
	400	PM Peak Hour: 4:30 PM-5:30 PM		NBL	40	10	9	10	0	10
	400	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	40	0	0	0	0	0
	400			NBR	40	180	274	275	0	275
	400			SBL	40	0	0	0	0	0
	400	PHF:	SB	SBT	40	0	0	0	0	0
	400	0.93		SBR	40	0	0	0	0	0
			TEV	**TEV**	**40**	**890**	**1379**	**1380**	**15**	**1395**
41	410	W. Harvard Ave. @ W. Broccoli St.		EBL	41	10	13	15	0	15
	410		EB	EBT	41	320	465	465	0	465
	410	Count Date: 6/5/2015		EBR	41	5	12	10	0	10
	410			WBL	41	65	149	150	0	150
	410		WB	WBT	41	510	851	850	0	850
	410			WBR	41	55	65	65	0	65
	410	PM Peak Hour: 5:00 PM-6:00 PM		NBL	41	2	4	5	0	5
	410	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	41	1	1	0	1	1
	410			NBR	41	45	74	75	0	75
	410			SBL	41	45	48	50	0	50
	410	PHF:	SB	SBT	41	5	9	10	0	10
	410	0.92		SBR	41	25	32	30	0	30
			TEV	**TEV**	**41**	**1088**	**1724**	**1725**	**1**	**1726**
42	420	W. Harvard Ave. @ NW Stewart Pkwy.(Draft IAMP 1		EBL	42	220		270	270	270
	420		EB	EBT	42	375		515	515	515
	420	Count Date: 10/2/2012		EBR	42	1		2	2	2
	420			WBL	42	1		2	2	2
	420		WB	WBT	42	515		715	715	715
	420			WBR	42	555		655	655	655
	420	PM Peak Hour: 4:45 PM-5:45 PM		NBL	42	10		10	10	10
	420	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	42	20		20	20	20
	420			NBR	42	10		10	10	10
	420			SBL	42	440		465	465	465
	420	PHF:	SB	SBT	42	5		5	5	5
	420	0.93		SBR	42	300		335	335	335
			TEV	**TEV**	**42**	**2452**	**0**	**3004**	**3004**	**3004**
43	430	W. Harvard Ave. @ W. Keady Ct.		EBL	43	1	0	0	1	1
	430		EB	EBT	43	795	1,037	1035	0	1035
	430	Count Date: 6/10/2015		EBR	43	20	18	20	0	20
	430			WBL	43	40	43	45	0	45
	430		WB	WBT	43	865	1,325	1325	0	1325
	430			WBR	43	1	0	0	1	1
	430	PM Peak Hour: 4:30 PM-5:30 PM		NBL	43	55	56	55	0	55
	430	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	43	1	0	0	1	1
	430			NBR	43	75	76	75	0	75
	430			SBL	43	1	0	0	1	1
	430	PHF:	SB	SBT	43	1	0	0	1	1
	430	0.87		SBR	43	1	0	0	1	1
			TEV	**TEV**	**43**	**1856**	**2555**	**2555**	**6**	**2561**
44	440	W. Harvard Ave. @ Centennial Dr.		EBL	44	20	20	20	5	25
	440		EB	EBT	44	850	1,102	1100	0	1100
	440	Count Date: 6/10/2015		EBR	44	0	0	0	0	0
	440			WBL	44	0	0	0	0	0
	440		WB	WBT	44	875	1,271	1270	0	1270
	440			WBR	44	50	85	85	0	85
	440	PM Peak Hour: 4:30 PM-5:30 PM		NBL	44	0	0	0	0	0
	440	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	44	0	0	0	0	0

N-S ID	Synchro ID	Intersection	Direction	Movement	Int ID	2016 Balanced Volumes PM Peak	2040 NCHRP 255-Base Unbalanced Future Baseline	2040 NCHRP 255-Base Rounded Future Baseline	2040 NCHRP 255-Base Volume Balancing Adjustments	240 NCHRP 255-Base Balanced Future Baseline
	440			NBR	44	0	0	0	0	0
	440			SBL	44	105	446	445	0	445
	440	PHF:	SB	SBT	44	0	0	0	0	0
	440	0.88		SBR	44	35	96	95	0	95
			TEV	**TEV**	**44**	**1935**	**3019**	**3015**	**5**	**3020**
45	450	W. Harvard Ave. @ W. Maple St.(Draft IAMP 124)		EBL	45	5		5	0	5
	450		EB	EBT	45	1105		1390	0	1390
	450	Count Date: 10/10/2012		EBR	45	0		0	0	0
	450			WBL	45	0		0	0	0
	450		WB	WBT	45	1195		1520	0	1520
	450			WBR	45	15		30	0	30
	450	PM Peak Hour: 4:45 PM-5:45 PM		NBL	45	0		0	0	0
	450	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	45	0		0	0	0
	450			NBR	45	0		0	0	0
	450			SBL	45	15		40	0	40
	450	PHF:	SB	SBT	45	0		0	0	0
	450	0.86		SBR	45	10		20	0	20
			TEV	**TEV**	**45**	**2345**	**0**	**3005**	**0**	**3005**
46	460	W. Harvard Ave. @ W. Harrison St.(Draft IAMP 124)		EBL	46	5		10	0	10
	460		EB	EBT	46	1100		1410	0	1410
	460	Count Date: 10/3/2012		EBR	46	15		15	0	15
	460			WBL	46	10		10	0	10
	460		WB	WBT	46	1165		1505	0	1505
	460			WBR	46	20		20	0	20
	460	PM Peak Hour: 4:45 PM-5:45 PM		NBL	46	20		20	0	20
	460	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	46	1		2	0	2
	460			NBR	46	30		30	0	30
	460			SBL	46	20		20	0	20
	460	PHF:	SB	SBT	46	1		2	0	2
	460	0.83		SBR	46	25		25	0	25
			TEV	**TEV**	**46**	**2412**	**0**	**3069**	**0**	**3069**
47	470	W. Harvard Ave. @ W. Umpqua St.(Draft IAMP 124)		EBL	47	25		35	0	35
	470		EB	EBT	47	1060		1360	0	1360
	470	Count Date: 10/2/2012		EBR	47	15		15	0	15
	470			WBL	47	25		25	0	25
	470		WB	WBT	47	1090		1410	0	1410
	470			WBR	47	75		105	0	105
	470	PM Peak Hour: 4:15 PM-5:15 PM		NBL	47	20		20	0	20
	470	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	47	1		2	0	2
	470			NBR	47	25		25	0	25
	470			SBL	47	120		170	0	170
	470	PHF:	SB	SBT	47	1		2	0	2
	470	0.92		SBR	47	30		40	0	40
			TEV	**TEV**	**47**	**2487**	**0**	**3209**	**0**	**3209**
48	480	I-5 Exit 124 @ SB On/Off Ramps/W. Harvard Ave.(D		EBL	48	30		30	0	30
	480		EB	EBT	48	870		1085	0	1085
	481	Count Date: 10/1/2012		EBR	48	295		400	0	400
	480			WBL	48	145		240	0	240
	480		WB	WBT	48	910		1215	0	1215
	480			WBR	48	5		5	0	5
	480	PM Peak Hour: 4:00 PM-5:00 PM		NBL	48	240		290	0	290
	480	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	48	30		30	0	30
	480			NBR	48	260		350	0	350
	480			SBL	48	40		40	0	40
	480	PHF:	SB	SBT	48	10		15	0	15
	480	0.95		SBR	48	50		45	0	45
			TEV	**TEV**	**48**	**2885**	**0**	**3745**	**0**	**3745**
49	490	I-5 Exit 124 @ NB On-Ramp/W. Harvard Ave.(Draft I		EBL	49	0		15	-15	0
	490		EB	EBT	49	1170		1045	315	1360
	490	Count Date:		EBR	49	0		0	0	0
	490			WBL	49	0		0	0	0
	490		WB	WBT	49	1065		1765	-330	1435
	490			WBR	49	440		590	0	590
	490	PM Peak Hour: 4:30 PM-5:30 PM		NBL	49	0			0	0
	490	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	49	0			0	0
	490			NBR	49	0			0	0
	490			SBL	49	0			0	0
	490	PHF:	SB	SBT	49	0			0	0
	490	#DIV/0!		SBR	49	0			0	0
			TEV	**TEV**	**49**	**2675**	**0**	**3415**	**-30**	**3385**
50	500	I-5 Exit 124 @ NB On/Off Ramps/W. Harvard Ave.(D		EBL	50	15		15	0	15
	500		EB	EBT	50	845		1045	0	1045

Project: Roseburg TSP Update
Job #: ODOT 00000888
Subject: *PM Turning Movement Volumes*

11/3/2017

N-S ID	Synchro ID	Intersection	Direction	Movement	Int ID	2016 Balanced Volumes PM Peak	2040 NCHRP 255-Base Unbalanced Future Baseline	2040 NCHRP 255-Base Rounded Future Baseline	2040 NCHRP 255-Base Volume Balancing Adjustments	240 NCHRP 255-Base Balanced Future Baseline
	500	Count Date:		EBR	50	310		300	-300	0
	500		WB	WBL	50	0		0	0	0
	500			WBT	50	1305		1765	0	1765
	500			WBR	50	20		25	0	25
	500	PM Peak Hour: 4:30 PM-5:30 PM	NB	NBL	50	165		225	0	225
	500	PM Peak Hour Used: 4:30 PM-5:30 PM		NBT	50	5		2	0	2
	500			NBR	50	110		170	0	170
	500		SB	SBL	50	15		15	0	15
	500	PHF:		SBT	50	0		0	0	0
	500	0.89		SBR	50	35		35	0	35
			TEV	**TEV**	**50**	**2825**	**0**	**3597**	**-300**	**3297**
51	510	W. Harvard Ave. @ W. Corey St.(Draft IAMP 124)	EB	EBL	51	0		0	0	0
	510			EBT	51	940		1200	0	1200
	510	Count Date: 10/3/2012		EBR	51	30		30	0	30
	510		WB	WBL	51	5		5	0	5
	510			WBT	51	1320		1780	0	1780
	510			WBR	51	0		0	0	0
	510	PM Peak Hour: 4:30 PM-5:30 PM	NB	NBL	51	10		10	0	10
	510	PM Peak Hour Used: 4:30 PM-5:30 PM		NBT	51	0		0	0	0
	510			NBR	51	15		90	0	90
	510		SB	SBL	51	0		0	0	0
	510	PHF:		SBT	51	0		0	0	0
	510	0.81		SBR	51	0		0	0	0
			TEV	**TEV**	**51**	**2320**	**0**	**3115**	**0**	**3115**
52	520	SE Washington Ave. @ W. Madrone St.(Draft IAMP	EB	EBL	52	50		40	0	40
	520			EBT	52	0		0	0	0
	520	Count Date: 10/2/2012		EBR	52	920		1235	0	1235
	520		WB	WBL	52	5		10	0	10
	520			WBT	52	1210		1635	0	1635
	520			WBR	52	45		50	0	50
	520	PM Peak Hour: 4:30 PM-5:30 PM	NB	NBL	52	0		0	0	0
	520	PM Peak Hour Used: 4:30 PM-5:30 PM		NBT	52	0		0	0	0
	520			NBR	52	0		0	0	0
	520		SB	SBL	52	40		5	0	5
	520	PHF:		SBT	52	0		0	0	0
	520	0.88		SBR	52	115		150	0	150
			TEV	**TEV**	**52**	**2385**	**0**	**3125**	**0**	**3125**
53	530	NE Diamond Lake Blvd. @ SE Stephens St.(OR 138	EB	EBL	53	0		0	0	0
	530			EBT	53	0		0	0	0
	530	Count Date: 12/12/2012		EBR	53	0		0	0	0
	530		WB	WBL	53	420		675	0	675
	530			WBT	53	0			0	0
	530			WBR	53	70			0	0
	530	PM Peak Hour: 4:30 PM-5:30 PM	NB	NBL	53	0			0	0
	530	PM Peak Hour Used: 4:30 PM-5:30 PM		NBT	53	510		760	0	760
	530			NBR	53	470		530	0	530
	530		SB	SBL	53	220		490	0	490
	530	PHF:		SBT	53	435		620	0	620
	530	0.95		SBR	53	0			0	0
			TEV	**TEV**	**53**	**2125**	**0**	**3075**	**0**	**3075**
54	540	NE Diamond Lake Blvd. @ NE Jackson St./NE Winc	EB	EBL	54	55	57	55	55	110
	540			EBT	54	560	858	860	-35	825
	540	Count Date: 5/13/2015		EBR	54	75	78	80	5	85
	540		WB	WBL	54	20	27	25	60	85
	540			WBT	54	390	501	500	70	570
	540			WBR	54	380	504	505	-55	450
	540	PM Peak Hour: 4:15 PM-5:15 PM	NB	NBL	54	35	31	30	-30	0
	540	PM Peak Hour Used: 4:30 PM-5:30 PM		NBT	54	100	90	90	10	100
	540			NBR	54	15	20	20	20	40
	540		SB	SBL	54	390	436	435	5	440
	540	PHF:		SBT	54	125	94	95	-30	65
	540	0.95		SBR	54	65	48	50	55	105
			TEV	**TEV**	**54**	**2210**	**2743**	**2745**	**130**	**2875**
55	550	NE Diamond Lake Blvd. @ NE Fulton St.	EB	EBL	55	25	28	30	0	30
	550			EBT	55	775	1,063	1065	0	1065
	550	Count Date: 5/12/2015		EBR	55	5	6	5	0	5
	550		WB	WBL	55	5	7	5	0	5
	550			WBT	55	625	826	825	0	825
	550			WBR	55	10	12	10	0	10
	550	PM Peak Hour: 4:15 PM-5:15 PM	NB	NBL	55	5	7	5	0	5
	550	PM Peak Hour Used: 4:30 PM-5:30 PM		NBT	55	1	1	0	1	1
	550			NBR	55	1	2	0	1	1
	550			SBL	55	15	20	20	0	20

N-S ID	Synchro ID	Intersection	Direction	Movement	Int ID	2016 Balanced Volumes PM Peak	2040 NCHRP 255-Base Unbalanced Future Baseline	2040 NCHRP 255-Base Rounded Future Baseline	2040 NCHRP 255-Base Volume Balancing Adjustments	240 NCHRP 255-Base Balanced Future Baseline
	550	PHF:	SB	SBT	55	1	1	0	1	1
	550	0.96		SBR	55	30	36	35	0	35
			TEV	**TEV**	**55**	**1498**	**2008**	**2000**	**3**	**2003**
56	560	NE Diamond Lake Blvd. @ NE Rifle Range St.		EBL	56	35	52	50	0	50
	560		EB	EBT	56	670	931	930	0	930
	560	Count Date: 5/13/2015		EBR	56	80	96	95	0	95
	560			WBL	56	15	18	20	0	20
	560		WB	WBT	56	550	734	735	0	735
	560			WBR	56	1	1	0	5	5
	560	PM Peak Hour: 4:00 PM-5:00 PM		NBL	56	55	69	70	0	70
	560	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	56	5	7	5	0	5
	560			NBR	56	25	32	30	0	30
	560			SBL	56	5	7	5	0	5
	560	PHF:	SB	SBT	56	5	6	5	0	5
	560	0.91		SBR	56	30	42	40	0	40
			TEV	**TEV**	**56**	**1476**	**1997**	**1985**	**5**	**1990**
57	570	NE Diamond Lake Blvd. @ NE Douglas Ave.		EBL	57	0	0	0	0	0
	570		EB	EBT	57	560	748	750	0	750
	570	Count Date: 6/3/2015		EBR	57	5	5	5	5	10
	570			WBL	57	10	10	10	5	15
	570		WB	WBT	57	375	499	500	0	500
	570			WBR	57	0	0	0	0	0
	570	PM Peak Hour: 4:45 PM-5:45 PM		NBL	57	5	5	5	5	10
	570	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	57	0	0	0	0	0
	570			NBR	57	15	15	15	5	20
	570			SBL	57	0	0	0	0	0
	570	PHF:	SB	SBT	57	0	0	0	0	0
	570	0.92		SBR	57	0	0	0	0	0
			TEV	**TEV**	**57**	**970**	**1282**	**1285**	**20**	**1305**
58	580	SE Washington Ave. @ SE Spruce St.(Draft IAMP 1		EBL	58	0		0	0	0
	580		EB	EBT	58	0		0	0	0
	580	Count Date: 10/3/2012		EBR	58	0		0	0	0
	580			WBL	58	10		15	0	15
	580		WB	WBT	58	1085		1465	0	1465
	580			WBR	58	10		10	0	10
	580	PM Peak Hour: 4:45 PM-5:45 PM		NBL	58	80		85	0	85
	580	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	58	120		120	0	120
	580			NBR	58	0		0	0	0
	580			SBL	58	0		0	0	0
	580	PHF:	SB	SBT	58	10		10	0	10
	580	0.78		SBR	58	95		145	0	145
			TEV	**TEV**	**58**	**1410**	**0**	**1850**	**0**	**1850**
59	590	SE Stephens St. @ SE Douglas Ave.(OR 138E Solu		EBL	59	80		135	0	135
	590		EB	EBT	59	95		55	0	55
	590	Count Date: 1/19/2011		EBR	59	10		5	0	5
	590			WBL	59	130		220	0	220
	590		WB	WBT	59	35		15	0	15
	590			WBR	59	105		0	0	0
	590	PM Peak Hour: 4:15 PM-5:15 PM		NBL	59	80		65	0	65
	590	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	59	795		1155	0	1155
	590			NBR	59	65		0	0	0
	590			SBL	59	85		185	0	185
	590	PHF:	SB	SBT	59	730		1035	0	1035
	590	0.87		SBR	59	40		75	0	75
			TEV	**TEV**	**59**	**2250**	**0**	**2945**	**0**	**2945**
60	600	SE Washington Ave. @ SE Pine St.(Draft IAMP 124		EBL	60	0			0	0
	600		EB	EBT	60	0			0	0
	600	Count Date: 1/19/2011		EBR	60	0			0	0
	600			WBL	60	0			0	0
	600		WB	WBT	60	0			0	0
	600			WBR	60	0			0	0
	600	PM Peak Hour: 4:15 PM-5:15 PM		NBL	60	0			0	0
	600	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	60	1230			1575	1575
	600			NBR	60	0			0	0
	600			SBL	60	0			0	0
	600	PHF:	SB	SBT	60	0			0	0
	600	0.83		SBR	60	630			920	920
			TEV	**TEV**	**60**	**1860**	**0**	**0**	**2495**	**2495**
61	610	SE Washington Ave. @ SE Stephens St.(Draft IAMP		EBL	61	0		0	0	0
	610		EB	EBT	61	0		0	0	0
	610	Count Date:		EBR	61	0		0	0	0
	610			WBL	61	30		55	0	55

N-S ID	Synchro ID	Intersection	Direction	Movement	Int ID	2016 Balanced Volumes PM Peak	2040 NCHRP 255-Base Unbalanced Future Baseline	2040 NCHRP 255-Base Rounded Future Baseline	2040 NCHRP 255-Base Volume Balancing Adjustments	240 NCHRP 255-Base Balanced Future Baseline
	610		WB	WBT	61	145		155	0	155
	610			WBR	61	35		70	0	70
	610	PM Peak Hour: 4:30 PM-5:30 PM		NBL	61	290		405	0	405
	610	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	61	940		1170	0	1170
	610			NBR	61	0		0	0	0
	610			SBL	61	0		0	0	0
	610	PHF:	SB	SBT	61	600		865	0	865
	610	0.81		SBR	61	240		395	0	395
			TEV	**TEV**	**61**	**2280**	**0**	**3115**	**0**	**3115**
62	620	SE Douglas Ave. @ NE Jackson St.		EBL	62	35	59	60	0	60
	620		EB	EBT	62	135	643	645	-515	130
	620	Count Date: 5/13/2015		EBR	62	25	56	55	5	60
	620			WBL	62	20	19	20	0	20
	620		WB	WBT	62	185	448	450	-235	215
	620			WBR	62	70	50	50	20	70
	620	PM Peak Hour: 4:30 PM-5:30 PM		NBL	62	0	0	0	0	0
	620	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	62	0	0	0	0	0
	620			NBR	62	0	0	0	0	0
	620			SBL	62	105	120	120	5	125
	620	PHF:	SB	SBT	62	75	40	40	5	45
	620	0.86		SBR	62	40	56	55	0	55
			TEV	**TEV**	**62**	**690**	**1491**	**1495**	**-715**	**780**
63	630	SE Oak Ave. @ SE Spruce St.(Draft IAMP 124)		EBL	63	190		190	0	190
	630		EB	EBT	63	765		1015	0	1015
	630	Count Date: 10/4/2012		EBR	63	0		2	-1	1
	630			WBL	63	0			0	0
	630		WB	WBT	63	0			0	0
	630			WBR	63	0			0	0
	630	PM Peak Hour: 4:15 PM-5:15 PM		NBL	63	0			0	0
	630	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	63	0			1	1
	630			NBR	63	0			5	5
	630			SBL	63	20		20	0	20
	630	PHF:	SB	SBT	63	0			1	1
	630	0.94		SBR	63	0			0	0
			TEV	**TEV**	**63**	**975**	**0**	**1227**	**6**	**1233**
64	640	SE Oak Ave. @ SE Pine St.(Draft IAMP 124)		EBL	64	0		0	0	0
	640		EB	EBT	64	475		620	0	620
	640	Count Date:		EBR	64	260		285	0	285
	640			WBL	64	0		0	0	0
	640		WB	WBT	64	0		0	0	0
	640			WBR	64	0		0	0	0
	640	PM Peak Hour: 4:30 PM-5:30 PM		NBL	64	0		0	0	0
	640	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	64	0		0	0	0
	640			NBR	64	0		0	0	0
	640			SBL	64	30		100	0	100
	640	PHF:	SB	SBT	64	600		820	0	820
	640	0.87		SBR	64	0		0	0	0
			TEV	**TEV**	**64**	**1365**	**0**	**1825**	**0**	**1825**
65	650	SE Oak Ave. @ SE Stephens St.(Draft IAMP 124)		EBL	65	300		505	0	505
	650		EB	EBT	65	205		215	0	215
	650	Count Date:		EBR	65	0			0	0
	650			WBL	65	0		0	0	0
	650		WB	WBT	65	0		0	0	0
	650			WBR	65	0		0	0	0
	650	PM Peak Hour: 4:30 PM-5:30 PM		NBL	65	0		0	0	0
	650	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	65	925		1080	0	1080
	650			NBR	65	60		125	0	125
	650			SBL	65	0		0	0	0
	650	PHF:	SB	SBT	65	0		0	0	0
	650	0.89		SBR	65	0		0	0	0
			TEV	**TEV**	**65**	**1490**	**0**	**1925**	**0**	**1925**
66	660	SE Washington Ave. @ SE Jackson St.		EBL	66	0	0	0	0	0
	660		EB	EBT	66	0	0	0	0	0
	660	Count Date: 6/9/2015		EBR	66	0	0	0	0	0
	660			WBL	66	35	48	50	-5	45
	660		WB	WBT	66	195	277	275	-35	240
	660			WBR	66	0	0	0	0	0
	660	PM Peak Hour: 4:15 PM-5:15 PM		NBL	66	0	0	0	0	0
	660	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	66	0	0	0	0	0
	660			NBR	66	0	0	0	0	0
	660			SBL	66	0	0	0	0	0
	660	PHF:	SB	SBT	66	80	76	75	10	85
	660	0.70		SBR	66	40	39	40	0	40

N-S ID	Synchro ID	Intersection	Direction	Movement	Int ID	2016 Balanced Volumes PM Peak	2040 NCHRP 255-Base Unbalanced Future Baseline	2040 NCHRP 255-Base Rounded Future Baseline	2040 NCHRP 255-Base Volume Balancing Adjustments	240 NCHRP 255-Base Balanced Future Baseline
			TEV	**TEV**	**66**	**350**	**440**	**440**	**-30**	**410**
67	670	SE Douglas Ave. @ SE Kane St.		EBL	67	0	0	0	0	0
	670		EB	EBT	67	175	180	180	0	180
	670	Count Date: 6/08/2015		EBR	67	65	74	75	0	75
	670			WBL	67	65	127	125	-35	90
	670		WB	WBT	67	210	225	225	35	260
	670			WBR	67	0	0	0	0	0
	670	PM Peak Hour: 4:30 PM-5:30 PM		NBL	67	60	45	45	0	45
	670	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	67	0	0	0	0	0
	670			NBR	67	70	85	85	0	85
	670			SBL	67	0	0	0	0	0
	670	PHF:	SB	SBT	67	0	0	0	0	0
	670	0.82		SBR	67	0	0	0	0	0
			TEV	**TEV**	**67**	**645**	**736**	**735**	**0**	**735**
68	680	SE Douglas Ave. @ SE Ramp Rd.		EBL	68	0	0	0	0	0
	680		EB	EBT	68	85	94	95	0	95
	680	Count Date: 6/2/2015		EBR	68	80	92	90	0	90
	680			WBL	68	35	51	50	0	50
	680		WB	WBT	68	55	62	60	5	65
	680			WBR	68	0	0	0	0	0
	680	PM Peak Hour: 5:00 PM-6:00 PM		NBL	68	45	65	65	0	65
	680	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	68	0	0	0	0	0
	680			NBR	68	25	44	45	0	45
	680			SBL	68	0	0	0	0	0
	680	PHF:	SB	SBT	68	0	0	0	0	0
	680	0.83		SBR	68	0	0	0	0	0
			TEV	**TEV**	**68**	**325**	**408**	**405**	**5**	**410**
69	690	NE Douglas Ave. @ NE Rifle Range St.		EBL	69	60	92	90	0	90
	690		EB	EBT	69	50	42	40	10	50
	690	Count Date: 6/3/2015		EBR	69	0	0	0	0	0
	690			WBL	69	0	0	0	0	0
	690		WB	WBT	69	30	25	25	5	30
	690			WBR	69	10	16	15	0	15
	690	PM Peak Hour: 4:45 PM-5:45 PM		NBL	69	0	0	0	0	0
	690	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	69	0	0	0	0	0
	690			NBR	69	0	0	0	0	0
	690			SBL	69	20	31	30	0	30
	690	PHF:	SB	SBT	69	0	0	0	0	0
	690	0.89		SBR	69	60	86	85	0	85
			TEV	**TEV**	**69**	**230**	**293**	**285**	**15**	**300**
70	700	SE Oak Ave. @ SE Jackson St.		EBL	70	0	0	0	0	0
	700		EB	EBT	70	170	224	225	0	225
	700	Count Date: 6/8/2015		EBR	70	60	67	65	0	65
	700			WBL	70	0	0	0	0	0
	700		WB	WBT	70	0	0	0	0	0
	700			WBR	70	0	0	0	0	0
	700	PM Peak Hour: 4:15 PM-5:15 PM		NBL	70	0	0	0	0	0
	700	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	70	0	0	0	0	0
	700			NBR	70	0	0	0	0	0
	700			SBL	70	25	30	30	0	30
	700	PHF:	SB	SBT	70	90	93	95	5	100
	700	0.90		SBR	70	0	0	0	0	0
			TEV	**TEV**	**70**	**345**	**414**	**415**	**5**	**420**
71	710	SE Pine St. @ SE Mosher Ave.		EBL	71	0	0	0	0	0
	710		EB	EBT	71	50	53	55	0	55
	710	Count Date: 5/21/2015		EBR	71	25	16	15	0	15
	710			WBL	71	30	28	30	0	30
	710		WB	WBT	71	20	18	20	0	20
	710			WBR	71	0	0	0	0	0
	710	PM Peak Hour: 4:15 PM-5:15 PM		NBL	71	0	0	0	0	0
	710	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	71	0	0	0	0	0
	710			NBR	71	0	0	0	0	0
	710			SBL	71	55	99	100	0	100
	710	PHF:	SB	SBT	71	625	665	665	0	665
	710	0.79		SBR	71	35	37	35	0	35
			TEV	**TEV**	**71**	**840**	**916**	**920**	**0**	**920**
72	720	SE Stephens St. @ SE Mosher Ave.		EBL	72	50	59	60	0	60
	720		EB	EBT	72	55	93	95	0	95
	720	Count Date: 5/20/2015		EBR	72	0	0	0	0	0
	720			WBL	72	0	0	0	0	0
	720		WB	WBT	72	30	28	30	0	30
	720			WBR	72	30	35	35	0	35

Project: Roseburg TSP Update
Job #: ODOT 00000888
Subject: *PM Turning Movement Volumes*

11/3/2017

N-S ID	Synchro ID	Intersection	Direction	Movement	Int ID	2016 Balanced Volumes PM Peak	2040 NCHRP 255-Base Unbalanced Future Baseline	2040 NCHRP 255-Base Rounded Future Baseline	2040 NCHRP 255-Base Volume Balancing Adjustments	240 NCHRP 255-Base Balanced Future Baseline
	720	PM Peak Hour: 4:15 PM-5:15 PM		NBL	72	20	18	20	0	20
	720	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	72	650	737	735	0	735
	720			NBR	72	15	25	25	0	25
	720			SBL	72	0	0	0	0	0
	720	PHF:	SB	SBT	72	0	0	0	0	0
	720	0.87		SBR	72	0	0	0	0	0
			TEV	**TEV**	**72**	**850**	**996**	**1000**	**0**	**1000**
73	730	I-5 Exit 123 @ SB On/Off Ramps/SW Portland Ave.		EBL	73	0	0	0	0	0
	730		EB	EBT	73	20	35	35	0	35
	730	Count Date: 6/3/2015		EBR	73	5	10	10	0	10
	730			WBL	73	15	22	20	0	20
	730		WB	WBT	73	10	11	10	5	15
	730			WBR	73	0	0	0	0	0
	730	PM Peak Hour: 5:00 PM-6:00 PM		NBL	73	0	0	0	0	0
	730	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	73	0	0	0	0	0
	730			NBR	73	0	0	0	0	0
	730			SBL	73	25	37	35	5	40
	730	PHF:	SB	SBT	73	1	2	0	1	1
	730	0.76		SBR	73	40	53	55	0	55
			TEV	**TEV**	**73**	**116**	**170**	**165**	**11**	**176**
74	740	I-5 Exit 123 @ NB On/Off Ramps/SW Portland Ave.		EBL	74	20	38	40	0	40
	740		EB	EBT	74	25	37	35	0	35
	740	Count Date: 6/4/2015		EBR	74	0	0	0	0	0
	740			WBL	74	0	0	0	0	0
	740		WB	WBT	74	15	19	20	0	20
	740			WBR	74	20	23	25	0	25
	740	PM Peak Hour: 5:00 PM-6:00 PM		NBL	74	10	13	15	0	15
	740	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	74	5	6	5	0	5
	740			NBR	74	10	9	10	0	10
	740			SBL	74	0	0	0	0	0
	740	PHF:	SB	SBT	74	0	0	0	0	0
	740	0.95		SBR	74	0	0	0	0	0
			TEV	**TEV**	**74**	**105**	**145**	**150**	**0**	**150**
75	750	SE Stephens St. @ S. Gate Shopping Center Entrar		EBL	75	5	5	5	0	5
	750		EB	EBT	75	1	1	0	1	1
	750	Count Date: 6/15/2015		EBR	75	1	1	0	1	1
	750			WBL	75	25	25	25	0	25
	750		WB	WBT	75	1	1	0	1	1
	750			WBR	75	40	40	40	0	40
	750	PM Peak Hour: 4:30 PM-5:30 PM		NBL	75	2	2	0	2	2
	750	PM Peak Hour Used: 4:30 PM-5:30 PM	NB	NBT	75	435	435	435	0	435
	750			NBR	75	45	45	45	0	45
	750			SBL	75	70	70	70	0	70
	750	PHF:	SB	SBT	75	510	510	510	0	510
	750	0.90		SBR	75	1	1	0	1	1
			TEV	**TEV**	**75**	**1136**	**1136**	**1130**	**6**	**1136**

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	30	5	15	260	150	20
Future Vol, veh/h	30	5	15	260	150	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	6	7	16
Mvmt Flow	33	5	16	283	163	22

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	489	174	185	0	-	0
Stage 1	174	-	-	-	-	-
Stage 2	315	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	542	875	1402	-	-	-
Stage 1	861	-	-	-	-	-
Stage 2	744	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	534	875	1402	-	-	-
Mov Cap-2 Maneuver	534	-	-	-	-	-
Stage 1	861	-	-	-	-	-
Stage 2	734	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.8	0.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1402	-	565	-	-
HCM Lane V/C Ratio	0.012	-	0.067	-	-
HCM Control Delay (s)	7.6	0	11.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	1.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	25	35	240	50	20	135
Future Vol, veh/h	25	35	240	50	20	135
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	175	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	5	9	5	2	6	7
Mvmt Flow	27	37	255	53	21	144

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	441	255	0	0	255	0
Stage 1	255	-	-	-	-	-
Stage 2	186	-	-	-	-	-
Critical Hdwy	6.45	6.29	-	-	4.16	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.381	-	-	2.254	-
Pot Cap-1 Maneuver	568	767	-	-	1287	-
Stage 1	781	-	-	-	-	-
Stage 2	839	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	559	767	-	-	1287	-
Mov Cap-2 Maneuver	559	-	-	-	-	-
Stage 1	781	-	-	-	-	-
Stage 2	825	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11	0	1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	664	1287	-
HCM Lane V/C Ratio	-	-	0.096	0.017	-
HCM Control Delay (s)	-	-	11	7.8	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0.1	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	125	260	145	175	240	15
Future Volume (vph)	125	260	145	175	240	15
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1511	1473	1630	1699	3068	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1511	1473	1630	1699	3068	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	130	271	151	182	250	16
RTOR Reduction (vph)	0	202	0	0	6	0
Lane Group Flow (vph)	130	69	151	182	260	0
Heavy Vehicles (%)	10%	1%	2%	3%	6%	29%
Turn Type	Prot	Prot	Prot	NA	NA	
Protected Phases	8	8	1	6	2	
Permitted Phases						
Actuated Green, G (s)	11.2	11.2	8.0	25.8	13.3	
Effective Green, g (s)	12.2	12.2	8.5	27.8	15.3	
Actuated g/C Ratio	0.25	0.25	0.18	0.58	0.32	
Clearance Time (s)	5.0	5.0	4.5	6.0	6.0	
Vehicle Extension (s)	2.5	2.5	2.5	4.8	4.8	
Lane Grp Cap (vph)	384	374	288	984	977	
v/s Ratio Prot	c0.09	0.05	c0.09	0.11	c0.08	
v/s Ratio Perm						
v/c Ratio	0.34	0.18	0.52	0.18	0.27	
Uniform Delay, d1	14.6	14.0	17.9	4.8	12.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	0.2	1.3	0.2	0.3	
Delay (s)	15.0	14.2	19.2	4.9	12.5	
Level of Service	B	B	B	A	B	
Approach Delay (s)	14.4			11.4	12.5	
Approach LOS	B			B	B	

Intersection Summary			
HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	48.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	34.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR	SWL	SWR
Lane Configurations								
Traffic Vol, veh/h	35	110	135	0	145	45	0	0
Future Vol, veh/h	35	110	135	0	145	45	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop	Stop	Stop
RT Channelized	-	None	-	-	-	None	-	-
Storage Length	470	-	-	600	0	375	-	-
Veh in Median Storage, #	-	0	0	-	0	-	-	-
Grade, %	-	0	0	-	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2
Mvmt Flow	38	120	147	0	158	49	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	147	0	-	0	343	147
Stage 1	-	-	-	-	147	-
Stage 2	-	-	-	-	196	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1435	-	-	0	653	900
Stage 1	-	-	-	0	880	-
Stage 2	-	-	-	0	837	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1435	-	-	-	636	900
Mov Cap-2 Maneuver	-	-	-	-	675	-
Stage 1	-	-	-	-	880	-
Stage 2	-	-	-	-	815	-

Approach	EB	WB	SB
HCM Control Delay, s	1.8	0	11.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1435	-	-	675	900
HCM Lane V/C Ratio	0.027	-	-	0.233	0.054
HCM Control Delay (s)	7.6	-	-	12	9.2
HCM Lane LOS	A	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	0.9	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	55	145	135	165	65	90	200	70	105	245	150
Future Volume (vph)	55	55	145	135	165	65	90	200	70	105	245	150
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1599	1750	1444	1568	1716	1458	1662	1716	1340	1583	1667	1403
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1599	1750	1444	1568	1716	1458	1662	1716	1340	1583	1667	1403
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	60	158	147	179	71	98	217	76	114	266	163
RTOR Reduction (vph)	0	0	127	0	0	54	0	0	54	0	0	83
Lane Group Flow (vph)	60	60	31	147	179	17	98	217	22	114	266	80
Heavy Vehicles (%)	4%	0%	3%	6%	2%	2%	0%	2%	11%	5%	5%	6%
Turn Type	Prot	NA	Prot	Prot	NA	Prot	Prot	NA	Prot	Prot	NA	pt+ov
Protected Phases	3	8	8	7	4	4	1	6	6	5	2	2 3
Permitted Phases												
Actuated Green, G (s)	6.1	11.3	11.3	8.6	13.8	13.8	5.4	16.0	16.0	6.5	17.1	29.2
Effective Green, g (s)	7.1	12.3	12.3	9.6	14.8	14.8	6.4	18.0	18.0	7.5	19.1	31.2
Actuated g/C Ratio	0.11	0.19	0.19	0.15	0.23	0.23	0.10	0.28	0.28	0.12	0.30	0.49
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.0	6.0	5.0	6.0	
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	4.8	4.8	2.5	4.8	
Lane Grp Cap (vph)	179	339	280	237	400	340	167	487	380	187	502	690
v/s Ratio Prot	0.04	0.03	0.02	c0.09	c0.10	0.01	0.06	0.13	0.02	c0.07	c0.16	0.06
v/s Ratio Perm												
v/c Ratio	0.34	0.18	0.11	0.62	0.45	0.05	0.59	0.45	0.06	0.61	0.53	0.12
Uniform Delay, d1	26.0	21.3	21.0	25.2	20.8	18.8	27.2	18.6	16.5	26.6	18.4	8.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.2	0.1	4.3	0.6	0.0	4.3	1.3	0.1	4.7	1.8	0.1
Delay (s)	26.8	21.5	21.2	29.5	21.4	18.9	31.5	19.9	16.6	31.2	20.2	8.8
Level of Service	C	C	C	C	C	B	C	B	B	C	C	A
Approach Delay (s)		22.5			23.9			22.2			19.1	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	21.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	63.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	45.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	270	115	755	80	80	525
Future Volume (vph)	270	115	755	80	80	525
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1630	1444	1733	1444	1568	1699
Flt Permitted	0.95	1.00	1.00	1.00	0.15	1.00
Satd. Flow (perm)	1630	1444	1733	1444	246	1699
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	281	120	786	83	83	547
RTOR Reduction (vph)	0	89	0	20	0	0
Lane Group Flow (vph)	281	31	786	63	83	547
Confl. Peds. (#/hr)				1	1	
Heavy Vehicles (%)	2%	3%	1%	3%	6%	3%
Turn Type	Prot	Prot	NA	Prot	pm+pt	NA
Protected Phases	8	8	2	2	1	6
Permitted Phases					6	
Actuated Green, G (s)	19.2	19.2	42.2	42.2	50.2	50.2
Effective Green, g (s)	20.2	20.2	43.2	43.2	51.2	51.2
Actuated g/C Ratio	0.25	0.25	0.54	0.54	0.64	0.64
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	3.0	3.0	2.0	3.0
Lane Grp Cap (vph)	414	367	942	785	225	1095
v/s Ratio Prot	c0.17	0.02	c0.45	0.04	0.02	c0.32
v/s Ratio Perm					0.22	
v/c Ratio	0.68	0.08	0.83	0.08	0.37	0.50
Uniform Delay, d1	26.7	22.5	15.1	8.6	11.0	7.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.5	0.0	6.5	0.0	0.4	0.4
Delay (s)	30.1	22.6	21.6	8.7	11.4	7.7
Level of Service	C	C	C	A	B	A
Approach Delay (s)	27.9		20.3			8.2
Approach LOS	C		C			A

Intersection Summary			
HCM 2000 Control Delay	17.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	79.4	Sum of lost time (s)	13.0
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	1	15	85	1	65	10	925	140	70	785	1
Future Volume (vph)	15	1	15	85	1	65	10	925	140	70	785	1
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.93			0.94		1.00	0.98		1.00	1.00	
Flt Protected		0.98			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1597			1594		1662	3232		1662	3166	
Flt Permitted		0.88			0.81		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1435			1324		1662	3232		1662	3166	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	15	1	15	88	1	67	10	954	144	72	809	1
RTOR Reduction (vph)	0	12	0	0	50	0	0	13	0	0	0	0
Lane Group Flow (vph)	0	19	0	0	106	0	10	1085	0	72	810	0
Heavy Vehicles (%)	0%	0%	0%	1%	0%	0%	0%	1%	0%	0%	5%	0%
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4								
Actuated Green, G (s)		8.9			8.9		0.4	27.1		2.5	29.2	
Effective Green, g (s)		9.4			9.4		0.4	27.6		2.5	29.7	
Actuated g/C Ratio		0.18			0.18		0.01	0.54		0.05	0.58	
Clearance Time (s)		4.5			4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)		2.5			2.5		2.5	4.3		2.5	4.3	
Lane Grp Cap (vph)		261			241		12	1732		80	1825	
v/s Ratio Prot							0.01	c0.34		c0.04	0.26	
v/s Ratio Perm		0.01			c0.08							
v/c Ratio		0.07			0.44		0.83	0.63		0.90	0.44	
Uniform Delay, d1		17.4			18.7		25.5	8.3		24.4	6.2	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1			0.9		166.4	0.9		67.8	0.3	
Delay (s)		17.5			19.6		191.9	9.2		92.2	6.5	
Level of Service		B			B		F	A		F	A	
Approach Delay (s)		17.5			19.6			10.9			13.5	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	12.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	51.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	43.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	70	1	225	10	1	1	435	630	15	5	370	75
Future Vol, veh/h	70	1	225	10	1	1	435	630	15	5	370	75
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Free	-	-	None	-	-	Yield	-	-	Free
Storage Length	-	-	300	-	-	-	275	-	0	100	-	75
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	8	0	5	0	0	0	2	1	0	0	2	5
Mvmt Flow	72	1	232	10	1	1	448	649	15	5	381	77

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1939	1938	-	1938	1938	649	381	0	0	649	0	0
Stage 1	392	392	-	1546	1546	-	-	-	-	-	-	-
Stage 2	1547	1546	-	392	392	-	-	-	-	-	-	-
Critical Hdwy	7.18	6.5	-	7.1	6.5	6.2	4.12	-	-	4.1	-	-
Critical Hdwy Stg 1	6.18	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.18	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.572	4	-	3.5	4	3.3	2.218	-	-	2.2	-	-
Pot Cap-1 Maneuver	~ 47	66	0	50	66	473	1177	-	-	947	-	0
Stage 1	621	610	0	145	178	-	-	-	-	-	-	0
Stage 2	139	178	0	637	610	-	-	-	-	-	-	0
Platoon blocked, %								-	-		-	
Mov Cap-1 Maneuver	~ 32	41	-	34	41	473	1177	-	-	947	-	-
Mov Cap-2 Maneuver	~ 32	41	-	34	41	-	-	-	-	-	-	-
Stage 1	385	607	-	90	110	-	-	-	-	-	-	-
Stage 2	85	110	-	633	607	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 854	145.1	4	0.1
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT
Capacity (veh/h)	1177	-	-	32	-	37	947	-
HCM Lane V/C Ratio	0.381	-	-	2.287	-	0.334	0.005	-
HCM Control Delay (s)	9.9	-	-	$ 854	0	145.1	8.8	-
HCM Lane LOS	A	-	-	F	A	F	A	-
HCM 95th %tile Q(veh)	1.8	-	-	8.4	-	1.1	0	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s   +: Computation Not Defined   *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	575	25	235	1050	20	25	5	200	45	5	5
Future Volume (vph)	5	575	25	235	1050	20	25	5	200	45	5	5
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.97	
Satd. Flow (prot)	1662	2963		1662	3260	1488	1662	1479		1579	1568	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.74	1.00		0.30	0.41	
Satd. Flow (perm)	1662	2963		1662	3260	1488	1291	1479		496	667	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	5	599	26	245	1094	21	26	5	208	47	5	5
RTOR Reduction (vph)	0	2	0	0	0	5	0	184	0	0	4	0
Lane Group Flow (vph)	5	623	0	245	1094	16	26	29	0	29	24	0
Heavy Vehicles (%)	0%	12%	0%	0%	2%	0%	0%	0%	1%	0%	0%	0%
Turn Type	Prot	NA		Prot	NA	Prot	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6	6		8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	1.2	67.9		22.2	88.9	88.9	13.4	13.4		13.4	13.4	
Effective Green, g (s)	1.7	69.9		22.7	90.9	90.9	13.4	13.4		13.4	13.4	
Actuated g/C Ratio	0.01	0.59		0.19	0.77	0.77	0.11	0.11		0.11	0.11	
Clearance Time (s)	4.5	6.0		4.5	6.0	6.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	4.5		2.5	4.5	4.5	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	23	1755		319	2511	1146	146	167		56	75	
v/s Ratio Prot	0.00	0.21		c0.15	c0.34	0.01		0.02				
v/s Ratio Perm							0.02			c0.06	0.04	
v/c Ratio	0.22	0.36		0.77	0.44	0.01	0.18	0.17		0.52	0.31	
Uniform Delay, d1	57.5	12.4		45.2	4.7	3.1	47.3	47.3		49.3	48.1	
Progression Factor	1.00	1.00		0.81	1.85	29.17	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.4	0.6		6.2	0.3	0.0	0.4	0.4		5.9	1.7	
Delay (s)	60.9	13.0		42.8	9.0	91.8	47.7	47.6		55.2	49.8	
Level of Service	E	B		D	A	F	D	D		E	D	
Approach Delay (s)		13.4			16.4			47.6			52.5	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	118.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	770	40	65	1235	240	60	20	100	295	20	45
Future Volume (vph)	15	770	40	65	1235	240	60	20	100	295	20	45
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.87		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1409	3175		1662	3217		1662	1518		1662	1567	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1409	3175		1662	3217		1662	1518		1662	1567	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	16	819	43	69	1314	255	64	21	106	314	21	48
RTOR Reduction (vph)	0	3	0	0	10	0	0	95	0	0	37	0
Lane Group Flow (vph)	16	859	0	69	1559	0	64	32	0	314	32	0
Heavy Vehicles (%)	18%	4%	3%	0%	1%	0%	0%	0%	1%	0%	0%	0%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	2.1	57.2		7.5	62.6		8.3	12.3		22.5	26.5	
Effective Green, g (s)	2.6	58.2		8.0	63.6		8.8	12.8		23.0	27.0	
Actuated g/C Ratio	0.02	0.49		0.07	0.54		0.07	0.11		0.19	0.23	
Clearance Time (s)	4.5	5.0		4.5	5.0		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	2.5	5.2		2.5	5.2		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	31	1565		112	1733		123	164		323	358	
v/s Ratio Prot	0.01	0.27		c0.04	c0.48		0.04	c0.02		c0.19	0.02	
v/s Ratio Perm												
v/c Ratio	0.52	0.55		0.62	0.90		0.52	0.20		0.97	0.09	
Uniform Delay, d1	57.1	20.8		53.5	24.3		52.6	47.9		47.2	35.8	
Progression Factor	1.23	0.90		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.0	1.3		8.3	7.9		3.0	0.4		42.3	0.1	
Delay (s)	80.3	20.0		61.8	32.3		55.6	48.4		89.5	35.9	
Level of Service	F	B		E	C		E	D		F	D	
Approach Delay (s)		21.1			33.5			50.8			79.8	
Approach LOS		C			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	36.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	118.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	30	1185	1515	90	40	25
Future Vol, veh/h	30	1185	1515	90	40	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	2	1	2	0	0
Mvmt Flow	33	1288	1647	98	43	27

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1745	0	-	0	2405	872
Stage 1	-	-	-	-	1696	-
Stage 2	-	-	-	-	709	-
Critical Hdwy	4.1	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	365	-	-	-	~ 28	298
Stage 1	-	-	-	-	137	-
Stage 2	-	-	-	-	454	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	365	-	-	-	~ 25	298
Mov Cap-2 Maneuver	-	-	-	-	102	-
Stage 1	-	-	-	-	137	-
Stage 2	-	-	-	-	413	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	56.4
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	365	-	-	-	137
HCM Lane V/C Ratio	0.089	-	-	-	0.516
HCM Control Delay (s)	15.8	-	-	-	56.4
HCM Lane LOS	C	-	-	-	F
HCM 95th %tile Q(veh)	0.3	-	-	-	2.5

Notes

~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	20	35	200	15	65	75	870	185	65	1295	35
Future Volume (vph)	65	20	35	200	15	65	75	870	185	65	1295	35
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.91		1.00	0.88		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1662	1584		1662	1536		1662	3260	1488	1662	3280	
Flt Permitted	0.70	1.00		0.72	1.00		0.11	1.00	1.00	0.22	1.00	
Satd. Flow (perm)	1227	1584		1256	1536		186	3260	1488	391	3280	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	70	22	38	215	16	70	81	935	199	70	1392	38
RTOR Reduction (vph)	0	28	0	0	52	0	0	0	98	0	2	0
Lane Group Flow (vph)	70	32	0	215	34	0	81	935	101	70	1428	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	1%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Prot	pm+pt	NA	
Protected Phases		8			4		1	6	6	5	2	
Permitted Phases	8			4			6			2		
Actuated Green, G (s)	18.3	18.3		18.3	18.3		41.8	36.6	36.6	41.8	36.6	
Effective Green, g (s)	19.3	19.3		19.3	19.3		43.8	38.6	38.6	43.8	38.6	
Actuated g/C Ratio	0.25	0.25		0.25	0.25		0.58	0.51	0.51	0.58	0.51	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	6.0	6.0	5.0	6.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	4.8	4.8	2.5	4.8	
Lane Grp Cap (vph)	311	401		318	389		227	1653	754	328	1663	
v/s Ratio Prot		0.02			0.02		c0.03	0.29	0.07	0.02	c0.44	
v/s Ratio Perm	0.06			c0.17			0.18			0.11		
v/c Ratio	0.23	0.08		0.68	0.09		0.36	0.57	0.13	0.21	0.86	
Uniform Delay, d1	22.5	21.6		25.6	21.7		11.4	13.0	9.9	7.9	16.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.1		5.1	0.1		0.7	0.7	0.2	0.2	5.1	
Delay (s)	22.7	21.7		30.7	21.7		12.1	13.7	10.1	8.2	21.4	
Level of Service	C	C		C	C		B	B	B	A	C	
Approach Delay (s)		22.3			28.1			13.0			20.8	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	18.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	76.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↱		↰	↱	
Traffic Volume (vph)	45	820	365	95	620	35	335	35	75	55	75	50
Future Volume (vph)	45	820	365	95	620	35	335	35	75	55	75	50
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.99		1.00	0.90		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1568	3149		1646	3197		1646	1549		1662	1646	
Flt Permitted	0.31	1.00		0.12	1.00		0.67	1.00		0.68	1.00	
Satd. Flow (perm)	504	3149		200	3197		1157	1549		1190	1646	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	49	891	397	103	674	38	364	38	82	60	82	54
RTOR Reduction (vph)	0	56	0	0	4	0	0	51	0	0	26	0
Lane Group Flow (vph)	49	1232	0	103	708	0	364	69	0	60	110	0
Heavy Vehicles (%)	6%	1%	0%	1%	3%	6%	1%	0%	2%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	36.2	33.6		38.2	34.6		29.3	29.3		29.3	29.3	
Effective Green, g (s)	36.2	34.6		38.2	35.6		29.8	29.8		29.8	29.8	
Actuated g/C Ratio	0.45	0.43		0.48	0.45		0.37	0.37		0.37	0.37	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	262	1361		160	1422		430	577		443	613	
v/s Ratio Prot	0.01	c0.39		c0.03	0.22			0.04			0.07	
v/s Ratio Perm	0.08			0.28			c0.31			0.05		
v/c Ratio	0.19	0.91		0.64	0.50		0.85	0.12		0.14	0.18	
Uniform Delay, d1	12.7	21.2		16.0	15.8		23.0	16.5		16.6	16.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	8.8		7.6	0.2		14.0	0.1		0.1	0.1	
Delay (s)	12.9	30.0		23.7	16.0		37.0	16.5		16.7	17.0	
Level of Service	B	C		C	B		D	B		B	B	
Approach Delay (s)		29.4			17.0			32.0			16.9	
Approach LOS		C			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	25.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	17.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	130	115	60	635	725	335
Future Vol, veh/h	130	115	60	635	725	335
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	250	0	350	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	1	0	0	2	0	1
Mvmt Flow	141	125	65	690	788	364

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1446	576	1152	0	-	0
Stage 1	970	-	-	-	-	-
Stage 2	476	-	-	-	-	-
Critical Hdwy	6.82	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.82	-	-	-	-	-
Critical Hdwy Stg 2	5.82	-	-	-	-	-
Follow-up Hdwy	3.51	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	~ 124	466	614	-	-	-
Stage 1	331	-	-	-	-	-
Stage 2	594	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 111	466	614	-	-	-
Mov Cap-2 Maneuver	~ 111	-	-	-	-	-
Stage 1	331	-	-	-	-	-
Stage 2	531	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	139.1	1	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	614	-	111	466	-	-
HCM Lane V/C Ratio	0.106	-	1.273	0.268	-	-
HCM Control Delay (s)	11.6	-	248.4	15.5	-	-
HCM Lane LOS	B	-	F	C	-	-
HCM 95th %tile Q(veh)	0.4	-	9.4	1.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	835	110	30	515	5	85	15	40	15	30	155
Future Volume (vph)	60	835	110	30	515	5	85	15	40	15	30	155
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt		0.98		1.00	1.00		1.00	0.89		1.00	0.87	
Flt Protected		1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3257		1662	3256		1662	1536		1458	1513	
Flt Permitted		0.89		0.17	1.00		0.43	1.00		0.72	1.00	
Satd. Flow (perm)		2896		297	3256		753	1536		1103	1513	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	908	120	33	560	5	92	16	43	16	33	168
RTOR Reduction (vph)	0	10	0	0	1	0	0	31	0	0	130	0
Lane Group Flow (vph)	0	1083	0	33	564	0	92	28	0	16	71	0
Heavy Vehicles (%)	0%	0%	1%	0%	2%	0%	0%	0%	2%	14%	2%	1%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		2			6		3	8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		28.0		28.0	28.0		20.9	16.6		13.5	12.9	
Effective Green, g (s)		29.0		29.0	29.0		21.9	17.1		14.5	13.4	
Actuated g/C Ratio		0.49		0.49	0.49		0.37	0.29		0.24	0.23	
Clearance Time (s)		5.0		5.0	5.0		4.5	4.5		4.5	4.5	
Vehicle Extension (s)		4.5		4.5	4.5		2.5	2.5		2.5	3.0	
Lane Grp Cap (vph)		1418		145	1595		352	443		276	342	
v/s Ratio Prot					0.17		c0.02	0.02		0.00	0.05	
v/s Ratio Perm		c0.37		0.11			c0.08			0.01		
v/c Ratio		0.76		0.23	0.35		0.26	0.06		0.06	0.21	
Uniform Delay, d1		12.3		8.7	9.3		12.7	15.3		17.1	18.6	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.8		1.4	0.2		0.3	0.0		0.1	0.3	
Delay (s)		15.1		10.1	9.6		13.0	15.3		17.1	18.9	
Level of Service		B		B	A		B	B		B	B	
Approach Delay (s)		15.1			9.6			13.9			18.8	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	13.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	59.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Intersection Delay, s/veh	9.7
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations																
Traffic Vol, veh/h	0	25	115	65	0	35	95	15	0	65	55	55	0	25	85	35
Future Vol, veh/h	0	25	115	65	0	35	95	15	0	65	55	55	0	25	85	35
Peak Hour Factor	0.92	0.93	0.93	0.93	0.92	0.93	0.93	0.93	0.92	0.93	0.93	0.93	0.92	0.93	0.93	0.93
Heavy Vehicles, %	2	0	3	3	2	0	4	0	2	3	0	5	2	0	0	0
Mvmt Flow	0	27	124	70	0	38	102	16	0	70	59	59	0	27	91	38
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.9	9.5	9.8	9.4
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	37%	12%	24%	17%
Vol Thru, %	31%	56%	66%	59%
Vol Right, %	31%	32%	10%	24%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	175	205	145	145
LT Vol	65	25	35	25
Through Vol	55	115	95	85
RT Vol	55	65	15	35
Lane Flow Rate	188	220	156	156
Geometry Grp	1	1	1	1
Degree of Util (X)	0.259	0.293	0.217	0.214
Departure Headway (Hd)	4.946	4.778	5.008	4.945
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	719	745	709	717
Service Time	3.031	2.858	3.095	3.033
HCM Lane V/C Ratio	0.261	0.295	0.22	0.218
HCM Control Delay	9.8	9.9	9.5	9.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	1	1.2	0.8	0.8

Intersection	
Intersection Delay, s/veh	10.1
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations			✥				✥				✥				✥	
Traffic Vol, veh/h	0	35	25	5	0	120	95	70	0	5	40	40	0	45	60	40
Future Vol, veh/h	0	35	25	5	0	120	95	70	0	5	40	40	0	45	60	40
Peak Hour Factor	0.92	0.85	0.85	0.85	0.92	0.85	0.85	0.85	0.92	0.85	0.85	0.85	0.92	0.85	0.85	0.85
Heavy Vehicles, %	2	0	0	0	2	0	5	3	2	0	0	5	2	3	2	0
Mvmt Flow	0	41	29	6	0	141	112	82	0	6	47	47	0	53	71	47
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.7	11.1	8.7	9.5
HCM LOS	A	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	6%	54%	42%	31%
Vol Thru, %	47%	38%	33%	41%
Vol Right, %	47%	8%	25%	28%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	85	65	285	145
LT Vol	5	35	120	45
Through Vol	40	25	95	60
RT Vol	40	5	70	40
Lane Flow Rate	100	76	335	171
Geometry Grp	1	1	1	1
Degree of Util (X)	0.134	0.107	0.428	0.234
Departure Headway (Hd)	4.83	5.029	4.595	4.947
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	736	707	781	720
Service Time	2.903	3.1	2.645	3.013
HCM Lane V/C Ratio	0.136	0.107	0.429	0.237
HCM Control Delay	8.7	8.7	11.1	9.5
HCM Lane LOS	A	A	B	A
HCM 95th-tile Q	0.5	0.4	2.2	0.9

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	30	90	120	70	105	65
Future Vol, veh/h	30	90	120	70	105	65
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	5	0	0	0	0	0
Mvmt Flow	32	97	129	75	113	70

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	481	148	183	0	-	0
Stage 1	148	-	-	-	-	-
Stage 2	333	-	-	-	-	-
Critical Hdwy	6.45	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	539	904	1404	-	-	-
Stage 1	872	-	-	-	-	-
Stage 2	719	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	487	904	1404	-	-	-
Mov Cap-2 Maneuver	487	-	-	-	-	-
Stage 1	872	-	-	-	-	-
Stage 2	650	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.8	4.9	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1404	-	745	-	-
HCM Lane V/C Ratio	0.092	-	0.173	-	-
HCM Control Delay (s)	7.8	0	10.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.6	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	1460	55	35	1485	10	110	5	50	10	5	10
Future Volume (vph)	40	1460	55	35	1485	10	110	5	50	10	5	10
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	
Frt	1.00	0.99		1.00	1.00			1.00	0.85		0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.98	
Satd. Flow (prot)	1662	3132		1662	3257			1623	1488		1623	
Flt Permitted	0.95	1.00		0.95	1.00			0.72	1.00		0.89	
Satd. Flow (perm)	1662	3132		1662	3257			1219	1488		1476	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	41	1505	57	36	1531	10	113	5	52	10	5	10
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	44	0	8	0
Lane Group Flow (vph)	41	1560	0	36	1541	0	0	118	8	0	17	0
Heavy Vehicles (%)	0%	2%	100%	0%	2%	0%	3%	0%	0%	0%	0%	0%
Turn Type	Prot	NA		Prot	NA		Perm	NA	Prot	Perm	NA	
Protected Phases	5	2		1	6			8	8		4	
Permitted Phases							8			4		
Actuated Green, G (s)	5.1	71.2		5.1	71.2			15.7	15.7		15.7	
Effective Green, g (s)	5.1	71.7		5.1	71.7			16.2	16.2		16.2	
Actuated g/C Ratio	0.05	0.68		0.05	0.68			0.15	0.15		0.15	
Clearance Time (s)	4.0	4.5		4.0	4.5			4.5	4.5		4.5	
Vehicle Extension (s)	2.5	4.0		2.5	4.0			2.5	2.5		2.5	
Lane Grp Cap (vph)	80	2138		80	2224			188	229		227	
v/s Ratio Prot	c0.02	c0.50		0.02	0.47				0.01			
v/s Ratio Perm								c0.10			0.01	
v/c Ratio	0.51	0.73		0.45	0.69			0.63	0.04		0.07	
Uniform Delay, d1	48.7	10.5		48.6	10.0			41.6	37.8		38.0	
Progression Factor	1.00	1.00		1.08	0.62			1.00	1.00		1.00	
Incremental Delay, d2	4.1	2.2		2.3	1.5			5.6	0.0		0.1	
Delay (s)	52.8	12.8		54.8	7.7			47.1	37.8		38.1	
Level of Service	D	B		D	A			D	D		D	
Approach Delay (s)		13.8			8.7			44.3			38.1	
Approach LOS		B			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	13.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	1045	55	35	955	5	110	5	50	5	1	10
Future Volume (vph)	40	1045	55	35	955	5	110	5	50	5	1	10
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (prot)	1662	3235		1662	3258			1623	1488		1680	1488
Flt Permitted	0.25	1.00		0.21	1.00			0.73	1.00		0.84	1.00
Satd. Flow (perm)	441	3235		365	3258			1244	1488		1476	1488
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	42	1089	57	36	995	5	115	5	52	5	1	10
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	45	0	0	9
Lane Group Flow (vph)	42	1143	0	36	1000	0	0	120	7	0	6	1
Heavy Vehicles (%)	0%	2%	2%	0%	2%	0%	3%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Prot	Perm	NA	Prot
Protected Phases	5	2		1	6			8	8		4	4
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	76.9	73.3		76.9	73.3			15.1	15.1		15.1	15.1
Effective Green, g (s)	77.9	73.8		77.9	73.8			15.1	15.1		15.1	15.1
Actuated g/C Ratio	0.74	0.70		0.74	0.70			0.14	0.14		0.14	0.14
Clearance Time (s)	4.5	4.5		4.5	4.5			4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.5	3.0		2.5	3.0			2.5	2.5		2.0	2.0
Lane Grp Cap (vph)	374	2273		321	2289			178	213		212	213
v/s Ratio Prot	c0.00	c0.35		0.00	0.31				0.01			0.00
v/s Ratio Perm	0.08			0.08				c0.10			0.00	
v/c Ratio	0.11	0.50		0.11	0.44			0.67	0.04		0.03	0.01
Uniform Delay, d1	4.0	7.2		4.3	6.7			42.6	38.7		38.6	38.5
Progression Factor	1.87	2.58		1.26	1.53			1.00	1.00		1.00	1.00
Incremental Delay, d2	0.1	0.7		0.0	0.1			8.8	0.0		0.0	0.0
Delay (s)	7.6	19.2		5.4	10.3			51.4	38.7		38.7	38.5
Level of Service	A	B		A	B			D	D		D	D
Approach Delay (s)		18.8			10.1			47.6			38.6	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	80	195	90	5	5	40
Future Vol, veh/h	80	195	90	5	5	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	1	0	1	0	0	3
Mvmt Flow	94	229	106	6	6	47

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	112	0	-	0	527	109
Stage 1	-	-	-	-	109	-
Stage 2	-	-	-	-	418	-
Critical Hdwy	4.11	-	-	-	6.4	6.23
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.209	-	-	-	3.5	3.327
Pot Cap-1 Maneuver	1484	-	-	-	515	942
Stage 1	-	-	-	-	921	-
Stage 2	-	-	-	-	669	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1484	-	-	-	477	942
Mov Cap-2 Maneuver	-	-	-	-	477	-
Stage 1	-	-	-	-	921	-
Stage 2	-	-	-	-	620	-

Approach	EB	WB	SB
HCM Control Delay, s	2.2	0	9.5
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1484	-	-	-	850
HCM Lane V/C Ratio	0.063	-	-	-	0.062
HCM Control Delay (s)	7.6	0	-	-	9.5
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.2	-	-	-	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	20	180	55	30	105	300	545	15	60	695	75
Future Volume (vph)	50	20	180	55	30	105	300	545	15	60	695	75
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.87		1.00	0.88		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	1514		1662	1546		1630	3312		1662	3247	
Flt Permitted	0.60	1.00		0.37	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1044	1514		648	1546		1630	3312		1662	3247	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	22	196	60	33	114	326	592	16	65	755	82
RTOR Reduction (vph)	0	169	0	0	97	0	0	2	0	0	8	0
Lane Group Flow (vph)	54	49	0	60	50	0	326	606	0	65	829	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%	1%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4								
Actuated Green, G (s)	11.7	10.1		13.1	10.8		19.9	40.2		6.0	26.3	
Effective Green, g (s)	11.7	10.6		13.1	11.3		19.9	40.7		6.0	26.8	
Actuated g/C Ratio	0.15	0.14		0.17	0.15		0.26	0.54		0.08	0.35	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	4.5		2.5	4.5	
Lane Grp Cap (vph)	174	212		143	231		429	1783		131	1151	
v/s Ratio Prot	0.01	0.03		c0.01	0.03		c0.20	0.18		0.04	c0.26	
v/s Ratio Perm	0.04			c0.06								
v/c Ratio	0.31	0.23		0.42	0.22		0.76	0.34		0.50	0.72	
Uniform Delay, d1	28.2	28.9		27.1	28.3		25.6	9.9		33.4	21.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.4		1.4	0.3		7.2	0.2		2.1	2.6	
Delay (s)	28.9	29.3		28.6	28.6		32.9	10.1		35.5	23.7	
Level of Service	C	C		C	C		C	B		D	C	
Approach Delay (s)		29.2			28.6			18.0			24.6	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	22.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	75.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Intersection Delay, s/veh	8.3
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations																
Traffic Vol, veh/h	0	35	45	1	0	1	45	35	0	10	10	5	0	45	15	30
Future Vol, veh/h	0	35	45	1	0	1	45	35	0	10	10	5	0	45	15	30
Peak Hour Factor	0.92	0.85	0.85	0.85	0.92	0.85	0.85	0.85	0.92	0.85	0.85	0.85	0.92	0.85	0.85	0.85
Heavy Vehicles, %	2	0	6	0	2	0	0	6	2	0	0	0	2	3	8	8
Mvmt Flow	0	41	53	1	0	1	53	41	0	12	12	6	0	53	18	35
Number of Lanes	0	1	1	0	0	0	1	0	0	0	1	0	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	2
HCM Control Delay	8.3	8.4	8.3	8.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	40%	100%	0%	1%	100%	0%
Vol Thru, %	40%	0%	98%	56%	0%	33%
Vol Right, %	20%	0%	2%	43%	0%	67%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	25	35	46	81	45	45
LT Vol	10	35	0	1	45	0
Through Vol	10	0	45	45	0	15
RT Vol	5	0	1	35	0	30
Lane Flow Rate	29	41	54	95	53	53
Geometry Grp	6	7	7	6	7	7
Degree of Util (X)	0.041	0.062	0.075	0.125	0.082	0.069
Departure Headway (Hd)	5.07	5.432	5.017	4.708	5.558	4.673
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	707	661	716	763	646	768
Service Time	3.092	3.149	2.734	2.724	3.276	2.39
HCM Lane V/C Ratio	0.041	0.062	0.075	0.125	0.082	0.069
HCM Control Delay	8.3	8.5	8.1	8.4	8.8	7.7
HCM Lane LOS	A	A	A	A	A	A
HCM 95th-tile Q	0.1	0.2	0.2	0.4	0.3	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	1	160	1	1	1	125	1455	1	1	1565	20
Future Volume (vph)	10	1	160	1	1	1	125	1455	1	1	1565	20
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.87			0.95		1.00	1.00		1.00	1.00	
Flt Protected		1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1496			1612		1599	3259		1630	3254	
Flt Permitted		0.98			0.94		0.08	1.00		0.11	1.00	
Satd. Flow (perm)		1478			1548		137	3259		192	3254	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	1	174	1	1	1	136	1582	1	1	1701	22
RTOR Reduction (vph)	0	70	0	0	1	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	116	0	0	2	0	136	1583	0	1	1722	0
Heavy Vehicles (%)	0%	2%	2%	2%	2%	2%	4%	2%	2%	2%	2%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4			6			2		
Actuated Green, G (s)		10.8			10.8		53.4	48.7		45.2	44.6	
Effective Green, g (s)		11.8			11.8		54.3	49.7		46.2	45.6	
Actuated g/C Ratio		0.16			0.16		0.73	0.67		0.62	0.61	
Clearance Time (s)		5.0			5.0		4.5	5.0		4.5	5.0	
Vehicle Extension (s)		2.5			2.5		2.5	3.0		2.5	2.2	
Lane Grp Cap (vph)		233			244		201	2171		140	1989	
v/s Ratio Prot							c0.05	0.49		0.00	c0.53	
v/s Ratio Perm		c0.08			0.00		0.44			0.00		
v/c Ratio		0.50			0.01		0.68	0.73		0.01	0.87	
Uniform Delay, d1		28.7			26.5		12.7	8.1		6.6	12.0	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.2			0.0		7.9	1.3		0.0	4.1	
Delay (s)		29.9			26.5		20.6	9.3		6.6	16.1	
Level of Service		C			C		C	A		A	B	
Approach Delay (s)		29.9			26.5			10.2			16.1	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	74.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	530	0	0	795	0	5
Future Vol, veh/h	530	0	0	795	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	576	0	0	864	0	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	-	576
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.318
Pot Cap-1 Maneuver	-	0	0	-	0	517
Stage 1	-	0	0	-	0	-
Stage 2	-	0	0	-	0	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	-	517
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	12
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	WBT
Capacity (veh/h)	517	-	-
HCM Lane V/C Ratio	0.011	-	-
HCM Control Delay (s)	12	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	0	-	-

Intersection	
Int Delay, s/veh	4.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	800	5	530	1170
Future Vol, veh/h	0	0	800	5	530	1170
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	870	5	576	1272

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	437	0	0	875	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	4.14	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	0	567	-	-	767	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	567	-	-	767	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	7
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	767	-
HCM Lane V/C Ratio	-	-	-	0.751	-
HCM Control Delay (s)	-	-	0	22.4	-
HCM Lane LOS	-	-	A	C	-
HCM 95th %tile Q(veh)	-	-	-	7	-

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	5	1	5	5	25	5	25	5	45	55	5
Future Vol, veh/h	1	5	1	5	5	25	5	25	5	45	55	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	0	20	0	0	0	0	0	4	0	3	0	0
Mvmt Flow	1	6	1	6	6	29	6	29	6	53	65	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	236	221	68	221	220	32	71	0	0	35	0	0
Stage 1	174	174	-	44	44	-	-	-	-	-	-	-
Stage 2	62	47	-	177	176	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.7	6.2	7.1	6.5	6.2	4.1	-	-	4.13	-	-
Critical Hdwy Stg 1	6.1	5.7	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.7	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.18	3.3	3.5	4	3.3	2.2	-	-	2.227	-	-
Pot Cap-1 Maneuver	723	647	1001	739	682	1048	1542	-	-	1570	-	-
Stage 1	833	722	-	975	862	-	-	-	-	-	-	-
Stage 2	954	821	-	829	757	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	677	622	1001	711	655	1048	1542	-	-	1570	-	-
Mov Cap-2 Maneuver	677	622	-	711	655	-	-	-	-	-	-	-
Stage 1	830	697	-	971	859	-	-	-	-	-	-	-
Stage 2	917	818	-	792	731	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.5	9.1	1	3.2
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1542	-	-	666	909	1570	-	-
HCM Lane V/C Ratio	0.004	-	-	0.012	0.045	0.034	-	-
HCM Control Delay (s)	7.3	0	-	10.5	9.1	7.4	0	-
HCM Lane LOS	A	A	-	B	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	5.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	215	10	505	380	10	275
Future Vol, veh/h	215	10	505	380	10	275
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Free	-	None	-	Free
Storage Length	-	-	225	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	1	33	3	1	40	3
Mvmt Flow	231	11	543	409	11	296

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	231	0	1521	-
Stage 1	-	-	-	-	231	-
Stage 2	-	-	-	-	1290	-
Critical Hdwy	-	-	4.145	-	7.2	-
Critical Hdwy Stg 1	-	-	-	-	6	-
Critical Hdwy Stg 2	-	-	-	-	6.4	-
Follow-up Hdwy	-	-	2.2285	-	3.88	-
Pot Cap-1 Maneuver	-	0	1329	-	90	0
Stage 1	-	0	-	-	713	0
Stage 2	-	0	-	-	173	0
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	1329	-	53	-
Mov Cap-2 Maneuver	-	-	-	-	53	-
Stage 1	-	-	-	-	713	-
Stage 2	-	-	-	-	102	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.5	89.5
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	WBL	WBT
Capacity (veh/h)	53	-	-	1329	-
HCM Lane V/C Ratio	0.203	-	-	0.409	-
HCM Control Delay (s)	89.5	0	-	9.6	-
HCM Lane LOS	F	A	-	A	-
HCM 95th %tile Q(veh)	0.7	-	-	2	-

Intersection	
Int Delay, s/veh	14.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	465	10	150	850	65	5	1	75	50	10	30
Future Vol, veh/h	15	465	10	150	850	65	5	1	75	50	10	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	2	3	0	0	0	0	2	0	0
Mvmt Flow	16	505	11	163	924	71	5	1	82	54	11	33

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	995	0	0	516	0	0	1336	1864	258	1571	1834	497
Stage 1	-	-	-	-	-	-	543	543	-	1285	1285	-
Stage 2	-	-	-	-	-	-	793	1321	-	286	549	-
Critical Hdwy	4.1	-	-	4.14	-	-	7.5	6.5	6.9	7.54	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.54	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.54	5.5	-
Follow-up Hdwy	2.2	-	-	2.22	-	-	3.5	4	3.3	3.52	4	3.3
Pot Cap-1 Maneuver	703	-	-	1046	-	-	114	74	747	75	77	524
Stage 1	-	-	-	-	-	-	497	523	-	174	237	-
Stage 2	-	-	-	-	-	-	352	228	-	697	520	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	703	-	-	1046	-	-	81	61	747	57	64	524
Mov Cap-2 Maneuver	-	-	-	-	-	-	81	61	-	57	64	-
Stage 1	-	-	-	-	-	-	486	511	-	170	200	-
Stage 2	-	-	-	-	-	-	264	192	-	606	508	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	1.3	14.8	245.5
HCM LOS			B	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	454	703	-	-	1046	-	-	83
HCM Lane V/C Ratio	0.194	0.023	-	-	0.156	-	-	1.179
HCM Control Delay (s)	14.8	10.2	-	-	9.1	-	-	245.5
HCM Lane LOS	B	B	-	-	A	-	-	F
HCM 95th %tile Q(veh)	0.7	0.1	-	-	0.6	-	-	7.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	1035	20	45	1325	1	55	1	75	1	1	1
Future Volume (vph)	1	1035	20	45	1325	1	55	1	75	1	1	1
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	0.85		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	3252		1614	3228		1662	1462		1662	1619	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1662	3252		1614	3228		1662	1462		1662	1619	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	1125	22	49	1440	1	60	1	82	1	1	1
RTOR Reduction (vph)	0	1	0	0	0	0	0	72	0	0	1	0
Lane Group Flow (vph)	1	1146	0	49	1441	0	60	11	0	1	1	0
Heavy Vehicles (%)	0%	2%	0%	3%	3%	0%	0%	0%	2%	0%	0%	0%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	0.6	40.4		4.4	44.2		4.5	7.7		0.6	3.8	
Effective Green, g (s)	0.6	41.4		4.4	45.2		4.5	8.2		0.6	4.3	
Actuated g/C Ratio	0.01	0.59		0.06	0.64		0.06	0.12		0.01	0.06	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	2.5	4.2		2.5	4.2		3.0	3.0		2.5	2.5	
Lane Grp Cap (vph)	14	1906		100	2066		105	169		14	98	
v/s Ratio Prot	0.00	0.35		c0.03	c0.45		c0.04	c0.01		0.00	0.00	
v/s Ratio Perm												
v/c Ratio	0.07	0.60		0.49	0.70		0.57	0.06		0.07	0.01	
Uniform Delay, d1	34.7	9.3		32.0	8.3		32.1	27.8		34.7	31.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	0.7		2.7	1.2		7.3	0.2		1.6	0.0	
Delay (s)	36.3	10.0		34.7	9.4		39.4	27.9		36.3	31.2	
Level of Service	D	A		C	A		D	C		D	C	
Approach Delay (s)		10.0			10.2			32.8			32.9	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	70.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	57.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	25	1100	1270	85	445	95
Future Volume (vph)	25	1100	1270	85	445	95
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.5	4.0	4.0		4.0	3.5
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1662	3260	3233		1630	1444
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1662	3260	3233		1630	1444
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	1196	1380	92	484	103
RTOR Reduction (vph)	0	0	4	0	0	69
Lane Group Flow (vph)	27	1196	1468	0	484	34
Heavy Vehicles (%)	0%	2%	2%	0%	2%	3%
Turn Type	Prot	NA	NA		Prot	pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases						1
Actuated Green, G (s)	5.1	55.2	46.6		27.8	5.1
Effective Green, g (s)	5.1	55.7	47.1		28.3	5.1
Actuated g/C Ratio	0.05	0.56	0.47		0.29	0.05
Clearance Time (s)	3.5	4.5	4.5		4.5	3.5
Vehicle Extension (s)	1.0	2.0	2.0		1.0	1.0
Lane Grp Cap (vph)	85	1830	1535		465	74
v/s Ratio Prot	0.02	c0.37	c0.45		c0.30	0.02
v/s Ratio Perm						
v/c Ratio	0.32	0.65	0.96		1.04	0.46
Uniform Delay, d1	45.4	15.1	25.1		35.5	45.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.8	0.6	13.8		52.8	1.6
Delay (s)	46.2	15.7	38.8		88.2	47.3
Level of Service	D	B	D		F	D
Approach Delay (s)		16.4	38.8		81.0	
Approach LOS		B	D		F	

Intersection Summary			
HCM 2000 Control Delay	38.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	99.2	Sum of lost time (s)	14.5
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	825	85	85	570	450	0	100	40	440	65	105
Future Volume (vph)	110	825	85	85	570	450	0	100	40	440	65	105
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1662	3107	1488	1662	3197	1488		1750	1488	1646	1587	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1662	3107	1488	1662	3197	1488		1750	1488	1646	1587	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	116	868	89	89	600	474	0	105	42	463	68	111
RTOR Reduction (vph)	0	0	54	0	0	108	0	0	35	0	51	0
Lane Group Flow (vph)	116	868	35	89	600	366	0	105	7	463	128	0
Heavy Vehicles (%)	0%	7%	0%	0%	4%	0%	0%	0%	0%	1%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			
Actuated Green, G (s)	12.1	51.2	51.2	7.6	46.7	46.7		20.2	20.2	34.0	58.2	
Effective Green, g (s)	12.1	51.2	51.2	7.6	46.7	46.7		20.2	20.2	34.0	58.2	
Actuated g/C Ratio	0.09	0.39	0.39	0.06	0.36	0.36		0.16	0.16	0.26	0.45	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0	4.0	4.0	
Vehicle Extension (s)	2.5	4.2	4.2	2.5	4.2	4.2		2.5	2.5	2.5	2.5	
Lane Grp Cap (vph)	154	1223	586	97	1148	534		271	231	430	710	
v/s Ratio Prot	0.07	c0.28		c0.05	0.19			c0.06		c0.28	0.08	
v/s Ratio Perm			0.02			0.25			0.00			
v/c Ratio	0.75	0.71	0.06	0.92	0.52	0.69		0.39	0.03	1.08	0.18	
Uniform Delay, d1	57.5	33.1	24.5	60.9	32.9	35.4		49.3	46.6	48.0	21.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	17.8	3.5	0.2	64.5	1.7	7.0		0.7	0.0	65.5	0.1	
Delay (s)	75.3	36.7	24.7	125.4	34.6	42.4		50.0	46.6	113.5	21.7	
Level of Service	E	D	C	F	C	D		D	D	F	C	
Approach Delay (s)		39.8			44.7			49.0			87.9	
Approach LOS		D			D			D			F	

Intersection Summary			
HCM 2000 Control Delay	52.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	1065	5	5	825	10	5	1	1	20	1	35
Future Vol, veh/h	30	1065	5	5	825	10	5	1	1	20	1	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	4	0	0	4	0	0	0	0	8	0	0
Mvmt Flow	31	1109	5	5	859	10	5	1	1	21	1	36

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	870	0	0	1115	0	0	1615	2054	557	1493	2052	435
Stage 1	-	-	-	-	-	-	1174	1174	-	875	875	-
Stage 2	-	-	-	-	-	-	441	880	-	618	1177	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.66	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.66	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.66	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.58	4	3.3
Pot Cap-1 Maneuver	783	-	-	634	-	-	71	56	479	81	56	575
Stage 1	-	-	-	-	-	-	207	268	-	298	370	-
Stage 2	-	-	-	-	-	-	570	368	-	429	267	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	783	-	-	634	-	-	63	53	479	77	53	575
Mov Cap-2 Maneuver	-	-	-	-	-	-	63	53	-	77	53	-
Stage 1	-	-	-	-	-	-	199	257	-	286	367	-
Stage 2	-	-	-	-	-	-	528	365	-	409	256	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.1	62.3	38.3
HCM LOS			F	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	70	783	-	-	634	-	-	165
HCM Lane V/C Ratio	0.104	0.04	-	-	0.008	-	-	0.354
HCM Control Delay (s)	62.3	9.8	-	-	10.7	-	-	38.3
HCM Lane LOS	F	A	-	-	B	-	-	E
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	930	95	20	735	5	70	5	30	5	5	40
Future Volume (vph)	50	930	95	20	735	5	70	5	30	5	5	40
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	5.0	5.0		5.0	5.0		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.87		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1471	3161		1539	3165		1614	1522		1330	1515	
Flt Permitted	0.35	1.00		0.23	1.00		0.73	1.00		0.73	1.00	
Satd. Flow (perm)	537	3161		373	3165		1233	1522		1025	1515	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	1011	103	22	799	5	76	5	33	5	5	43
RTOR Reduction (vph)	0	7	0	0	0	0	0	28	0	0	36	0
Lane Group Flow (vph)	54	1107	0	22	804	0	76	10	0	5	12	0
Heavy Vehicles (%)	13%	4%	1%	8%	5%	0%	3%	0%	0%	25%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	30.8	30.8		30.8	30.8		7.2	7.2		7.2	7.2	
Effective Green, g (s)	30.8	30.8		30.8	30.8		7.2	7.2		7.2	7.2	
Actuated g/C Ratio	0.65	0.65		0.65	0.65		0.15	0.15		0.15	0.15	
Clearance Time (s)	5.0	5.0		5.0	5.0		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	4.8	4.8		4.8	4.8		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	348	2049		241	2052		186	230		155	229	
v/s Ratio Prot		c0.35			0.25			0.01			0.01	
v/s Ratio Perm	0.10			0.06			c0.06			0.00		
v/c Ratio	0.16	0.54		0.09	0.39		0.41	0.04		0.03	0.05	
Uniform Delay, d1	3.3	4.5		3.1	3.9		18.2	17.2		17.2	17.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.5		0.3	0.2		1.1	0.1		0.1	0.1	
Delay (s)	3.7	5.0		3.4	4.2		19.3	17.3		17.2	17.3	
Level of Service	A	A		A	A		B	B		B	B	
Approach Delay (s)		4.9			4.2			18.6			17.3	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	5.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	47.5	Sum of lost time (s)	9.5
Intersection Capacity Utilization	63.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	750	10	15	500	10	20
Future Vol, veh/h	750	10	15	500	10	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	4	14	13	5	17	7
Mvmt Flow	815	11	16	543	11	22

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	826	0	1125	413
Stage 1	-	-	-	-	821	-
Stage 2	-	-	-	-	304	-
Critical Hdwy	-	-	4.36	-	7.14	7.04
Critical Hdwy Stg 1	-	-	-	-	6.14	-
Critical Hdwy Stg 2	-	-	-	-	6.14	-
Follow-up Hdwy	-	-	2.33	-	3.67	3.37
Pot Cap-1 Maneuver	-	-	734	-	177	574
Stage 1	-	-	-	-	357	-
Stage 2	-	-	-	-	679	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	734	-	173	574
Mov Cap-2 Maneuver	-	-	-	-	280	-
Stage 1	-	-	-	-	357	-
Stage 2	-	-	-	-	664	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	14.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	425	-	-	734	-
HCM Lane V/C Ratio	0.077	-	-	0.022	-
HCM Control Delay (s)	14.2	-	-	10	-
HCM Lane LOS	B	-	-	B	-
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

Intersection	
Intersection Delay, s/veh	11.9
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	60	130	60	0	20	215	70	0	0	0	0
Future Vol, veh/h	0	60	130	60	0	20	215	70	0	0	0	0
Peak Hour Factor	0.92	0.86	0.86	0.86	0.92	0.86	0.86	0.86	0.92	0.86	0.86	0.86
Heavy Vehicles, %	2	6	1	0	2	9	2	0	2	0	0	0
Mvmt Flow	0	70	151	70	0	23	250	81	0	0	0	0
Number of Lanes	0	0	1	0	0	0	2	0	0	0	0	0

Approach	EB	WB
Opposing Approach	WB	EB
Opposing Lanes	2	1
Conflicting Approach Left	SB	
Conflicting Lanes Left	2	0
Conflicting Approach Right		SB
Conflicting Lanes Right	0	2
HCM Control Delay	13.8	10.7
HCM LOS	B	B

Lane	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	24%	16%	0%	85%	0%
Vol Thru, %	52%	84%	61%	15%	29%
Vol Right, %	24%	0%	39%	0%	71%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	250	128	178	148	78
LT Vol	60	20	0	125	0
Through Vol	130	108	108	23	23
RT Vol	60	0	70	0	55
Lane Flow Rate	291	148	206	172	90
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.468	0.245	0.313	0.317	0.143
Departure Headway (Hd)	5.79	5.943	5.464	6.652	5.703
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	625	605	658	542	629
Service Time	3.814	3.668	3.189	4.381	3.432
HCM Lane V/C Ratio	0.466	0.245	0.313	0.317	0.143
HCM Control Delay	13.8	10.6	10.7	12.5	9.4
HCM Lane LOS	B	B	B	B	A
HCM 95th-tile Q	2.5	1	1.3	1.4	0.5

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations			ꀀ	
Traffic Vol, veh/h	0	125	45	55
Future Vol, veh/h	0	125	45	55
Peak Hour Factor	0.92	0.86	0.86	0.86
Heavy Vehicles, %	2	1	0	3
Mvmt Flow	0	145	52	64
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	
Opposing Lanes	0
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	11.4
HCM LOS	B

Intersection	
Intersection Delay, s/veh	8.8
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations																
Traffic Vol, veh/h	0	0	0	0	0	45	240	0	0	0	0	0	0	0	85	40
Future Vol, veh/h	0	0	0	0	0	45	240	0	0	0	0	0	0	0	85	40
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	0	2	0	2	2	0	0	2	0	1	2
Mvmt Flow	0	0	0	0	0	49	261	0	0	0	0	0	0	0	92	43
Number of Lanes	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0

Approach	WB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		WB
Conflicting Lanes Left	0	2
Conflicting Approach Right	SB	
Conflicting Lanes Right	2	0
HCM Control Delay	9	8.3
HCM LOS	A	A

Lane	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	36%	0%	0%	0%
Vol Thru, %	64%	100%	100%	41%
Vol Right, %	0%	0%	0%	59%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	125	160	57	68
LT Vol	45	0	0	0
Through Vol	80	160	57	28
RT Vol	0	0	0	40
Lane Flow Rate	136	174	62	74
Geometry Grp	7	7	7	7
Degree of Util (X)	0.19	0.236	0.09	0.101
Departure Headway (Hd)	5.025	4.879	5.276	4.882
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	716	737	681	736
Service Time	2.742	2.596	2.995	2.6
HCM Lane V/C Ratio	0.19	0.236	0.091	0.101
HCM Control Delay	8.9	9.1	8.5	8.1
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.7	0.9	0.3	0.3

Intersection	
Int Delay, s/veh	3.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	180	75	90	260	45	85
Future Vol, veh/h	180	75	90	260	45	85
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	60
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	1	3	0	3	0	2
Mvmt Flow	212	88	106	306	53	100

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	300	0	774	256
Stage 1	-	-	-	-	256	-
Stage 2	-	-	-	-	518	-
Critical Hdwy	-	-	4.1	-	6.4	6.22
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.318
Pot Cap-1 Maneuver	-	-	1273	-	370	783
Stage 1	-	-	-	-	791	-
Stage 2	-	-	-	-	602	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1273	-	339	783
Mov Cap-2 Maneuver	-	-	-	-	339	-
Stage 1	-	-	-	-	791	-
Stage 2	-	-	-	-	552	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.1	12.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	339	783	-	-	1273	-
HCM Lane V/C Ratio	0.156	0.128	-	-	0.083	-
HCM Control Delay (s)	17.6	10.3	-	-	8.1	-
HCM Lane LOS	C	B	-	-	A	-
HCM 95th %tile Q(veh)	0.5	0.4	-	-	0.3	-

Intersection	
Int Delay, s/veh	3.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	95	90	50	65	65	45
Future Vol, veh/h	95	90	50	65	65	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	60	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	3	0	2	2	0
Mvmt Flow	112	106	59	76	76	53

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	218	0	359	165
Stage 1	-	-	-	-	165	-
Stage 2	-	-	-	-	194	-
Critical Hdwy	-	-	4.1	-	6.42	6.2
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.2	-	3.518	3.3
Pot Cap-1 Maneuver	-	-	1364	-	640	885
Stage 1	-	-	-	-	864	-
Stage 2	-	-	-	-	839	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1364	-	611	885
Mov Cap-2 Maneuver	-	-	-	-	611	-
Stage 1	-	-	-	-	864	-
Stage 2	-	-	-	-	801	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.4	10.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	611	885	-	-	1364	-
HCM Lane V/C Ratio	0.125	0.06	-	-	0.043	-
HCM Control Delay (s)	11.7	9.3	-	-	7.8	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0.4	0.2	-	-	0.1	-

Intersection						
Int Delay, s/veh	6					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	90	50	30	15	30	85
Future Vol, veh/h	90	50	30	15	30	85
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	0	0	2
Mvmt Flow	101	56	34	17	34	96

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	51	0	-	0	300	42
Stage 1	-	-	-	-	42	-
Stage 2	-	-	-	-	258	-
Critical Hdwy	4.1	-	-	-	6.4	6.22
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.318
Pot Cap-1 Maneuver	1568	-	-	-	696	1029
Stage 1	-	-	-	-	986	-
Stage 2	-	-	-	-	790	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1568	-	-	-	650	1029
Mov Cap-2 Maneuver	-	-	-	-	650	-
Stage 1	-	-	-	-	986	-
Stage 2	-	-	-	-	738	-

Approach	EB	WB	SB
HCM Control Delay, s	4.8	0	9.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1568	-	-	-	893
HCM Lane V/C Ratio	0.064	-	-	-	0.145
HCM Control Delay (s)	7.5	0	-	-	9.7
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.2	-	-	-	0.5

Intersection	
Intersection Delay, s/veh	8.8
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations			↑↱									
Traffic Vol, veh/h	0	0	225	65	0	0	0	0	0	0	0	0
Future Vol, veh/h	0	0	225	65	0	0	0	0	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	0	3	2	2	0	0	0	2	0	0	0
Mvmt Flow	0	0	245	71	0	0	0	0	0	0	0	0
Number of Lanes	0	0	2	0	0	0	0	0	0	0	0	0

Approach	EB
Opposing Approach	
Opposing Lanes	0
Conflicting Approach Left	SB
Conflicting Lanes Left	2
Conflicting Approach Right	
Conflicting Lanes Right	0
HCM Control Delay	8.8
HCM LOS	A

Lane	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	0%	47%	0%
Vol Thru, %	100%	54%	53%	100%
Vol Right, %	0%	46%	0%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	150	140	63	67
LT Vol	0	0	30	0
Through Vol	150	75	33	67
RT Vol	0	65	0	0
Lane Flow Rate	163	152	69	72
Geometry Grp	7	7	7	7
Degree of Util (X)	0.223	0.194	0.105	0.106
Departure Headway (Hd)	4.933	4.59	5.48	5.242
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	730	784	655	686
Service Time	2.649	2.306	3.2	2.962
HCM Lane V/C Ratio	0.223	0.194	0.105	0.105
HCM Control Delay	9.1	8.4	8.8	8.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.9	0.7	0.4	0.4

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↰↑	
Traffic Vol, veh/h	0	30	100	0
Future Vol, veh/h	0	30	100	0
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	0	0	0
Mvmt Flow	0	33	109	0
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	
Opposing Lanes	0
Conflicting Approach Left	
Conflicting Lanes Left	0
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	8.7
HCM LOS	A

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱			↰						↰↑↱	
Traffic Vol, veh/h	0	55	15	30	20	0	0	0	0	100	665	35
Future Vol, veh/h	0	55	15	30	20	0	0	0	0	100	665	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	2	4	4	0	0	0	0	0	2	2	12
Mvmt Flow	0	60	16	33	22	0	0	0	0	109	723	38

Major/Minor	Minor2			Minor1			Major2		
Conflicting Flow All	-	959	380	609	978	-	0	0	0
Stage 1	-	959	-	0	0	-	-	-	-
Stage 2	-	0	-	609	978	-	-	-	-
Critical Hdwy	-	6.54	6.98	7.58	6.5	-	4.14	-	-
Critical Hdwy Stg 1	-	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	6.58	5.5	-	-	-	-
Follow-up Hdwy	-	4.02	3.34	3.54	4	-	2.22	-	-
Pot Cap-1 Maneuver	0	256	612	375	252	0	-	-	-
Stage 1	0	334	-	-	-	0	-	-	-
Stage 2	0	-	-	444	331	0	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	-	256	612	299	252	-	-	-	-
Mov Cap-2 Maneuver	-	256	-	299	252	-	-	-	-
Stage 1	-	334	-	-	-	-	-	-	-
Stage 2	-	-	-	355	331	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	21.6	21.1	
HCM LOS	C	C	

Minor Lane/Major Mvmt	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	292	278	-	-	-
HCM Lane V/C Ratio	0.261	0.195	-	-	-
HCM Control Delay (s)	21.6	21.1	-	-	-
HCM Lane LOS	C	C	-	-	-
HCM 95th %tile Q(veh)	1	0.7	-	-	-

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	95	0	0	30	35	20	735	25	0	0	0
Future Vol, veh/h	60	95	0	0	30	35	20	735	25	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	2	0	0	0	0	0	4	0	0	0	0
Mvmt Flow	65	103	0	0	33	38	22	799	27	0	0	0

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	459	870	-	-	856	413	0	0	0
Stage 1	0	0	-	-	856	-	-	-	-
Stage 2	459	870	-	-	0	-	-	-	-
Critical Hdwy	7.5	6.54	-	-	6.5	6.9	4.1	-	-
Critical Hdwy Stg 1	-	-	-	-	5.5	-	-	-	-
Critical Hdwy Stg 2	6.5	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.02	-	-	4	3.3	2.2	-	-
Pot Cap-1 Maneuver	490	288	0	0	297	594	-	-	-
Stage 1	-	-	0	0	377	-	-	-	-
Stage 2	557	367	0	0	-	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	420	288	-	-	297	594	-	-	-
Mov Cap-2 Maneuver	420	288	-	-	297	-	-	-	-
Stage 1	-	-	-	-	377	-	-	-	-
Stage 2	476	367	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	27	15.7	
HCM LOS	D	C	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1
Capacity (veh/h)	-	-	-	328	406
HCM Lane V/C Ratio	-	-	-	0.514	0.174
HCM Control Delay (s)	-	-	-	27	15.7
HCM Lane LOS	-	-	-	D	C
HCM 95th %tile Q(veh)	-	-	-	2.8	0.6

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	35	10	20	15	0	0	0	0	40	1	55
Future Vol, veh/h	0	35	10	20	15	0	0	0	0	40	1	55
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	38	11	22	16	0	0	0	0	43	1	60

Major/Minor	Minor2			Minor1			Major2		
Conflicting Flow All	-	118	31	142	148	-	0	0	0
Stage 1	-	118	-	0	0	-	-	-	-
Stage 2	-	0	-	142	148	-	-	-	-
Critical Hdwy	-	6.5	6.2	7.1	6.5	-	4.1	-	-
Critical Hdwy Stg 1	-	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	6.1	5.5	-	-	-	-
Follow-up Hdwy	-	4	3.3	3.5	4	-	2.2	-	-
Pot Cap-1 Maneuver	0	776	1049	832	747	0	-	-	-
Stage 1	0	802	-	-	-	0	-	-	-
Stage 2	0	-	-	866	779	0	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	-	776	1049	793	747	-	-	-	-
Mov Cap-2 Maneuver	-	776	-	793	747	-	-	-	-
Stage 1	-	802	-	-	-	-	-	-	-
Stage 2	-	-	-	816	779	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	9.6	9.9	
HCM LOS	A	A	

Minor Lane/Major Mvmt	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	824	773	-	-	-
HCM Lane V/C Ratio	0.059	0.049	-	-	-
HCM Control Delay (s)	9.6	9.9	-	-	-
HCM Lane LOS	A	A	-	-	-
HCM 95th %tile Q(veh)	0.2	0.2	-	-	-

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	40	35	0	0	20	25	15	5	10	0	0	0
Future Vol, veh/h	40	35	0	0	20	25	15	5	10	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	600	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	33	0	0	0	0
Mvmt Flow	42	37	0	0	21	26	16	5	11	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	21	0	-	-	-	0	142	142	37
Stage 1	-	-	-	-	-	-	121	121	-
Stage 2	-	-	-	-	-	-	21	21	-
Critical Hdwy	4.1	-	-	-	-	-	6.4	6.83	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	5.4	5.83	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.4	5.83	-
Follow-up Hdwy	2.2	-	-	-	-	-	3.5	4.297	3.3
Pot Cap-1 Maneuver	1608	-	0	0	-	-	856	696	1041
Stage 1	-	-	0	0	-	-	909	740	-
Stage 2	-	-	0	0	-	-	1007	820	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1608	-	-	-	-	-	833	0	1041
Mov Cap-2 Maneuver	-	-	-	-	-	-	833	0	-
Stage 1	-	-	-	-	-	-	884	0	-
Stage 2	-	-	-	-	-	-	1007	0	-

Approach	EB	WB	NB
HCM Control Delay, s	3.9	0	9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR
Capacity (veh/h)	833	1041	1608	-	-	-
HCM Lane V/C Ratio	0.019	0.015	0.026	-	-	-
HCM Control Delay (s)	9.4	8.5	7.3	0	-	-
HCM Lane LOS	A	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	0	0.1	-	-	-

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	1	1	25	1	40	2	435	45	70	510	1
Future Vol, veh/h	5	1	1	25	1	40	2	435	45	70	510	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	220	-	-	220	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	100	0	4	0	0	0	7	5	0	4	0
Mvmt Flow	5	1	1	27	1	43	2	473	49	76	554	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1209	1233	555	1210	1210	497	555	0	0	522	0	0
Stage 1	707	707	-	502	502	-	-	-	-	-	-	-
Stage 2	502	526	-	708	708	-	-	-	-	-	-	-
Critical Hdwy	7.1	7.5	6.2	7.14	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	6.5	-	6.14	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	6.5	-	6.14	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.9	3.3	3.536	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	161	116	535	158	184	577	1026	-	-	1055	-	-
Stage 1	429	319	-	548	545	-	-	-	-	-	-	-
Stage 2	555	398	-	422	441	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	140	107	535	148	170	577	1026	-	-	1055	-	-
Mov Cap-2 Maneuver	140	107	-	148	170	-	-	-	-	-	-	-
Stage 1	428	296	-	547	544	-	-	-	-	-	-	-
Stage 2	511	397	-	389	409	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	30.5	20.8	0	1
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1026	-	-	149	149	577	1055	-	-
HCM Lane V/C Ratio	0.002	-	-	0.051	0.19	0.075	0.072	-	-
HCM Control Delay (s)	8.5	-	-	30.5	34.7	11.7	8.7	-	-
HCM Lane LOS	A	-	-	D	D	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.7	0.2	0.2	-	-

Intersection: 10: OR 99 & Wilbur Rd

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	59	39
Average Queue (ft)	24	2
95th Queue (ft)	52	15
Link Distance (ft)	845	1342
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 20: OR 99 & N Bank Rd

Movement	WB	NB	SB
Directions Served	LR	R	L
Maximum Queue (ft)	81	4	39
Average Queue (ft)	33	0	7
95th Queue (ft)	60	3	30
Link Distance (ft)	954		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		175	250
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 30: OR 99 & I-5 Exit 129 NB Ramps

Movement	EB	EB	NB	NB	SB	SB
Directions Served	L	R	L	T	T	TR
Maximum Queue (ft)	78	65	152	110	111	90
Average Queue (ft)	54	4	72	42	54	35
95th Queue (ft)	76	29	128	94	96	74
Link Distance (ft)	54	54		1267	2118	
Upstream Blk Time (%)	14	0				
Queuing Penalty (veh)	27	0				
Storage Bay Dist (ft)			350			500
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 40: Del Rio Rd & I-5 Exit 129 SB Ramps

Movement	EB	SB	SB
Directions Served	L	L	R
Maximum Queue (ft)	48	86	60
Average Queue (ft)	6	45	24
95th Queue (ft)	29	71	48
Link Distance (ft)		1315	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	470		375
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 50: OR 99 & Del Rio Rd/Umpqua College Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	R	L	T	R
Maximum Queue (ft)	85	80	231	167	156	103	128	173	100	153	214	131
Average Queue (ft)	36	33	117	72	65	33	56	69	25	68	90	49
95th Queue (ft)	72	68	198	133	125	80	108	129	66	132	161	101
Link Distance (ft)		856			1556			1146			1267	1267
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	365		515	290		290	350		260	350		
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 60: Stephens St & Kenneth Ford Dr

Movement	WB	WB	NB	NB	SB	SB
Directions Served	L	R	T	R	L	T
Maximum Queue (ft)	337	229	956	185	199	567
Average Queue (ft)	170	79	440	58	88	353
95th Queue (ft)	283	184	820	171	202	617
Link Distance (ft)	623		4143			528
Upstream Blk Time (%)						9
Queuing Penalty (veh)						0
Storage Bay Dist (ft)		175		110	125	
Storage Blk Time (%)	9	0	33		5	33
Queuing Penalty (veh)	10	0	27		29	26

Intersection: 120: Stephens St & NE Newton Creek Rd

Movement	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	T	TR	L	T	TR
Maximum Queue (ft)	54	152	42	263	234	109	152	178
Average Queue (ft)	22	69	8	136	84	49	53	69
95th Queue (ft)	52	120	31	224	180	91	119	139
Link Distance (ft)	100	976		754	754		1522	1522
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			175			200		
Storage Blk Time (%)				2				
Queuing Penalty (veh)				0				

Intersection: 140: NW Garden Valley Blvd & Melrose Rd/Darley Dr

Movement	EB	EB	WB	NB	SB	SB
Directions Served	LT	R	LTR	L	L	T
Maximum Queue (ft)	165	53	37	161	24	4
Average Queue (ft)	65	2	11	69	2	0
95th Queue (ft)	139	38	35	132	14	3
Link Distance (ft)	1793		914			1160
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		300		275	100	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 150: NW Troost St & NW Garden Valley Blvd

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	TR	L	LTR
Maximum Queue (ft)	41	202	213	223	373	320	11	70	179	34	105
Average Queue (ft)	6	103	102	164	83	45	1	22	73	8	32
95th Queue (ft)	28	176	185	242	282	180	6	58	129	29	78
Link Distance (ft)		3637	3637		721	721			475		670
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	200			150			145	90		80	
Storage Blk Time (%)		0		23	0	0		0	4		2
Queuing Penalty (veh)		0		119	0	0		1	1		0

Intersection: 160: NW Kline St & NW Garden Valley Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	174	692	678	224	558	587	169	271	834	834
Average Queue (ft)	39	413	392	79	264	293	60	98	643	431
95th Queue (ft)	140	736	726	186	512	537	127	199	1046	1068
Link Distance (ft)		732	732		1175	1175		420	815	815
Upstream Blk Time (%)		2	1					0	52	33
Queuing Penalty (veh)		6	5					0	0	0
Storage Bay Dist (ft)	100			150			100			
Storage Blk Time (%)	1	59		2	17		4	15		
Queuing Penalty (veh)	2	9		13	11		5	9		

Intersection: 170: NW Garden Valley Blvd & Roseburg Valley Mall Middle Dwy

Movement	EB	EB	EB	WB	SB
Directions Served	L	T	T	TR	LR
Maximum Queue (ft)	224	1210	1235	13	360
Average Queue (ft)	81	960	944	0	275
95th Queue (ft)	243	1643	1672	7	464
Link Distance (ft)		1175	1175	752	351
Upstream Blk Time (%)		23	18		54
Queuing Penalty (veh)		133	101		0
Storage Bay Dist (ft)	150				
Storage Blk Time (%)		73			
Queuing Penalty (veh)		22			

Intersection: 180: NW Stewart Pkwy & Roseburg Valley Mall Dwy/Walmart Dwy

Movement	EB	EB	WB	WB	NB	NB	NB	NB	B109	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	T	L	T	TR
Maximum Queue (ft)	103	111	226	120	139	290	307	169	15	225	1399	1403
Average Queue (ft)	40	39	153	30	45	126	145	60	1	98	1206	1230
95th Queue (ft)	89	88	254	81	93	230	250	128	10	254	1745	1734
Link Distance (ft)	172	172	207	207		400	400		563		1361	1361
Upstream Blk Time (%)			14	0		0	0				39	62
Queuing Penalty (veh)			0	0		1	2				0	0
Storage Bay Dist (ft)					110			200		150		
Storage Blk Time (%)					0	9	2	0			52	
Queuing Penalty (veh)					1	7	3	0			34	

Intersection: 190: NW Mulholland Dr/Aviation Dr & NW Stewart Pkwy

Movement	EB	EB	EB	B36	B36	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	T	T	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	224	503	551	88	86	83	174	185	150	364	89	120
Average Queue (ft)	44	255	310	5	5	32	86	103	121	120	26	39
95th Queue (ft)	157	472	518	71	75	71	147	167	171	334	63	91
Link Distance (ft)		701	701	1000	1000		1668	1668		706		679
Upstream Blk Time (%)		2	2							0		
Queuing Penalty (veh)		7	8							0		
Storage Bay Dist (ft)	150					125			75		100	
Storage Blk Time (%)		23				0	2		32	1	0	1
Queuing Penalty (veh)		10				0	2		35	5	0	0

Intersection: 210: NW Stewart Pkwy & NW Valley View Dr

Movement	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	R	L	T	T	T	TR
Maximum Queue (ft)	274	448	76	89	195	20	65
Average Queue (ft)	175	194	29	11	10	1	1
95th Queue (ft)	345	694	63	61	68	11	8
Link Distance (ft)		788		472	472	234	234
Upstream Blk Time (%)		9					0
Queuing Penalty (veh)		0					0
Storage Bay Dist (ft)	250		350				
Storage Blk Time (%)	26	0					
Queuing Penalty (veh)	29	0					

Intersection: 220: NE Airport Rd & NW Stewart Pkwy

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	LT	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	719	750	56	123	122	125	126	100	134
Average Queue (ft)	246	246	19	47	44	48	34	15	61
95th Queue (ft)	897	908	47	96	100	102	101	59	107
Link Distance (ft)	1668	1668		882	882		606	553	
Upstream Blk Time (%)	3	3							
Queuing Penalty (veh)	14	14							
Storage Bay Dist (ft)			200			80			90
Storage Blk Time (%)						3	5	0	3
Queuing Penalty (veh)						2	4	1	0

Intersection: 230: NE Vine St & NE Alameda Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	91	88	90	72
Average Queue (ft)	55	45	46	42
95th Queue (ft)	81	70	73	63
Link Distance (ft)	900	1015	906	922
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 240: NW Troost St & NW Calkins Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	51	111	64	124
Average Queue (ft)	30	62	37	54
95th Queue (ft)	51	94	58	97
Link Distance (ft)	377	2632	943	888
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 250: NW Keasey St & NW Calkins Ave

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	75	65
Average Queue (ft)	42	21
95th Queue (ft)	67	57
Link Distance (ft)	2632	1207
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 260: Duck Pond St/NW Goetz St & NW Garden Valley Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	L	T	TR	L	T	TR	LT	R	LTR
Maximum Queue (ft)	167	562	551	93	234	246	202	129	70
Average Queue (ft)	30	156	168	25	90	92	91	45	19
95th Queue (ft)	88	397	421	67	193	198	162	103	52
Link Distance (ft)		1240	1240		618	618	306	306	333
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	150			100					
Storage Blk Time (%)		6		0	5				
Queuing Penalty (veh)		2		2	2				

Intersection: 320: Walnut St & NE Garden Valley Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	LT	R	LT	R
Maximum Queue (ft)	139	430	425	50	69	75	144	161	44	54
Average Queue (ft)	40	194	148	12	13	21	66	44	7	9
95th Queue (ft)	123	459	416	38	47	60	123	102	29	36
Link Distance (ft)		442	442		452	452		1286	328	328
Upstream Blk Time (%)		5	2							
Queuing Penalty (veh)		25	13							
Storage Bay Dist (ft)	115			75			100			
Storage Blk Time (%)	0	28		0	0		4	1		
Queuing Penalty (veh)	0	11		0	0		2	1		

Intersection: 340: NE Garden Valley Blvd & NE Rocky Ridge Dr

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	71	49
Average Queue (ft)	9	26
95th Queue (ft)	41	52
Link Distance (ft)	1246	1263
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 350: NW Stewart Pkwy & NW Harvey Ave

Movement	EB	EB	WB	WB	NB	NB	SB	SB	SB	B104	B104
Directions Served	L	TR	L	TR	L	TR	L	T	TR	T	T
Maximum Queue (ft)	160	222	105	156	274	484	200	541	529	966	951
Average Queue (ft)	48	102	42	62	179	200	156	505	502	682	654
95th Queue (ft)	114	187	87	117	281	391	287	558	558	1298	1272
Link Distance (ft)		942		488		1427		442	442	1095	1095
Upstream Blk Time (%)								92	92	24	21
Queuing Penalty (veh)								0	0	0	0
Storage Bay Dist (ft)	100		200		200		175				
Storage Blk Time (%)	1	10		0	6	5	0	96			
Queuing Penalty (veh)	2	5		0	33	14	0	58			

Intersection: 360: NE Cedar St & NE Chestnut Ave

Movement	EB	EB	WB	NB	SB	SB
Directions Served	L	TR	LTR	LTR	L	TR
Maximum Queue (ft)	28	73	58	31	60	73
Average Queue (ft)	18	22	25	18	25	30
95th Queue (ft)	38	48	53	42	52	62
Link Distance (ft)		466	444	438	1291	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	90					90
Storage Blk Time (%)		0			0	0
Queuing Penalty (veh)		0			0	0

Intersection: 370: Stephens St & NE Chestnut Ave

Movement	EB	WB	NB	NB	NB	SB	SB	SB	B55
Directions Served	LTR	LTR	L	T	TR	L	T	TR	T
Maximum Queue (ft)	154	33	175	1196	1303	5	379	353	7
Average Queue (ft)	64	3	115	1023	1109	0	179	160	0
95th Queue (ft)	126	18	237	1604	1742	4	314	289	5
Link Distance (ft)	1049	197		1150	1150	870	870	870	456
Upstream Blk Time (%)				55	79				
Queuing Penalty (veh)				426	619				
Storage Bay Dist (ft)			100						
Storage Blk Time (%)			1	73					
Queuing Penalty (veh)			6	90					

Intersection: 380: Stephens St & NE Winchester St

Movement	WB	NB	NB	B45	B45	SB	SB	SB
Directions Served	R	T	TR	T	T	L	T	T
Maximum Queue (ft)	586	1011	1006	390	390	245	523	156
Average Queue (ft)	518	544	545	71	73	148	80	16
95th Queue (ft)	733	1218	1224	320	330	269	367	169
Link Distance (ft)	546	1012	1012	1413	1413		1150	1150
Upstream Blk Time (%)	79	21	23					
Queuing Penalty (veh)	0	80	85					
Storage Bay Dist (ft)						170		
Storage Blk Time (%)						13	0	
Queuing Penalty (veh)						75	0	

Intersection: 390: NE Lincoln St & NE Malheur Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	59	32	8	19
Average Queue (ft)	8	22	0	1
95th Queue (ft)	34	45	4	10
Link Distance (ft)	484	687	753	2389
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 400: Lookingglass Rd & W Harvard Ave

Movement	EB	WB	WB	WB	NB	NB
Directions Served	TR	L	T	T	L	R
Maximum Queue (ft)	42	179	12	3	72	85
Average Queue (ft)	2	67	0	0	13	6
95th Queue (ft)	20	138	9	2	48	39
Link Distance (ft)	696		691	691	827	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		225				50
Storage Blk Time (%)		0			2	0
Queuing Penalty (veh)		0			5	0

Intersection: 410: W Broccoli St & W Harvard Ave

Movement	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	TR	L	T	TR	LTR	LTR
Maximum Queue (ft)	38	5	115	4	6	81	111
Average Queue (ft)	9	0	37	0	0	38	52
95th Queue (ft)	33	4	82	3	5	63	88
Link Distance (ft)		691		2263	2263	505	415
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	150		150				
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 430: W Keady Ct & W Harvard Ave

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	20	232	256	225	1387	1395	108	92	7	32
Average Queue (ft)	1	78	96	59	949	980	44	43	0	3
95th Queue (ft)	12	170	195	173	1791	1784	89	76	5	17
Link Distance (ft)		1021	1021		1356	1356		503	246	246
Upstream Blk Time (%)					6	10				
Queuing Penalty (veh)					38	65				
Storage Bay Dist (ft)	150			150			105			
Storage Blk Time (%)		1		0	14		2	0		
Queuing Penalty (veh)		0		1	6		1	0		

Intersection: 440: W Harvard Ave & Stewart Park Dr/Centennial

Movement	EB	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	T	TR	L	R
Maximum Queue (ft)	95	312	334	912	923	372	320
Average Queue (ft)	24	155	169	483	512	260	70
95th Queue (ft)	66	269	287	1003	1008	397	199
Link Distance (ft)		1356	1356	892	892	352	352
Upstream Blk Time (%)				9	11	9	1
Queuing Penalty (veh)				66	80	0	0
Storage Bay Dist (ft)	150						
Storage Blk Time (%)		6					
Queuing Penalty (veh)		1					

Intersection: 540: Jackson/Winchester & Diamond Lake Blvd

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	T	R	L	TR
Maximum Queue (ft)	200	452	512	150	224	1060	1171	125	196	94	375	1429
Average Queue (ft)	122	272	288	60	92	473	675	120	91	22	367	1032
95th Queue (ft)	216	437	471	161	195	946	1135	148	168	62	414	1764
Link Distance (ft)		426	426			1322	1322		1035			1494
Upstream Blk Time (%)		0	2				0					23
Queuing Penalty (veh)		2	11				0					0
Storage Bay Dist (ft)	125			75	150			50		150	300	
Storage Blk Time (%)	13	34	46	0	3	17	54	24	3		64	0
Queuing Penalty (veh)	52	37	39	0	8	15	245	68	1		109	0

Intersection: 550: NE Fulton St & SE Diamond Lake Blvd

Movement	EB	B67	WB	WB	NB	SB
Directions Served	L	T	L	TR	LTR	LTR
Maximum Queue (ft)	50	12	25	4	34	92
Average Queue (ft)	14	0	2	0	8	36
95th Queue (ft)	42	9	16	3	30	73
Link Distance (ft)		1322		2636	456	677
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	150		150			
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 560: NE Rifle Range St & SE Diamond Lake Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	98	207	222	75	131	155	103	64	42	60
Average Queue (ft)	32	71	91	17	51	67	45	21	5	26
95th Queue (ft)	73	148	163	51	103	127	84	54	26	54
Link Distance (ft)		2636	2636		8741	8741		925	579	579
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	150			150			225			
Storage Blk Time (%)	0	0			0					
Queuing Penalty (veh)	0	0			0					

Intersection: 570: NE Douglas Ave & SE Diamond Lake Blvd

Movement	EB	WB	NB
Directions Served	T	L	LR
Maximum Queue (ft)	5	58	70
Average Queue (ft)	0	10	24
95th Queue (ft)	4	37	58
Link Distance (ft)	8741		592
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		150	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 620: SE Jackson St & SE Douglas Ave

Movement	EB	WB	WB	SB	SB
Directions Served	LTR	LT	TR	LT	TR
Maximum Queue (ft)	220	78	78	132	61
Average Queue (ft)	94	42	36	54	46
95th Queue (ft)	168	69	60	98	70
Link Distance (ft)	485		385	1035	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		25			35
Storage Blk Time (%)		16	8	15	5
Queuing Penalty (veh)		28	11	11	8

Intersection: 660: SE Jackson St & SE Washington Ave

Movement	WB	WB	SB	SB
Directions Served	LT	T	T	TR
Maximum Queue (ft)	80	56	35	59
Average Queue (ft)	46	34	27	33
95th Queue (ft)	68	53	49	53
Link Distance (ft)	377	377	319	319
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 670: SE Kane St & SE Douglas Ave

Movement	EB	WB	NB	NB
Directions Served	TR	L	L	R
Maximum Queue (ft)	10	59	60	61
Average Queue (ft)	1	18	26	34
95th Queue (ft)	6	50	55	52
Link Distance (ft)	385	248	290	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				60
Storage Blk Time (%)			1	0
Queuing Penalty (veh)			0	0

Intersection: 680: SE Ramp Rd & SE Douglas Ave

Movement	EB	WB	NB	NB
Directions Served	TR	LT	L	R
Maximum Queue (ft)	5	65	70	41
Average Queue (ft)	0	10	31	24
95th Queue (ft)	4	40	57	47
Link Distance (ft)	992	944		776
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			60	
Storage Blk Time (%)			0	0
Queuing Penalty (veh)			0	0

Intersection: 690: SE Douglas Ave & NE Rifle Range St

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	34	72
Average Queue (ft)	5	37
95th Queue (ft)	25	60
Link Distance (ft)	944	925
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 700: SE Jackson St & Oak/SE Oak Ave

Movement	EB	EB	SB	SB
Directions Served	T	TR	LT	T
Maximum Queue (ft)	67	102	35	44
Average Queue (ft)	31	48	33	28
95th Queue (ft)	60	77	44	51
Link Distance (ft)	480	480	359	359
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 710: OR 99 SB & SE Mosher Ave

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	81	70	5	25
Average Queue (ft)	40	29	0	1
95th Queue (ft)	67	58	0	11
Link Distance (ft)	254	261	1066	1066
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 720: OR 99 NB & SE Mosher Ave

Movement	EB	WB	NB
Directions Served	LT	TR	TR
Maximum Queue (ft)	134	76	21
Average Queue (ft)	58	36	1
95th Queue (ft)	102	62	10
Link Distance (ft)	261	381	2280
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 730: I-5 Exit 123 SB Ramps & Heritage Way/SW Portland Ave

Movement	EB	WB
Directions Served	TR	LT
Maximum Queue (ft)	49	38
Average Queue (ft)	23	21
95th Queue (ft)	48	47
Link Distance (ft)	1158	262
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 740: I-5 Exit 123 NB Ramps & SW Portland Ave

Movement	EB	NB	NB
Directions Served	LT	L	TR
Maximum Queue (ft)	25	31	62
Average Queue (ft)	2	10	11
95th Queue (ft)	15	33	38
Link Distance (ft)	262		928
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		600	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 750: OR 99 & S Gate Shopping Center Dwy

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	L	L
Maximum Queue (ft)	36	56	62	6	70
Average Queue (ft)	5	20	25	0	23
95th Queue (ft)	22	50	51	5	57
Link Distance (ft)	104	241	241		
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)				220	220
Storage Blk Time (%)					
Queuing Penalty (veh)					

Zone Summary

Zone wide Queuing Penalty: 3200

Appendix D

Future Bicycle Level of Traffic Stress

Appendix D

Future Bicycle Level of Traffic Stress

Appendix D - Future Bicycle Level of Traffic Stress

BTLS_	Segment	From	To	Bike Lane	Bike Lane Category Description	On-Street	Lanes per	Speed	Prevailing	LTS	Rural vpd	Rural Shoulder
1	Diamond Lake Boulevar	Stephens St	Rifle Range St	3	Mixed Traffic	No	2	35	2 Lane	4		
2		Rifle Range St	Phoenix Charter School	3	Mixed Traffic	No	2	45	2 Lane	4		
3		Phoenix Charter School	East UGB	4	Rural no bike lanes	No	2	55	2 Lane	3	>7000	4-<6
4	Edenbower Blvd	Renan St	Stewart Pkwy	2	Bike Lane without Adjacent Parking Lane	No	1	25	<=5.5'	2		
5		Stewart Pkwy	Stephens St	2	Bike Lane without Adjacent Parking Lane	No	1	40	5.5'-7'	4		
6	Garden Valley Blvd	Melrose Rd	Troost St	4	Rural no bike lanes	No	2	45	Unmarked	3	>7000	4-<6
7		Troost St	Newcastle St	2	Bike Lane without Adjacent Parking Lane	No	2	40	5.5'-7'	4		
8		Newcastle St	I-5 SB Ramp	2	Bike Lane without Adjacent Parking Lane	No	2	35	<=5.5'	3		
9		I-5 SB Ramp	Stephens St	3	Mixed Traffic	No	2	30	2 Lane	4		
10		Stephens St	Junker Ave	2	Bike Lane without Adjacent Parking Lane	No	1	25	<=5.5'	2		
11	Harvard Ave	Old Melrose Rd	Lookingglass Rd	2	Bike Lane without Adjacent Parking Lane	No	1	35	<=5.5'	3		
12		Lookingglass Rd	Stewart Park Dr	3	Mixed Traffic	No	2	35	2 Lane	4		
13		Stewart Park Dr	Umpqua St	3	Mixed Traffic	No	2	30	2 Lane	4		
14		Umpqua St	Madrone St	2	Bike Lane without Adjacent Parking Lane	No	2	30	<=5.5'	2		
15	Oak Ave	Madrone St	Oak Ave Bridge	2	Bike Lane without Adjacent Parking Lane	No	2	30	<=5.5'	2		
16		Oak Ave Bridge	Oak Ave Bridge	2	Bike Lane without Adjacent Parking Lane	No	2	30	>=7'	1		
17		Oak Ave Bridge	Pine St	2	Bike Lane without Adjacent Parking Lane	No	2	30	<=5.5'	2		
18		Pine St	Chadwick St	3	Mixed Traffic	Yes	2	25	2 Lane	3		
19	Pine St	Douglas Ave	Mosher Ave	2	Bike Lane without Adjacent Parking Lane	No	2	25	<=5.5'	2		
20		Mosher Ave	South UGB	2	Bike Lane without Adjacent Parking Lane	No	2	35	<=5.5'	3		
21	Stephens St (Old Highwa	North UGB	Del Rio Rd	4	Rural no bike lanes	No	1	35	1 Lane	2	1500-7000	4-<6
22		Del Rio Rd	Bridge	2	Bike Lane without Adjacent Parking Lane	No	1	35	>=7'	2		
23		Bridge	Bridge	3	Mixed Traffic	No	1	35	1 Lane	4		
24		Bridge	Taft Dr	4	Rural no bike lanes	No	1	45	1 Lane	3	1500-7000	2-<4
25		Taft Dr	Edenbower Blvd	2	Bike Lane without Adjacent Parking Lane	No	1	45	<=5.5'	4		
26		Edenbower Blvd	Garden Valley Blvd	2	Bike Lane without Adjacent Parking Lane	No	1	35	<=5.5'	3		
27		Garden Valley Blvd	Douglas Ave	3	Mixed Traffic	No	1	35	2 Lane	4		
78		Douglas Ave	Oak Ave	2	Bike Lane without Adjacent Parking Lane	No	1	25	<=5.5'	2		
79		Oak Ave	South	3	Mixed Traffic	Yes	2	25	2 Lane	3		
28	Stewart Pkwy	Edenbower Blvd	Valley View Dr	2	Bike Lane without Adjacent Parking Lane	No	2	40	<=5.5'	4		
29		Valley View Dr	Harvard Ave	2	Bike Lane without Adjacent Parking Lane	No	2	35	5.5'-7'	3		
80		Edenbower Blvd	Stephens St	2	Bike Lane without Adjacent Parking Lane	No	2	40	<=5.5'	4		
30	Washington Ave	Madrone St	Spruce St	2	Bike Lane without Adjacent Parking Lane	No	2	30	<=5.5'	2		
31		Spruce St	Chadwick St	3	Mixed Traffic	Yes	2	25	2 Lane	3		
32	Alameda Ave			2	Bike Lane without Adjacent Parking Lane	No	1	25	<=5.5'	2		
33	Aviation Dr			2	Bike Lane without Adjacent Parking Lane	No	1	25	<=5.5'	2		
34	Kane St	Douglas Ave	Lane Ave	3	Mixed Traffic	Yes	1	25	1 Lane	2		
35		Lane Ave	Southern End	3	Mixed Traffic	No	1	25	Unmarked	1		
36	Lookingglass Road	Harvard Ave	Goedeck Ave	2	Bike Lane without Adjacent Parking Lane	No	1	40	5.5'-7'	4		
37		Goedeck Ave	UGB	4	Rural no bike lanes	No	1	50	>=7'	2	1500-7000	>=6
38	Pearce Rd			3	Mixed Traffic	No	1	25	Unmarked	1		
39	Ramp St			3	Mixed Traffic	No	1	25	1 Lane	2		
40	Troost St	North	Garden Valley Blvd	3	Mixed Traffic	No	1	25	1 Lane	2		
41		Garden Valley Blvd	Greenley St	1	Bike Lane with Adjacent Parking Lane	Yes	1	25	<=13'	3		
42		Greenley St	UGB	3	Mixed Traffic	No	1	25	1 Lane	2		
43	Vine St	Meadow Ave	Garden Valley Blvd	2	Bike Lane without Adjacent Parking Lane	No	1	25	5.5'-7'	1		
44	Winchester St			2	Bike Lane without Adjacent Parking Lane	No	1	35	<=5.5'	3		
45	Airport Rd			2	Bike Lane without Adjacent Parking Lane	No	1	25	<=5.5'	2		
46	Bellows St			3	Mixed Traffic	No	1	25	Unmarked	1		
47	Calkins Rd			3	Mixed Traffic	No	1	25	1 Lane	2		
48	Cedar St (north of Chestnut Ave)			2	Bike Lane without Adjacent Parking Lane	No	1	25	<=5.5'	2		
49	Chestnut Ave	West End	Cedar St	3	Mixed Traffic	No	1	25	1 Lane	2		
50		Cedar St	Stephens St	2	Bike Lane without Adjacent Parking Lane	No	1	25	5.5'-7'	1		
51	Del Rio Rd	West UGB	I-5 SB Ramp	4	Rural no bike lanes	No	1	45	<=5.5'	3	1500-7000	2-<4
52		West UGB	Stephens St	2	Bike Lane without Adjacent Parking Lane	No	2	35	<=5.5'	3		
53	Douglas Ave	Spruce St	Jackson St	3	Mixed Traffic	No	1	25	1 Lane	2		
54		Jackson St	Dos Gatos Ct	1	Bike Lane with Adjacent Parking Lane	Yes	1	25	1 Lane	2		
55		Dos Gatos Ct	Rifle Range St	3	Mixed Traffic	Yes	1	35	1 Lane	4		
56		Rifle Range St	OR 138	3	Mixed Traffic	No	1	35	1 Lane	4		
57	Fulton St	Fleser Ave	Commercial Ave	3	Mixed Traffic	No	1	25	1 Lane	2		
58		Commercial Ave	Northern Limit	3	Mixed Traffic	No	1	25	Unmarked	1		
59	Harvey Ave			3	Mixed Traffic	No	1	25	1 Lane	2		
60	Hughwood Dr	Troost St	Newcastle St	3	Mixed Traffic	No	1	25	Unmarked	1		
61		Newcastle St	Kline St	2	Bike Lane without Adjacent Parking Lane	No	1	25	<=5.5'	2		
62	Jackson St	Diamond Lake Blvd	Douglas Ave	3	Mixed Traffic	Yes	1	25	1 Lane	2		
63		Douglas Ave	Mosher Ave	3	Mixed Traffic	Yes	1	25	2 Lane	3		
64		Mosher Ave	South End	3	Mixed Traffic	Yes	1	25	Unmarked	1		
65	Keasey St			2	Bike Lane without Adjacent Parking Lane	No	1	25	<=5.5'	2		
66	Kline St			3	Mixed Traffic	No	1	25	1 Lane	2		
67	Lane Ave	Sheridan St	Kane St	3	Mixed Traffic	Yes	1	25	1 Lane	2		
68		Kane St	East End	3	Mixed Traffic	Yes	1	25	Unmarked	1		
69	Lincoln St	Junker Ave	Malheur Ave	3	Mixed Traffic	Yes	1	25	1 Lane	2		
70	Main St	Douglas Ave	Lane Ave	3	Mixed Traffic	Yes	1	25	1 Lane	2		
71	Mosher Ave	Sheridan St	Main St	3	Mixed Traffic	No	1	25	1 Lane	2		
72	Portland Ave			3	Mixed Traffic	No	1	25	1 Lane	2		
73	Renann St			2	Bike Lane without Adjacent Parking Lane	No	1	25	<=5.5'	2		
74	Rifle Range St			3	Mixed Traffic	No	1	25	1 Lane	2		
75	Umpqua College Rd			4	Rural no bike lanes	No	1	45	>=7'	2	1500-7000	>=6
76	Valley View Dr	Kline St	Stewart Pkwy	3	Mixed Traffic	No	1	25	1 Lane	2		
77	Walnut St	Garden Valley Blvd	Chestnut Ave	3	Mixed Traffic	Yes	1	25	1 Lane	2		
	ALL MULTIUSE PATHS HAVE LTS 1 PER METHODOLOGY											

Exhibit 14-3 Bike Lane with Adjacent Parking Lane Criteria

1 Lane per direction				≥2 lanes per direction	
Prevailing or Posted Speed	**≥ 15' bike lane + parking**	**14' – 14.5' bike lane + parking**	**≤ 13' bike lane + parking or Frequent blockage[1]**	**≥ 15' bike lane + parking**	**≤ 14.5' bike lane + parking or Frequent blockage[1]**
≤25 mph	LTS 1	LTS 2	LTS 3	LTS 2	LTS 3
30 mph	LTS 1	LTS 2	LTS 3	LTS 2	LTS 3
35 mph	LTS 2	LTS 3	LTS 3	LTS 3	LTS 3
≥40 mph	LTS 2	LTS 4	LTS 4	LTS 3	LTS 4

[1]Typically occurs in urban areas (i.e. delivery trucks, parking maneuvers, stopped buses).

Exhibit 14-4 Bike Lane without Adjacent Parking Lane Criteria

1 Lane per direction					≥2 lanes per direction	
Prevailing or Posted Speed	≥ 7' (Buffered bike lane)	5.5' – 7' Bike lane	≤ 5.5' Bike lane	Frequent bike lane blockage[1]	≥ 7' (Buffered bike lane)	<7' bike lane or frequent blockage[1]
≤30 mph	LTS 1	LTS 1	LTS 2	LTS 3	LTS 1	LTS 3
35 mph	LTS 2	LTS 3	LTS 3	LTS 3	LTS 2	LTS 3
≥40 mph	LTS 3	LTS 4	LTS 4	LTS 4	LTS 3	LTS 4

[1]Typically occurs in urban areas (i.e. delivery trucks, parking maneuvers, stopped buses).

Exhibit 14-5 Urban/Suburban Mixed Traffic Criteria

Prevailing Speed or Speed Limit (mph)	Unmarked Centerline	1 lane per direction	2 lanes per direction	3+ lanes per direction
≤ 25[1]	LTS 1	LTS 2	LTS 3	LTS 4
30	LTS 2	LTS 3	LTS 4	LTS 4
≥ 35	LTS 3	LTS 4	LTS 4	LTS 4

[1]Presesence of "sharrow" markings may reduce the LTS by a level for 25 mph or less sections depending on overall area context.

Exhibit 14-11 Rural Segment Criteria with posted speeds 45 mph or greater[1,2,3]

Daily Volume (vpd)	Paved Shoulder Width			
	0 – <2 ft	**2 - <4 ft**	**4 – <6 ft**	**≥ 6 ft**
<400	LTS 2	LTS 2	LTS 2	LTS 2
400 - 1500	LTS 3	LTS 2	LTS 2	LTS 2
1500 - 7000[4]	LTS 4	LTS 3	LTS 2	LTS 2
> 7000	LTS 4	LTS 4	LTS 3	LTS 3

[1] Based on p1-3 & Table 1-2 from the Oregon Bicycle and Pedestrian Design Guide, 2011.
[2]Adequate stopping sight distances on curves and grades assumed. A high frequency of sharper curves and short vertical transitions can increase the stress level especially on roadways with less than 6' shoulders. Engineering judgment will be needed to determine what impact this will have on the LTS level on a particular segment.
[3]Segments with flashing warning beacons announcing presence of bicyclists (typically done on narrower long bridges or tunnels) may, depending on judgment, reduce the LTS by one, but no less than LTS 2.
[4]Over 1500 AADT, the Oregon Bicycle and Pedestrian Design Guide indicates the need for shoulders.

Appendix E

Planned Projects

Appendix E

Planned Projects

ODOT 2018-2021 STIP
Bicycle and Pedestrian Projects from 2009 Bicycle and Pedestrian Plan
Roseburg CIP

Name: DOUGLAS COUNTY WARNING SIGN UPGRADES Key: 20248

Description **Install curve signs, chevrons and flashing beacon on North Bank Road. Install Curve signs and chevrons on Glenbrook Loop/Riddle Bypass Rd/Sixth Ave., Tiller Trail Highway and Garden Valley Rd.** Region: **3**

MPO: **Non-MPO** Work Type: **SAFETY**

Applicant: **DOUGLAS COUNTY** Status: **PROJECT SCHEDULED FOR CONSTRUCTION**

Location(s)

Mileposts	Length	Route	Highway	ACT	County(s)
		Various	**VARIOUS HIGHWAYS**	**SOUTH WEST OREGON ACT**	**DOUGLAS**

Current Project Estimate

	Planning	Prelim. Engineering	Right of Way	Utility Relocation	Construction	Other	Project Total
Year		**2019**	**2019**		**2019**		
Total		**$67,000.00**	**$1,000.00**		**$330,000.00**		**$398,000.00**
Fund 1		MS30 $61,787.40	MS30 $922.20		MS30 $304,326.00		
Match							
Fund 2		OTH0 $5,212.60	OTH0 $77.80		OTH0 $25,674.00		
Match							

Footnote:

Name: ROSEBURG PEDESTRIAN UPGRADES Key: 20250

Description **Install rapid flasher on Stephens St @ Roseland; Countdown ped signals on Stephens St @ Edenbower, Newton Creek and Stewart Parkway and on Harvard Av @ Stewart Pkwy, Keady Ct, Centennial Dr, Umpqua St.** Region: **3**

MPO: **Non-MPO** Work Type: **SAFETY**

Applicant: **CITY OF ROSEBURG** Status: **PROJECT SCHEDULED FOR CONSTRUCTION**

Location(s)

Mileposts	Length	Route	Highway	ACT	County(s)
				SOUTH WEST OREGON ACT	**DOUGLAS**

Current Project Estimate

	Planning	Prelim. Engineering	Right of Way	Utility Relocation	Construction	Other	Project Total
Year		**2019**	**2019**		**2019**		
Total		**$100,000.00**	**$2,000.00**		**$400,000.00**		**$502,000.00**
Fund 1		MS30 $92,222.00	MS30 $1,844.40		MS30 $368,880.00		
Match							
Fund 2		OTH0 $7,778.00	OTH0 $155.60		OTH0 $31,120.00		
Match							

Footnote:

Name: UPPER OLALLA ROAD: BERRY CREEK BRIDGE Key: 20358

Description **Replace current bridge with a new single-span bridge on the same alignment.** Region: **3**

MPO: **Non-MPO** Work Type: **BRIDGE**

Applicant: **DOUGLAS COUNTY** Status: **PROJECT SCHEDULED FOR CONSTRUCTION**

Location(s)

Mileposts	Length	Route	Highway	ACT	County(s)
				SOUTH WEST OREGON ACT	**DOUGLAS**

Current Project Estimate

	Planning	Prelim. Engineering	Right of Way	Utility Relocation	Construction	Other	Project Total
Year		**2018**	**2018**		**2019**		
Total		**$604,887.00**	**$32,814.00**		**$2,456,342.00**		**$3,094,043.00**
Fund 1		Z233 $542,765.11	Z233 $29,444.00		Z233 $2,204,075.68		
Match		$62,121.89	$3,370.00		$252,266.32		

Footnote:

Name:	I-5: EXIT 124 SIGNAL UPGRADES & BELLOWS ST REALIGN	Key:	20694

Description **Replace signal poles and hardware at the northbound and southbound ramp terminals. Add turn lanes and realign Bellows St. and the southbound off-ramp.** Region: **3**

MPO: **Non-MPO** Work Type: **OP-SSI**

Applicant: **ODOT** Status: **PROJECT SCHEDULED FOR CONSTRUCTION**

Location(s)

Mileposts	Length	Route	Highway	ACT	County(s)
124.00 to 124.00	**0.00**	**I-5**	**PACIFIC HIGHWAY**	**SOUTH WEST OREGON ACT**	**DOUGLAS**

Current Project Estimate

	Planning	Prelim. Engineering	Right of Way	Utility Relocation	Construction	Other	Project Total
Year		**2017**	**2018**		**2019**		
Total		**$180,000.00**	**$34,000.00**		**$1,846,000.00**		**$2,060,000.00**
Fund 1		L24E $165,996.00	M0E1 $30,508.20		M0E1 $1,521,820.80		
Match		$14,004.00	$3,491.80		$174,179.20		
Fund 2					OTH0 $150,000.00		
Match							

Footnote:

Name:	NORTH BANK ROAD RECONSTRUCTION	Key:	20910

Description **Replacement of two culverts, Full Depth Reclamation, excavation and embankment, aggregate subbase and base, paving & installation of guardrail** Region: **3**

MPO: **Non-MPO** Work Type: **OPERAT**

Applicant: **DOUGLAS COUNTY** Status: **PROJECT SCHEDULED FOR CONSTRUCTION**

Location(s)

Mileposts	Length	Route	Highway	ACT	County(s)
				SOUTH WEST OREGON ACT	**DOUGLAS**

Current Project Estimate

	Planning	Prelim. Engineering	Right of Way	Utility Relocation	Construction	Other	Project Total
Year		**2019**			**2019**		
Total		**$229,449.00**			**$1,912,075.00**		**$2,141,524.00**
Fund 1		K200 $181,989.00			K200 $1,593,825.00		
Match		$47,460.00			$318,250.00		

Footnote:

Name:	LITTLE RIVER ROAD ROCK SLOPE STABILIZATION	Key:	21013

Description **Stabilization of the rock slope, rehabilitation of the existing pavement and reinstallation of new guardrail.** Region: **3**

MPO: **Non-MPO** Work Type: **OP-SLD, PRESRV**

Applicant: **DOUGLAS COUNTY** Status: **PROJECT SCHEDULED FOR CONSTRUCTION**

Location(s)

Mileposts	Length	Route	Highway	ACT	County(s)
				SOUTH WEST OREGON ACT	**DOUGLAS**

Current Project Estimate

	Planning	Prelim. Engineering	Right of Way	Utility Relocation	Construction	Other	Project Total
Year		**2017**			**2018**		
Total		**$272,000.00**			**$1,894,000.00**		**$2,166,000.00**
Fund 1		G200 $272,000.00			G200 $1,672,000.00		
Match					$222,000.00		

Footnote:

Comprehensive Project Program

Providing bicycle and pedestrian facilities in some situations requires a more involved process and cost for planning, preliminary engineering, and construction. The Comprehensive Project Program consists of these larger scale projects. These projects may be accomplished as part of existing capital improvement roadways or parks projects, or as stand alone planning or engineering projects.

The highest priority projects in the program represent projects for corridors identified as critical routes. Phased projects were recommended for some of these routes. Appendix A includes a comprehensive list of improvement project.

PROJECT PRIORITIZATION

Transportation System Plans are typically implemented using a combination of funding over decades, and they often require a combination of private, local, state, and federal funding and participation. A deliberate phasing and prioritization strategy is required to effectively focus available funding, maximize funding and implementation, and meet the needs of the community, while also allowing flexibility to maximize projects completed. The following elements were considered in the development of the phasing and prioritization of bicycle and pedestrian construction improvements and programs.

- Need: Based on prior plans, data collection, field observation, considerable public comment, and input from the Ad Hoc Committee (AHC) and Project Management Team (PMT) throughout the process has provided direction.

- Feasibility: Considers the size and corresponding cost of the improvements and the best opportunity for implementation and funding. Projects that do not usually require acquiring right-of-way, such as restriping or adding sidewalks, are easiest to implement. Easier projects were prioritized higher than projects requiring expensive or potentially controversial right-of-way acquisition.

Construction Improvement Prioritization

Recommended infrastructure related improvements include the following types of projects, which differ in terms of priority, impact and funding availability and need:

- Spot Improvements
- Signal, Sign and Stripe
- Accessibility Improvements
- Comprehensive Project Program

As previously discussed in Chapter 3, critical routes were identified through an evaluation of important destinations to be connected, and which routes best achieve the desired connections. These connections were then refined and prioritized based on the criteria of connectivity, system users, safety and comfort, addressing travel barriers, livability and feasibility and alternatives. The critical route projects comprise the highest priority projects in the Comprehensive Project Program.

The lists of projects in each of the programs were identified and prioritized for completion on the basis of, need and feasibility, particularly project costs and public and committee support. Other projects may potentially have greater impact to vehicle traffic, access, businesses, such as removing parking or narrowing lanes, and require a longer-term and comprehensive review to build public support prior to implementation.

Construction projects were then categorized into short-term, medium-term and long-term. While all of the projects designated as critical routes are important to the development of Roseburg's bicycle and pedestrian network, focusing on the most viable and publicly supported projects can build momentum and set the groundwork for future investments. The categories reflect the prioritization strategy previously discussed, with previously-determined, publicly supported, easy-to-implement and less-expensive projects designated as short-term. Any of these projects should proceed when conditions warrant.

It must be recognized that these construction projects, while deemed the most important, may not all get built within the time periods noted due to fiscal constraints.

Short-Term Improvements

Projects selected for short-term development are considered the highest priority for implementation. In addition, projects that have the highest impact for the lowest cost and are relatively simple to implement were selected as short-term projects. These projects should be implemented within the first five years after the bicycle and pedestrian additions are adopted and are illustrated in Figure 7-2.

The following projects were designated as short-term projects:

- Oak and Washington Street Bridge Restriping
- Douglas Street (Fowler To Rifle Range Road) –Striping and sidewalk gap)
- W. Harvard (storm grate elevation fixes)
- Rowe Street railroad trestle undercrossing
- Aviation Drive (sidewalk gap south of Edenbower Blvd)
- Washington, Oak and Douglas railroad crossing improvements (for bikes and pedestrians)

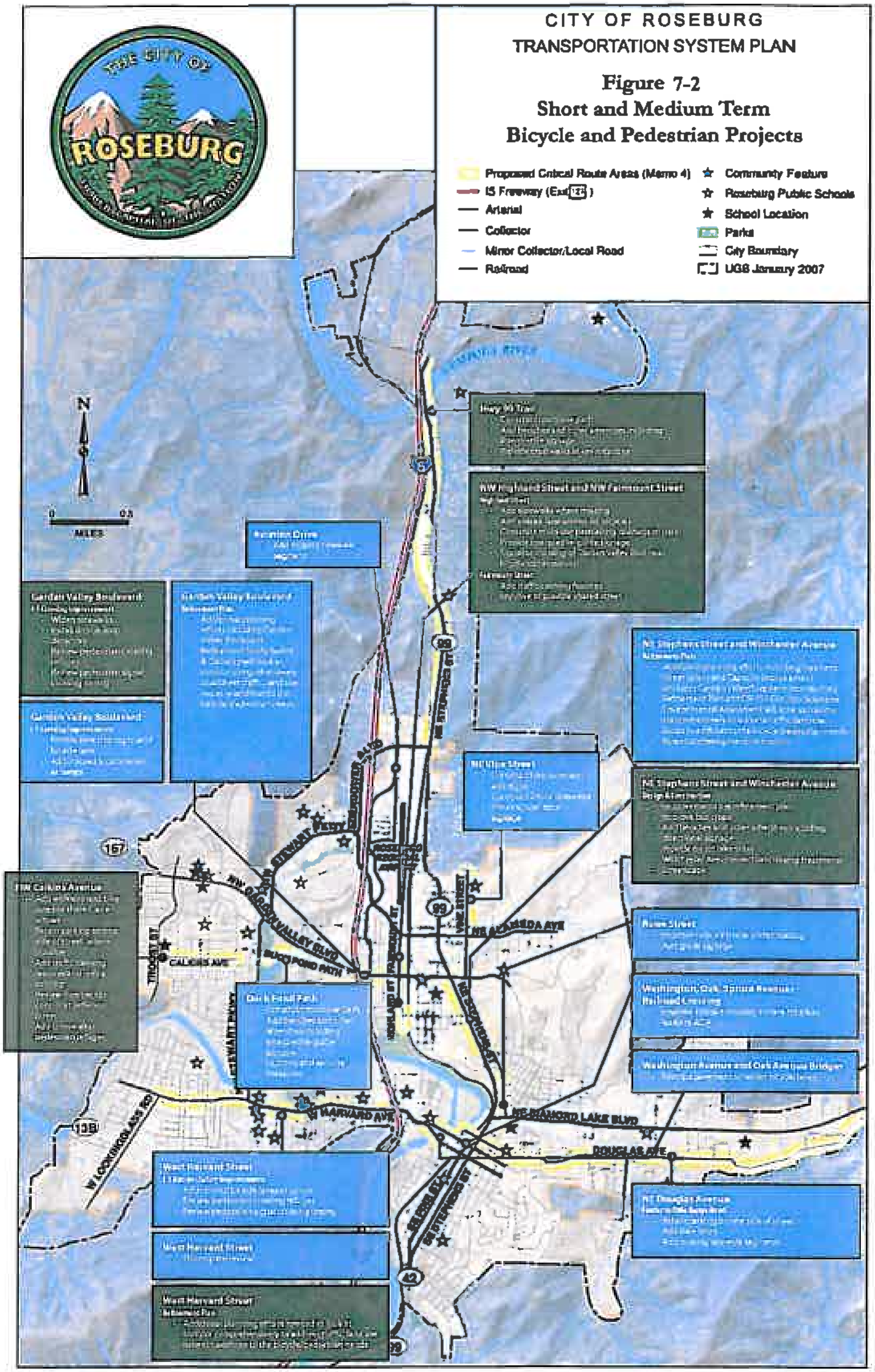
- Harvard Avenue I-5 Ramp Safety Improvements
- Duck Pond Multi-Use Path
- Vine Street, Alameda Ave to Meadow Ave (bike lanes and sidewalks)
- NW Garden Valley Refinement Plan
- NE Stephens St Refinement Plan
- Garden Valley Blvd. Overcrossing of I-5 (Bike lane restriping)

Medium-Term Improvements

Medium-term projects may be likely to have less impact, require more planning/design efforts, or maybe more expensive to construct that short-term projects. Projects selected as medium-term are routes that should be implemented within six to fifteen years and are illustrated in Figure 7-2.

The following projects were designated as medium-term critical routes:

- NW Calkins Ave Traffic Calming
- W Harvard Ave Refinement Plan
- Hwy 99 Trail (Edenbower over No. Umpqua)
- NE Stephens St/ Winchester Design and Construction
- Garden Valley Blvd. Overcrossing of I-5 (Sidewalk widening and enhancements)
- Highland/Fairmount (Sidewalks, signage, traffic signal)


THE CITY OF ROSEBURG
CITY OF ROSEBURG
TRANSPORTATION SYSTEM PLAN
Figure 7-2
Short and Medium Term
Bicycle and Pedestrian Projects
Proposed Critical Route Areas (Memo 4)
I5 Freeway (Exit)
Arterial
Collector
Minor Collector/Local Road
Railroad
Community Feature
Roseburg Public Schools
School Location
Parks
City Boundary
UGB January 2007
N
MILES
NE STEPHENS ST
NE ALAMEDA AVE
NW GARDEN VALLEY BLVD
CALKINS AVE
HARVARD AVE
NE DIAMOND LAKE BLVD
DOUGLAS AVE
W LOOKINGGLASS RD
VINE STREET

Long-Term Improvements

Projects designated long-term have less identified need or are considered more expensive or potentially controversial to construct. Long-term projects are routes that should be implemented within fifteen to twenty years. All critical route projects in this Plan that were not incorporated into the short- or medium-term project lists are considered long-term Projects.

The projects designated as long-term critical routes are shown in Table 7-1, 7-2, and 7-3 as follows

Table 7-1. Recommended Long-Term Multi-Use Construction Improvements

Name	Description
Deer Creek Pathway	South Umpqua River to Douglas Street Bridge
Portland Avenue Bridge	New bridge crossing South Umpqua River
I-5 Westside Path	Adjacent to I-5 between Edenbower Blvd. to Dogwood Street or Hill Ave
S. Umpqua River – West Riverbank	Along the S. Umpqua River connecting the Fairgrounds to the Shady Bridge
Stewart Park	Adjacent to Stewart Park Drive from Harvard to S. Umpqua River
S. Umpqua River – East Riverbank	Along the east side of the S. Umpqua River from Douglas Avenue to Portland Avenue (new crossing)
S. Umpqua River – West Riverbank	Along the west side of the S. Umpqua River from Kendall St. to Fairgrounds
Umpqua College Rd Connection	N. Umpqua River crossing to Umpqua Community College
Davis Creek Trail	Davis Creek
Newton Creek Trail	Newton Creek from Charles Gardner Park to Garden Valley Blvd.
Harvard Avenue Bridge	Harvard Avenue Bridge and Harvard Avenue, west of Lookingglass Rd.
Troost Street Trail	Troost Street
Pilger Street Trail	Pilger Street
Commercial Street Trail	Commercial Street
Jackson Street Trail	Trail under Jackson Street Bridge over Deer Creek
Deer Creek Bridge	Bridge across Deer Creek
Keasey Connection	Connect Keasey Street near Domenico Drive to Stewart Parkway
Troost St. Connection	Connect Whipple St/Riverview Drive to Troost St.
Finlay Ave Connection	Connect path at South Umpqua crossing to Finlay Ave/Bowden St
N. Umpqua Crossing	Crossing of N. Umpqua River at I-5 Bridge

Table 7-2. Recommended Long-Term Bicycle Lane Construction Improvements

Name	Description
Alameda Avenue	Vine St. to east end
Broad Street	Bike lanes on Broad St. from the Edenbower interchange to the new road connection
Garden Valley Blvd.	Melrose Rd. to Troost St.
Ramp Street	Douglas Avenue to east and eventual connection to Terrace Dr
Spruce Street	Douglas Avenue to Mosher Avenue
Garden Valley Blvd.	Stephens St. to Mulholland Dr

Main Street	Add bike lanes on collector
Mosher Avenue	Spruce St. to Mill St.
Mosher Avenue	Add bike lanes on collectors
Rice Avenue	Mill St. to Pine St.
Troost Street	From end of existing bike lanes to the west end connecting to new street connection
Jackson Street Keasey Avenue	Diamond Lake Blvd. to Douglas Avenue Entire length

Table 7-3. Recommended Long-Term Sidewalk Improvements

Name	**Description**
Broad Street	Add new sidewalk at the northern portion of Broad St.
Stewart Parkway and Garden Valley Blvd	Add sidewalk on Steward Parkway north of Harvey Avenue and continuing west along Garden Valley Blvd.
Troost Street	Add sidewalks along Troost St. south of Calkins Rd. to Charter Oaks Dr.
Lookingglass Road	Add sidewalks along length of Lookingglass Road to Urban Growth Boundary
Old Melrose Road	Add sidewalks along Old Melrose Rd. from Harvard Avenue to Urban Growth Boundary
Lincoln Street	Add sidewalks along Lincoln St. south of Garden Valley Blvd. and north of Diamond Lake Blvd.
Fulton Street	Add sidewalks along Fulton St. from Diamond Lake Blvd. north to end of public street
Shambrook Avenue	Add sidewalks along Shambrook Avenue between Stephens St. and Winchester St.
Ramp Street	Add sidewalks along the length of Ramp St.
Pine Street	Add sidewalks along Pine St. from Rice Avenue south to existing sidewalk
Main Street	Add sidewalks along Main St. from Rice Avenue south to end
Templin Park	Sidewalks and drainage

Evaluation/Inventory and Outreach Programs

The programs recommended in this Plan are a relatively inexpensive method for improving and raising public awareness and adding to the safety and enjoyment of bicycling and walking in Roseburg. Because of their minimal expense and importance to supporting the bicycle and pedestrian travel and thereby increase usage, all of the recommended programs are designated for short- or medium-term implementation.

It is recommended that the evaluation and inventory programs not specifically recommended as short-term be conducted at least one per year until the list is completed. These may be done with volunteers, students, or summer interns.

Short-Term Programs

Programs designated for short-term development were identified as highest priority. Similarly as for the construction projects, programs that have the highest impact for the lowest cost were selected as short-term programs. These programs should be implemented within the first five years.

The following programs were designated as short-term priority and previously described:

- Bike-Walk School Safety
- Incentives Programs
- Bicycle-Pedestrian Advisory Committee
- Maintenance-Safety Hotline
- Public Education
- Storm Grate Review

When formed, the Bicycle-Pedestrian Advisory Committee is recommended to take on the program tasks of Annual Review and Planning/Design Review; prior to the City forming an official Committee, Council should agree to an ex officio member of the Public Works Commission as a representation from the community organized committee.

Medium-Term Programs

Medium-term programs should be implemented within six to fifteen years.
The following were designated as medium-term programs:

- Art Bike Rack Design Contest
- Crash Reporting
- Website Resources
- Volume Counts
- Inventory updates
- Wayfinding-Guide Signage

Regular Maintenance

Like all roadways, bicycle and pedestrian facilities require regular maintenance. This includes sweeping, maintaining a smooth roadway to the extent possible, ensuring that the gutter-to-pavement transition remains relatively flat, and installing bicycle-friendly drainage grates. Pavement overlays can be used as a good opportunity to improve bicycle facilities. Considerations for bikeway repair and regular maintenance should be included in the maintenance management plan. Recognizing the critical importance of effective maintenance in promoting walking and biking, the City should periodically inquire of users or in other ways ask for feedback or assess the effectiveness of its maintenance efforts. Particular attention should be paid to ensuring that the following happen as regularly as is feasible:

- Sidewalk maintenance
- Curb Ramp maintenance
- Sweeping
- Roadway surface repair .
- Review and correct Gutter-To-Pavement Transition
- Review and correct drainage grates
- Pavement Overlays
- Signage, striping and markings
- Maintenance Management Plan

The *Bicycle and Pedestrian Support Document* provides additional information about recommended street construction and repair, and maintenance and repair needs and guidelines.

City of Roseburg
2016 – 2021
Capital Improvement Plan

Adopted March 14, 2016

THE CITY OF
ROSEBURG
TIMBER CAPITAL OF THE NATION

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CITY OF ROSEBURG

CAPITAL IMPROVEMENT PLAN

Introduction

A Capital Improvement Plan (CIP) is a five year plan for implementation of an organization's facility and infrastructure asset base improvement process. It is a financing and construction plan for projects that require significant capital investment. A CIP is essential to the future financial health of an organization and continued delivery of services to citizens and businesses.

The City of Roseburg is in the final stages of updating this CIP which will examine the capital needs of the City for the next five years. The CIP is reviewed and updated at least every two years to reflect the needs of the community and changes in resources for financing capital projects. The CIP lists the City's capital improvement projects; places the projects in a priority order (subject to periodic review) and schedules the projects for funding and construction.

The CIP is a tool to be used in the development of responsible and progressive financial planning. The program is developed in accordance with the financial policies of the City. The policies and the CIP form the basis for making annual capital budget decisions and support the City's continued commitment to sound, long-range financial planning and direction.

The CIP identifies short and long-range capital projects of all types, which will be coordinated with the annual budget to maintain full utilization of available resources. For each capital project, the CIP includes a variety of information, including a project description and the service need it addresses, a proposed timetable, proposed funding levels and sources and, if applicable, estimated ongoing operating costs.

These projects and improvements will be prioritized by year and by funding source. Every attempt will be made to match projects with available funding sources. Future operating costs associated with a project will also be given consideration in the establishment of priorities. Ongoing operating costs are not included in the CIP.

Development of the Capital Improvement Program is a collaborative effort by the City's Leadership Team and our citizen commissions. Departments participate in CIP development via specific master plans and other planning tools. Projects are typically generated and prioritized through public processes. Major capital projects are taken to the City Council during the development stage and often at the funding stage if there are grants or other funding sources.

Program Area Descriptions

The CIP is divided into the following categories:

1) General-includes General Fund capital outlay, technologies, grants
2) Bike Trail
3) Streetlights, sidewalks and traffic signals
4) Transportation
5) Park Improvements
6) Equipment Replacement
7) Urban Renewal
8) Facilities
9) Airport
10) Water
11) Storm Drainage

Project Types

Projects generally fall within the primary categories identified below:

- System Repairs and Replacements – Projects needed to maintain existing infrastructure; typically needed to ensure service reliability.
- System Improvements – Projects designed to increase the functionality, efficiency and/or capability of the infrastructure.
- Capacity Increasing Projects to Meet Growth – Projects needed in order to provide services to new customers (generally SDC eligible).
- Redevelopment and Community Enhancement – Projects created for urban renewal, overall community or neighborhood livability and safety enhancement.

Program Goals

- Provide quality management of the CIP and fiscally responsible decisions for the City Council.
- Provide updates to the Council on program implementation.
- Ensure timely information is provided to Finance and to the City Council for cost differences.
- Provide timely project starts and completions.

Performance Measures

- Transportation: provide adequate street funding to maintain the current PCI index at 72. Improve street and landscaping aesthetics and street surface ridership for vehicles and bicycles. Identify capacity projects as needed and look for opportunities to improve existing facilities through technology upgrades.
- Water: maintain water treatment and distribution system capacities to standards for a City this size including supply, fire flow requirements, treatment standards and public perception of quality.
- Storm Drains: Meet the Storm Water Management Plan requirements and adequately provide system capacity and update plan on a 5-year cycle.

What Projects Are in the CIP

Capital assets are defined as tangible and intangible assets acquired for use in operations that will benefit more than a single fiscal period. The Capital Improvement Program presents capital improvements and capital outlay. Capital improvements are expansions of or improvements to the City’s physical structure such as buildings, land and improvements and infrastructure such as roads, bridges, sidewalks, lighting, parks and utility systems. Capital outlay is generally furniture, equipment, vehicles and technologies. The City’s capitalization threshold is a minimum value of $5,000 and a life expectancy of at least three years. Projects costing less than $5,000 are not considered capital and are funded through operating budgets.

Projects in the CIP can include:

- Construction costs, i.e. labor, materials and contractors involved in completing a project,
- Acquisition of land or structures;
- Engineering or architectural services, professional studies or other administrative costs;
- Expenses for City vehicles, equipment, and technology; and
- Renovating or expanding City facilities.

Funding Overview

The CIP relies on a variety of funding sources to accomplish program projects. These include debt financing, tax increment revenues, user fees, general fund revenues, grants and system development charges.

The CIP is not a financing document in and of itself. Rather, the CIP is utilized as a planning document that places projects in the annual budget whereby funds are appropriated for them by the City Council. Prior to actual project work, required contracts are presented to the City Council for final approval of expending funds.

FY16/17 Program Summary

FY16/17 Proposed expenditures are approximately $11.1 million. This is similar to the budgeted capital expenditures in FY 15/16.

Proposed FY 2016-17 Capital Expenditures

Fund	2016-2017
GENERAL FUND/IT/OTHER/GRANT FUND TOTAL	$66,500
BIKE TRAIL TOTAL	$210,000
SIDEWALK/STREETLIGHT TOTAL	$445,000
TRANSPORTATION TOTAL	$880,000
PARKS TOTAL	$625,000
EQUIPMENT REPLACEMENT TOTAL	$680,500
URBAN RENEWAL TOTAL	$3,620,000
FACILITIES REPLACEMENT FUND TOTAL	$1,440,000
AIRPORT TOTAL	$110,000
WATER TOTAL	$1,665,000
STORM DRAINAGE TOTAL	$1,405,000
TOTAL ALL FUNDS	**$11,147,000**

City of Roseburg

2016-21 Capital Improvement Plan

100	**GENERAL FUND/IT/OTHER/GRANT FUND**						
	Project Description	**Estimated Cost**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**
	Archiving/Scanning	10,000	10,000				
	Office 2016	49,000	49,000				
	Copiers/Printers	37,500	7,500	7,500	7,500	7,500	7,500
	VMWare Enterprise Upgrade	18,000		18,000			
	Desktop Hardware Refresh - Outside Departments	30,000		30,000			
	Server Refresh	30,000			30,000		
	SAN Storage for Virtual Environment	60,000				60,000	
	Network Switch Upgrade	50,000					50,000
	GENERAL FUND/IT/OTHER/GRANT FUND TOTAL	**$284,500**	**$66,500**	**$55,500**	**$37,500**	**$67,500**	**$57,500**
250	**BIKE TRAIL FUND**						
	Project Description	**Estimated Cost**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**
	Multi-Use Path Upgrades - Grant Funding Required	600,000	200,000	100,000	100,000	100,000	100,000
	Repairs to existing multi-use trail system	50,000	10,000	10,000	10,000	10,000	10,000
	BIKE TRAIL TOTAL	**$650,000**	**$210,000**	**$110,000**	**$110,000**	**$110,000**	**$110,000**

290	**SIDEWALK/STREETLIGHT/SIGNAL**						
	Project Description	**Estimated Cost**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**
	ADA Transition Plan	100,000	100,000				
	Spruce/Parrott Street Reconstruction (UR)	75,000	75,000				
	Stewart Parkway Widening - Valley View to Harvey (T)	500,000	100,000	400,000			
	Wayfinding project	50,000	50,000				
	Rifle Range LID (T)	200,000			200,000		
	Valley View LID (T)	200,000			200,000		
	Douglas Avenue TE Improvements Match (T)	225,000				225,000	
	Fulton/Lake/Odell/Gardiner Street Improvements (T)	175,000					175,000
	Winchester Intersection Improvements (T)	25,000					25,000
	Sidewalk New Construction	50,000	10,000	10,000	10,000	10,000	10,000
	Sidewalk Reconstruction	500,000	100,000	100,000	100,000	100,000	100,000
	Traffic Signal Upgrades - Misc	50,000	10,000	10,000	10,000	10,000	10,000
	SIDEWALK/STREETLIGHT TOTAL	**$2,150,000**	**$445,000**	**$520,000**	**$520,000**	**$345,000**	**$320,000**

City of Roseburg

2016-21 Capital Improvement Plan

310	TRANSPORTATION						
	Project Description	**Estimated Cost**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**
	Spruce/Parrott Street Improvements (UR)	400,000	400,000				
	Stewart Parkway Bridge Deck Repairs	200,000	200,000				
	Stewart Parkway Widening - Valley View to Harvey	2,500,000	250,000	2,250,000			
	Transportation Funding Options	25,000	25,000				
	Rifle Range Street LID	400,000			400,000		
	Valley View Improvements	100,000			100,000		
	Douglas Avenue TE Improvements	250,000				250,000	
	Fulton/Lake/Odell/Gardiner Street Improvements	425,000				50,000	375,000
	Stewart Parkway - Harvey South Design	500,000				250,000	250,000
	Winchester Intersection Improvements Design	200,000					200,000
	GIS/Mapping Improvements	30,000	5,000	10,000	5,000	5,000	5,000
	TRANSPORTATION TOTAL	**$5,030,000**	**$880,000**	**$2,260,000**	**$505,000**	**$555,000**	**$830,000**

City of Roseburg

2016-21 Capital Improvement Plan

320
710 PARKS

Project Description	Estimated Cost	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021
Fir Grove Playground/Splash pad	625,000	625,000				
Stewart Park Bathroom Remodel *(Facilities)*	100,000		100,000			
Property Acquisition/Playground development	225,000			75,000	150,000	
Skate Park Improvements	25,000			25,000		
PARKS TOTAL	**$975,000**	**$625,000**	**$100,000**	**$100,000**	**$150,000**	**$0**

330 EQUIPMENT REPLACEMENT

Project Description	Estimated Cost	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021
Finance						
Fire	1,131,000	97,000	95,000	254,000	35,000	650,000
Police	510,500	58,500	177,000	210,000	65,000	-
Public Works - Administration	50,000	25,000	-	25,000	-	-
Public Works - Engineering	25,000	-	25,000	-	-	-
Public Works - Streets	1,030,000	335,000	155,000	150,000	220,000	170,000
Parks	569,000	165,000	165,000	140,000	99,000	-
EQUIPMENT REPLACEMENT TOTAL	**$3,315,500**	**$680,500**	**$617,000**	**$779,000**	**$419,000**	**$820,000**

350	URBAN RENEWAL						
	Project Description	**Estimated Cost**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**
	ADA Improvements within UR district	375,000	125,000	125,000	125,000		
	Airport - FAA Grant Match	247,000	20,000	102,000	125,000		
	Airport Wetland Mitigation	100,000	100,000				
	Black Street Extension	1,250,000	150,000	500,000	600,000		
	Deer Creek Path Imp.	200,000	200,000				
	Downtown Façade Program	150,000	50,000	50,000	50,000		
	Downtown Sidewalk Program	250,000	100,000	100,000	50,000		
	Downtown Streetscape	1,125,000	125,000	1,000,000			
	Edenbower/Stewart Parkway Left Turn	1,000,000	250,000	750,000			
	Garden Valley HSIP Project Match	75,000	75,000				
	Garden Valley/Stewart Parkway Intersection Improvements	600,000	100,000	200,000	300,000		
	Micelli/Templin Improvements	125,000	125,000				
	North Valley Mall Traffic Signal Removal/Relocation	100,000	100,000				
	Parking Structure Improvements	500,000	500,000				
	Pavement Management - Overlays	1,900,000	400,000	500,000	1,000,000		
	Property Acquisition	300,000	200,000	100,000			
	Riverfront Paths/River Overlooks	350,000	100,000	250,000			
	Spruce/Parrott Street Improvements	675,000	675,000				
	Traffic Signal Coordination/Conduit/Timing	550,000	225,000	225,000	100,000		
	Riverside Park/Waterfront Improvements	350,000		350,000			
	Rose Street Courtyard/Plaza	250,000			250,000		
	West Avenue	1,250,000		350,000	900,000		
	URBAN RENEWAL TOTAL	**$11,722,000**	**$3,620,000**	**$4,602,000**	**$3,500,000**		

360	FACILITIES REPLACEMENT FUND						
	Project Description	**Estimated Cost**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**
	City Hall	180,000	180,000				
	Fire Station #2	1,000,000		1,000,000			
	Fire Station #3	1,000,000	1,000,000				
	Fir Grove Park	10,000	10,000				
	Stewart Park	150,000	50,000	100,000			
	Public Safety Center	135,000	135,000				
	ADA Improvements - TBD	25,000	25,000				
	Other Facilities	20,000	20,000				
	Paving/Sealing	20,000	20,000				
	FACILITIES REPLACEMENT FUND TOTAL	**$2,540,000**	**$1,440,000**	**$1,100,000**	***$0***	**$0**	**$0**

520	AIRPORT FUND						
	Project Description	**Estimated Cost**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**
	Approach Procedure Update	10,000	10,000				
	Obstruction Removal	100,000	100,000				
	Master Plan / ALP Update/Runway Justification	247,223		247,223			
	ODA Pavement Mgt	20,000		20,000			
	Runway Lighting Rehab	620,000			620,000		
	Taxiway Extension	1,250,000				1,250,000	
	AIRPORT TOTAL	**$2,247,223**	**$110,000**	**$267,223**	**$620,000**	**$1,250,000**	**-**

530	WATER FUND						
	Project Description	**Estimated Cost**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**
	Land	25,000	5,000	5,000	5,000	5,000	5,000
	Buildings and Structures	50,000	10,000	10,000	10,000	10,000	10,000
	Equipment	285,000	70,000	-	130,000	-	85,000
	Water Vehicles	345,000	135,000	40,000	65,000	70,000	35,000
	Mapping/Plans	30,000	5,000	10,000	5,000	5,000	5,000
	Main Replacements	2,910,000	235,000	575,000	600,000	750,000	750,000
	New Mains	25,000	5,000	5,000	5,000	5,000	5,000
	Plant Improvements	2,160,000	525,000	410,000	466,000	342,000	417,000
	Reservoir Improvements	1,185,000	100,000	710,000	125,000	125,000	125,000
	Transmission Main	3,275,000	575,000	800,000	600,000	700,000	600,000
	LID	-	-	-	-	-	
	WATER TOTAL	**$10,290,000**	**$1,665,000**	**$2,565,000**	**$2,011,000**	**$2,012,000**	**$2,037,000**

City of Roseburg
2016-21 Capital Improvement Plan

560	**STORM DRAINAGE**						
	Project Description	**Estimated Cost**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**
	Ballf Area Storm Drainage Phase 2	500,000	100,000	400,000			
	Cascade Court Drainage	75,000	75,000				
	Fairmont/Garden Valley Improvements	150,000	150,000				
	Harvard repairs	425,000	425,000				
	Kenwood Extension	150,000	150,000				
	Spruce/Parrott Street Improvements (UR)	75,000	75,000				
	Stewart Parkway Flood Mitigation	750,000	250,000	500,000			
	Stormwater Mgt Manual/Update Standards	25,000	25,000				
	Calkins Area Phase 2A, 4 - Troost Street	525,000	75,000	450,000			
	Lookingglass Area Improvements	900,000		100,000	800,000		
	Rifle Range Street LID (T)	150,000			150,000		
	Broccoli -Tie In	160,000			160,000		
	Nash/Jackson Area	1,000,000			100,000	900,000	
	Valley View LID (T)	100,000			100,000		
	Cardinal Street	560,000				100,000	460,000
	Hickory/Chateau/Shasta	450,000				50,000	400,000
	Military Avenue Storm Improvements	450,000				200,000	250,000
	Diamond Lake Blvd/Fulton Street Drainage Improvements	250,000					250,000
	TMDL Implementation	25,000	5,000	5,000	5,000	5,000	5,000
	Misc. Storm Improvements	250,000	50,000	50,000	50,000	50,000	50,000
	Buildings and Structures	50,000	10,000	10,000	10,000	10,000	10,000
	Equipment Acquisition	65,000	10,000	25,000	10,000	10,000	10,000
	Improvements - Mapping	30,000	5,000	10,000	5,000	5,000	5,000
	STORM DRAINAGE TOTAL	**$7,115,000**	**$1,405,000**	**$1,550,000**	**$1,390,000**	**$1,330,000**	**$1,440,000**
	TOTAL ALL FUNDS	**$46,319,223**	**$11,147,000**	**$13,746,723**	**$9,572,500**	**$6,238,500**	**$5,614,500**

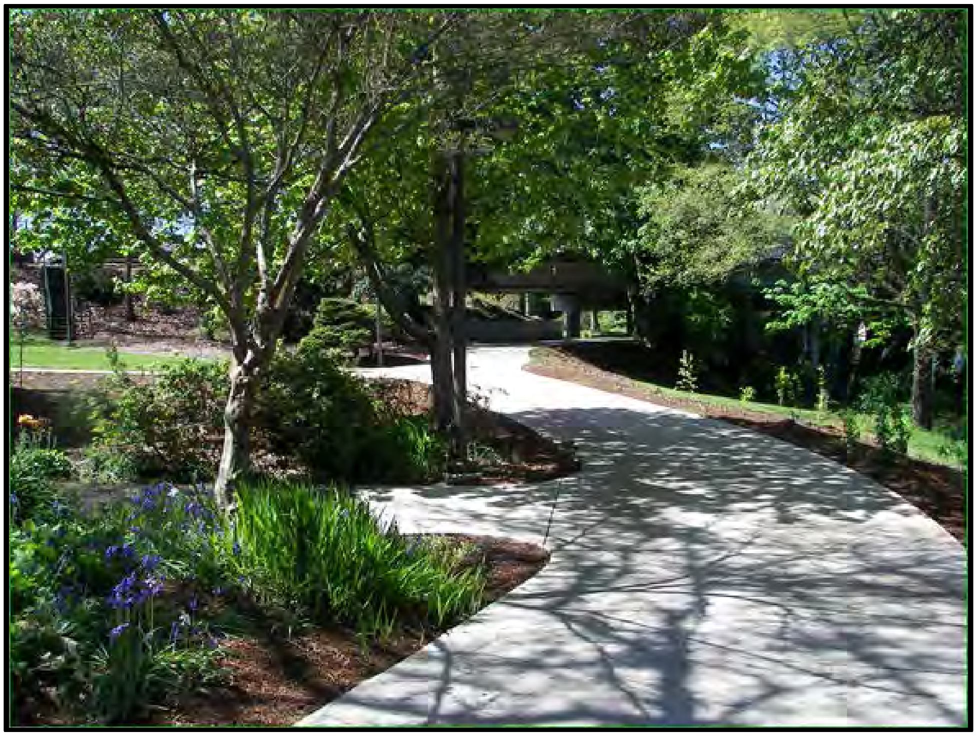
GENERAL FUND/IT/OTHER/GRANT FUND

The Information Technology (IT) Division of the Finance Department was formed to provide centralized services for technology related issues within the organization. The division also develops technology enhancements that will provide our customer and citizen base with the most economical and efficient service options available.

This section accounts for Information Technology, General Fund capital expenditures, and General Fund grant expenditures.

100	GENERAL FUND/IT/OTHER/GRANT FUND						
	Project Description	**Estimated Cost**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**
	Arciving/Scanning	10,000	10,000				
	Office 2016	49,000	49,000				
	Copiers/Printers	37,500	7,500	7,500	7,500	7,500	7,500
	VMWare Enterprise Upgrade	18,000		18,000			
	Desktop Hardware Refresh - Outside Departments	30,000		30,000			
	Server Refresh	30,000			30,000		
	SAN Storage for Virtual Environment	60,000				60,000	
	Network Switch Upgrade	50,000					50,000
	GENERAL FUND/IT/OTHER/GRANT FUND TOTAL	**$284,500**	**$66,500**	**$55,500**	**$37,500**	**$67,500**	**$57,500**

BIKE TRAIL PROJECTS



The Bike Trail Fund accounts for the state mandated 1% share of gasoline subventions and grant revenues for the construction of bike trails within the City boundaries. The projects in the Bike Trail Fund are coordinated through the Parks Division and Parks & Recreation Commission. Bike trails are located within many of the City's parks as well as adjacent to streets. The Bicycle and Pedestrian Plan was adopted in 2009 which identified priorities for bicycle and pedestrian facilities. Technically, repairs to existing paths are found in the Materials & Services portion of the Bike Trail Fund. Repairs have been included below for informational purposes.

250	BIKE TRAIL FUND						
	Project Description	**Estimated Cost**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**
	Multi-Use Path Upgrades - Grant Funding Required	600,000	200,000	100,000	100,000	100,000	100,000
	Repairs to existing multi-use trail system	50,000	10,000	10,000	10,000	10,000	10,000
	BIKE TRAIL TOTAL	**$650,000**	**$210,000**	**$110,000**	**$110,000**	**$110,000**	**$110,000**

BIKE TRAIL FUND
FINANCIALS

Bike Trail		16-17	17-18	18-19	19-20	20-21
Beg Fund		113,166	85,166	77,166	69,166	61,166
Rev		182,000	102,000	102,000	102,000	102,000
M&S		10,000	10,000	10,000	10,000	10,000
Capital		200,000	100,000	100,000	100,000	100,000
End Bal		85,166	77,166	69,166	61,166	53,166

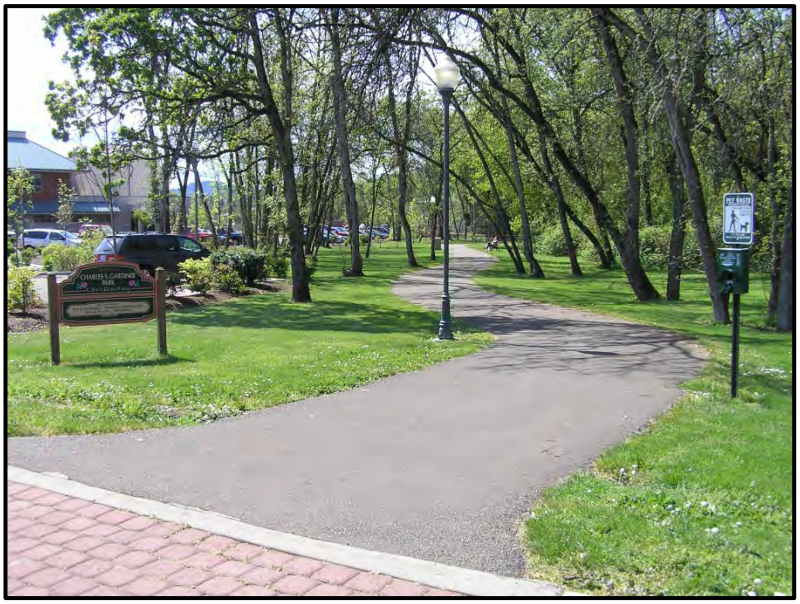
Assumptions:

- Materials & Services (M&S) remain unchanged
  - M&S includes path repairs that are not complete reconstructions

- Revenues –
  - 80 % of capital (grants)
  - $10,000 from franchise fees
  - $12,000 from gas tax pass through

Fund 250

BIKE TRAIL PROJECTS



Multi-Use Path Upgrades – Grant Match/Repairs

This is money budgeted annually to provide matching funds for any grant opportunities which may become available and for repairs to the existing path system. Any off-highway project listed within the Bicycle and Pedestrian Plan, Parks Master Plan, or the Waterfront Development Plan may be considered when applying for grants to construct new sections of path. Grants may also be utilized to replace existing sections of path that have reached the end of their useful life or to widen existing paths. Projects are chosen based on meeting the granting program criteria and on need. Staff is in the process of applying for a grant to reconstruct the path in Stewart Park from behind the maintenance facility to the east end of disc golf.

	Total	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**
Capital Costs	**50,000**	200,000	100,000	100,000	100,000	100,000
M&S Costs	**130,000**	10,000	10,000	10,000	10,000	10,000
Funding Source						
Bike Trail	**180,000**	200,000	110,000	110,000	110,000	110,000

Fund 250

SIDEWALK/STREETLIGHT/SIGNAL PROJECTS

Revenue for this fund is provided via a transfer from the Hotel/Motel Tax Fund, set by ordinance at 32.89 percent of revenue collected from the hotel/motel occupancy tax. The fund is utilized for construction of new sidewalks, reconstruction of inadequate sidewalk facilities, construction of new streetlights and construction or improvements to traffic signals.

Many of the sidewalk projects are recommended in the City's Bicycle and Pedestrian Plan. Sidewalk and streetlight projects are often constructed in conjunction with other street improvement projects. ADA upgrades will be a one of the primary focuses during this five year planning period.

290	SIDEWALK/STREETLIGHT/SIGNAL						
	Project Description	**Estimated Cost**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**
	ADA Transition Plan	100,000	100,000				
	Spruce/Parrott Street Reconstruction (UR)	75,000	75,000				
	Stewart Parkway Widening - Valley View to Harvey (T)	500,000	100,000	400,000			
	Wayfinding project	50,000	50,000				
	Rifle Range LID (T)	200,000			200,000		
	Valley View LID (T)	200,000			200,000		
	Douglas Avenue TE Improvements Match (T)	225,000				225,000	
	Fulton/Lake/Odell/Gardiner Street Improvements (T)	175,000					175,000
	Winchester Intersection Improvements (T)	25,000					25,000
	Sidewalk New Construction	50,000	10,000	10,000	10,000	10,000	10,000
	Sidewalk Reconstruction	500,000	100,000	100,000	100,000	100,000	100,000
	Traffic Signal Upgrades - Misc	50,000	10,000	10,000	10,000	10,000	10,000
	SIDEWALK/STREETLIGHT TOTAL	**$2,150,000**	**$445,000**	**$520,000**	**$520,000**	**$345,000**	**$320,000**

(T) – Project description included in Transportation Section
(UR) – Project Description included in Urban Renewal Section

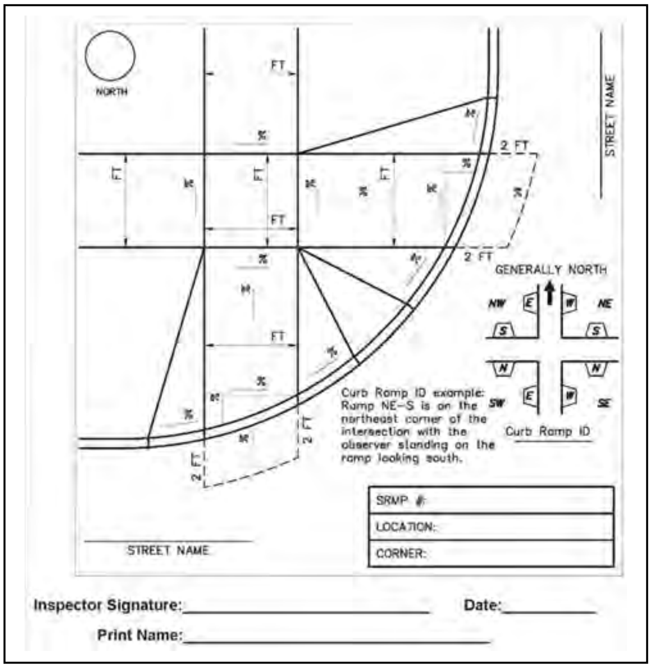
STREETLIGHT/SIDEWALK FUND
FINANCIALS

Sidewalk		16-17	17-18	18-19	19-20	20-21
Beg. Fund Balance		1,013,327	891,386	698,594	522,162	537,909
Revenue		400,132	408,135	428,541	449,968	472,467
M&S		77,073	80,927	84,973	89,222	93,683
Capital		445,000	520,000	520,000	345,000	320,000
Ending Fund Balance		891,386	698,594	522,162	537,909	596,693

Assumptions:

- Revenues increase 2% annually
- Materials & Services (M&S) increase 5% annually

SIDEWALK/STREETLIGHT/SIGNAL PROJECTS



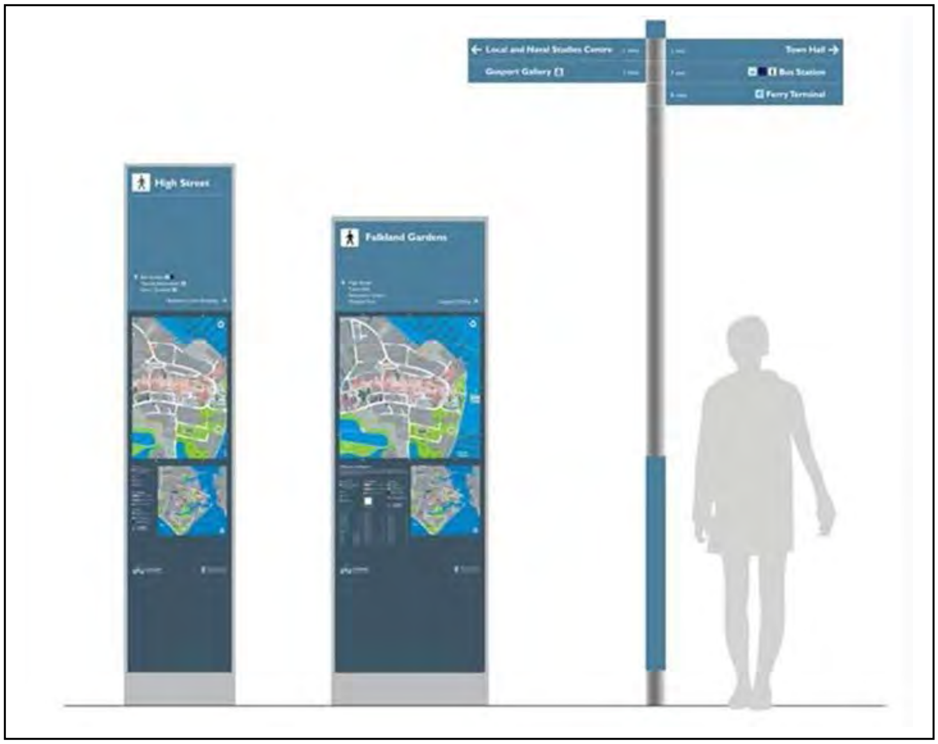
ADA Transition Plan/Implementation

The City is required to develop an ADA Transition Plan that outlines how and when substandard ADA sidewalk access ramps and other features will be replaced. Staff has been working towards this in-house, but does not have the time required to complete the document. Staff is proposing using a consultant to complete the plan.

	Total	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**
Capital Costs	**100,000**	100,000				
Funding Source						
Sidewalk/Streetlight	**100,000**	100,000				

Fund 290

SIDEWALK/STREETLIGHT/SIGNAL PROJECTS



Wayfinding Project

Money has been budgeted to design and implement a wayfinding project to enable visitors to identify their location and destinations in and around the Heart of Roseburg.

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Costs	**50,000**	50,000				
Funding Source						
Sidewalk/Streetlight	**50,000**	50,000				

SIDEWALK/STREETLIGHT/SIGNAL PROJECTS

Sidewalk New Construction

Money is budgeted annually in this line item to provide funding for small sidewalk projects to fill in gaps where needed.

	Total	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**
Capital Costs	**50,000**	10,000	10,000	10,000	10,000	10,000
Funding Source						
Sidewalk/Streetlight	**50,000**	10,000	10,000	10,000	10,000	10,000

SIDEWALK/STREETLIGHT/SIGNAL PROJECTS

Sidewalk Reconstruction

This project includes replacing existing sidewalks and sidewalk access ramps to meet ADA standards. Included in this annual project is the sidewalk rehabilitation program. The program pays the cost of labor for residential sidewalk reconstruction. The abutting property owner is required to pay for the cost of the materials. Public Works Engineering administers this program, which is typically budgeted at $40,000 annually.

	Total	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**
Capital Costs	**500,000**	100,000	100,000	100,000	100,000	100,000
Funding Source						
Sidewalk/Streetlight	**500,000**	100,000	100,000	100,000	100,000	100,000

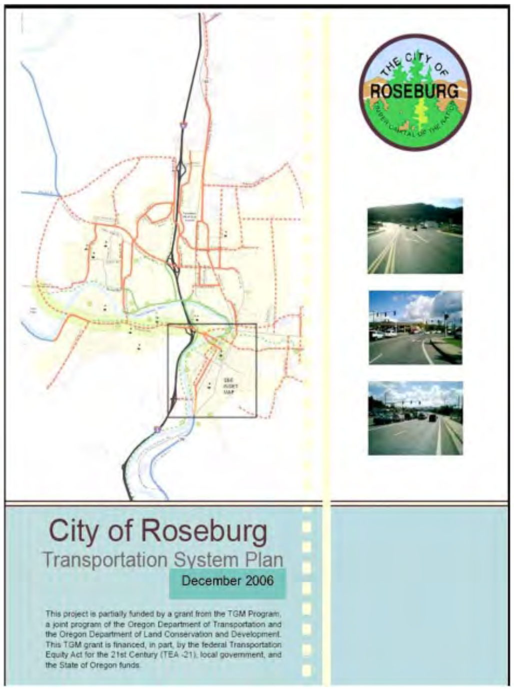
SIDEWALK/STREETLIGHT/SIGNAL PROJECTS

Traffic Signal Upgrade - Misc

This is annual funding set aside to make small improvements to signalized intersections to improve access, capacity, safety, or energy related issues. Recent projects include updating the traffic signal controllers and pedestrian heads at existing signalized intersections.

	Total	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**
Capital Costs	**50,000**	10,000	10,000	10,000	10,000	10,000
Funding Source						
Sidewalk/Streetlight	**50,000**	10,000	10,000	10,000	10,000	10,000

TRANSPORTATION PROJECTS



The Transportation Fund accounts for the financial resources used for infrastructure construction and major improvements other than those related to drainage, parks and proprietary fund assets. Historically, street reconstruction and new street projects have been funded through this fund.

The Public Works Department administers the Transportation Capital Improvement Fund with oversight from the Public Works Commission. Funding mechanisms include state gas tax subventions, system development charges, franchise fees and State Transportation Plan funds.

310	TRANSPORTATION						
	Project Description	**Estimated Cost**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**
	Spruce/Parrott Street Improvements (UR)	400,000	400,000				
	Stewart Parkway Bridge Deck Repairs	200,000	200,000				
	Stewart Parkway Widening - Valley View to Harvey	2,500,000	250,000	2,250,000			
	Transportation Funding Options	25,000	25,000				
	Rifle Range Street LID	400,000			400,000		
	Valley View Improvements	100,000			100,000		
	Douglas Avenue TE Improvements	250,000				250,000	
	Fulton/Lake/Odell/Gardiner Street Improvements	425,000				50,000	375,000
	Stewart Parkway - Harvey South Design	500,000				250,000	250,000
	Winchester Intersection Improvements Design	200,000					200,000
	GIS/Mapping Improvements	30,000	5,000	10,000	5,000	5,000	5,000
	TRANSPORTATION TOTAL	**5,030,000**	**880,000**	**2,260,000**	**505,000**	**555,000**	**830,000**

TRANSPORTATION FUND
FINANCIALS

Revenue	16-17	17-18	18-19	19-20	20-21
Franchise	446,697	460,098	473,901	488,118	502,761
STP	0	200,000	200,000	200,000	200,000
Gas Tax	1,280,144	1,292,945	1,305,875	1,318,934	1,332,123
ADDL TBD		500,000	500,000	500,000	500,000
SDCs	130,000	100,000	100,000	100,000	100,000
Interest	12,000	12,000	4,000	5,000	5,000
Total Revenue	1,868,841	2,565,043	2,583,776	2,612,052	2,639,884

Revenue Assumptions:

- Franchise Fees increase 3% annually
- Gas Tax revenue increases 1% annually
- Higher TSDC revenues
- Additional funding available beginning FY17-18

Transportation		16-17	17-18	18-19	19-20	20-21
Beg. Fund Balance		3,492,375	2,812,389	1,222,540	1,679,577	1,477,238
Revenue		1,868,841	2,565,043	2,583,776	2,612,052	2,639,884
M&S		868,827	894,892	921,739	1,059,391	1,091,172
Pavement Mgt		800,000	1,000,000	700,000	1,200,000	1,400,000
Capital		880,000	2,260,000	505,000	555,000	830,000
Ending Fund Balance		2,812,389	1,222,540	1,679,577	1,477,238	795,950

Expenditure Assumptions:

- Materials & Services (M&S) increase 3% annually
  - M&S additional increase in 19-20 due to expiration of Urban Renewal District

TRANSPORTATION PROJECTS

Stewart Parkway Bridge Deck Repairs

This project will address the deteriorating condition of the concrete bridge deck on the Stewart Parkway Bridge over the South Umpqua River. ODOT is doing similar bridge work in summer of 2017, and staff is working with them to have this work included in their project.

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Cost	200,000	200,000				
Funding Source						
Transportation	**200,000**	200,000				

TRANSPORTATION PROJECTS

Stewart Parkway Widening – Valley View to Harvey

The project involves widening and realigning Stewart Parkway between Valley View Drive and Harvey Court. Between Valley View Drive and the entrance to the Ford Family Foundation, the project will include an additional vehicle lane and a bike lane northbound, as well as sidewalk and storm drainage improvements on the east side of the roadway. From the Ford Family Foundation entrance south to Harvey Court, the roadway will be widened to two lanes in each direction with bike lanes, the curves will be re-aligned to meet current design standards, and curb, gutter, sidewalk, street lighting and storm drainage improvements will be installed. In addition, large detention ponds will be constructed to alleviate flooding in the area that has previously been problematic.

	Total	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**
Capital Costs	**3,750,000**	600,000	3,150,000			
Funding Source						
Transportation	**2,000,000**	250,000	2,250,000			
Storm Drainage	**750,000**	250,000	500,000			
Sidewalk/Streetlight	**500,000**	100,000	400,000			

TRANSPORTATION PROJECTS

Transportation Funding Options

Infrastructure funding is a high priority for the City Council. This money has been budgeted to assist staff in identifying potential transportation funding options and potentially surveying voters regarding those options.

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Cost	25,000	25,000				
Funding Source						
Transportation	**25,000**	25,000				

TRANSPORTATION PROJECTS

Rifle Range Street LID

Staff is considering formation of a Local Improvement District to fund improvements to Rifle Range Street. The project would serve a residential area north of Diamond Lake Boulevard. The overall project would reside in the Assessment Improvement Fund. Funds shown below would be the City's potential contribution to the overall project.

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Cost	750,000			750,000		
Funding Source						
Transportation	**400,000**			400,000		
Sidewalk/Streetlight	**200,000**			200,000		
Storm Drainage	**150,000**			150,000		

TRANSPORTATION PROJECTS

Valley View Drive LID

This project would improve Valley View Drive between Keasey Street and Kline Street. This is the only section of Valley View that has not previously been improved. Staff is considering formation of a Local Improvement District to fund this project. The funding outlined below would be the City's potential contribution to an LID project. The overall project funding would reside in the Assessment Improvement Fund.

	Total	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**
Capital Cost	400,000			400,000		
Funding Source						
Transportation	**100,000**			100,000		
Sidewalk/Streetlight	**200,000**			200,000		
Storm Drainage	**100,000**			100,000		

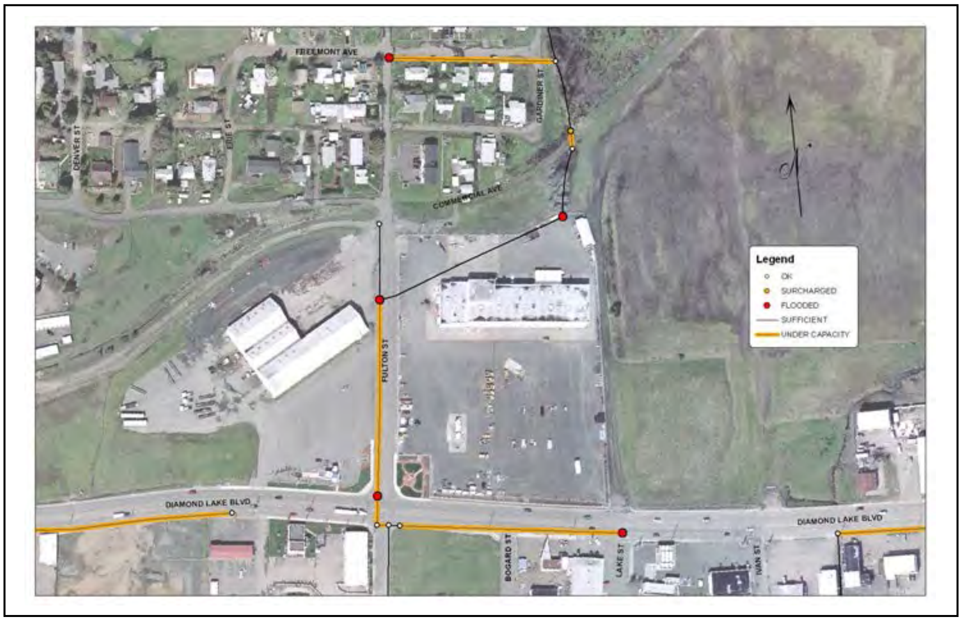
TRANSPORTATION PROJECTS

Douglas Avenue Transportation Enhancement Improvement

The City has applied to ODOT for a Transportation Enhancement grant to make improvements to Douglas Avenue from Stephens Street to the City Limits. Improvements west of Deer Creek would include improved ADA access ramps, street lighting, signage and striping to accommodate bicycles. Improvements east of Deer Creek would include widening to include bike lanes, curb, gutter, storm drainage, sidewalks and street lighting. The project may also include improvements to the multi-use path and pedestrian bridge connecting Eastwood Park to Eastwood School and an enhanced crossing treatment where the path meets Douglas Avenue. The project is dependent upon receiving grant funding. The funding shown below is the matching funds and costs of repaving existing sections of Douglas Avenue.

	Total	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**
Capital Cost	475,000				475,000	
Funding Source						
Transportation	**250,000**				250,000	
Sidewalk/Streetlight	**225,000**				225,000	

TRANSPORTATION PROJECTS



Fulton/Lake/Odell/Gardiner Street Improvements

This project includes full street improvements for sections of Fulton, Lake, Odell and Gardiner Streets. This project will provide connection to and be done in conjunction with other developer driven improvements in this area. This project is not fully funded. It is expected that a significant amount of funding will come from developers.

	Total	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**
Capital Costs	**600,000**				50,000	550,000
Funding Source						
Transportation	**425,000**				50,000	375,000
Sidewalk/Streetlight	**175,000**					175,000

TRANSPORTATION PROJECTS

Stewart Parkway – Harvey to Harvard - Design

This project would be the final phase of the multi-phase Stewart Parkway Improvements. The project would connect to planned improvements near the YMCA and complete the section south to Harvard Avenue. The improvements would include a new bridge or bridge widening to accommodate additional travel lanes. Funding shown below would be targeted at alternative analysis and design.

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Costs	**500,000**				250,000	250,000
Funding Source						
Transportation	500,000				250,000	250,000

TRANSPORTATION PROJECTS

Winchester Intersection Improvements

The intent of this project is to make safety improvements the intersection of Stephens Street and Winchester Street. This project is not fully developed and additional preliminary design will need to occur to define project scope and costs. Potential solutions may include realigning and/or signalizing the intersection. It is likely that additional funding will need to be identified to construct this project.

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Costs	**225,000**					225,000
Funding Source						
Transportation	**200,000**					200,000
Sidewalk/Streetlight	**25,000**					25,000

Mapping Improvements

Money budgeted annually for maintaining the City's GIS system related to storm drainage. Funds will be used for maintaining/upgrading the computer system, handheld GPS units and related software and technical support. Money is also budgeted every five years to update the City's aerial photos, next scheduled for 2017/18.

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Costs	**30,000**	5,000	10,000	5,000	5,000	5,000
Funding Source						
Transportation	**30,000**	5,000	10,000	5,000	5,000	5,000

PARKS PROJECTS

PARK IMPROVEMENT/STEWART TRUST FUNDS

The City of Roseburg owns and manages 362 acres of park land. The parks range in size from 0.2 to over 200 acres. The park system includes five mini-parks, three neighborhood parks, three community parks, one regional park, four special use areas and three natural areas/greenways. In addition, the Parks Division maintains beautification areas throughout the City.

In 2008 a Parks Master Plan was completed. The Plan was developed to guide the City in continuing to provide quality parks and recreation facilities that meet the needs of the community over the next two decades.

Projects within parks are generally accomplished with a combination of grant funding, Park Improvement Funds and/or Stewart Trust Funds for projects occurring within Stewart Park. In recent history, Urban Renewal Funds have been used as a grant matching source for projects located within the Urban Renewal District.

320 710	PARKS						
	Project Description	**Estimated Cost**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**
	Fir Grove Playground/Splash pad	625,000	625,000				
	Stewart Park Bathroom Remodel *(Facilities)*	100,000		100,000			
	Property Acquisition/Playground development	225,000			75,000	150,000	
	Skate Park Improvements	25,000			25,000		
	PARKS TOTAL	**$975,000**	**$625,000**	**$100,000**	**$100,000**	**$150,000**	**$0**

PARKS PROJECTS

Fir Grove Playground/Splash Pad

The Master Plan for Fir Grove Park includes the installation of play equipment near the existing concession stand area. This project would include play equipment, picnic areas, and a splash pad to enhance the play area. The City has secured grant funding for a portion of the project and is in the process of community fundraising to complete the funding package.

	Total	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**
Capital Costs	**600,000**	625,000				
Funding Source						
Park Improvement	**120,000**	120,000				
Stewart Trust	**40,000**	40,000				
Community Support	**145,000**	145,000				
OPRD LGG Grant	**305,000**	305,000				
City In-Kind	**15,000**	15,000				

PARKS PROJECTS

Property Acquisition/Playground Development

In 2013, the City Council voted to sell Willis Park with the Willis House in downtown Roseburg. Twenty five percent of the net sale will be dedicated to the Park Improvement Fund for the purpose of park land acquisition. The location of this property has not been finalized, but may be the land adjacent to Brown Park. Development of any new park land will be contingent upon a successful grant application.

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Costs	**225,000**			75,000	150,000	
Funding Source						
Park Improvement	**120,000**			30,000	90,000	
Grant	**105,000**			45,000	60,000	

PARKS PROJECTS

Skate Park Improvements

The Parks Master Plan recommends improvements to the Skate Park within Stewart Park. Improvements may include a new area for beginners, shade structure, spectator seating, and landscaping improvements. Improvements would be at least partially grant funded and could include a community support as a funding component.

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Costs	**25,000**			25,000		
Funding Source						
Stewart Trust Fund	**10,000**			10,000		
Grant Fund	**10,000**			10,000		
Community Support	**5,000**			5,000		

EQUIPMENT REPLACEMENT

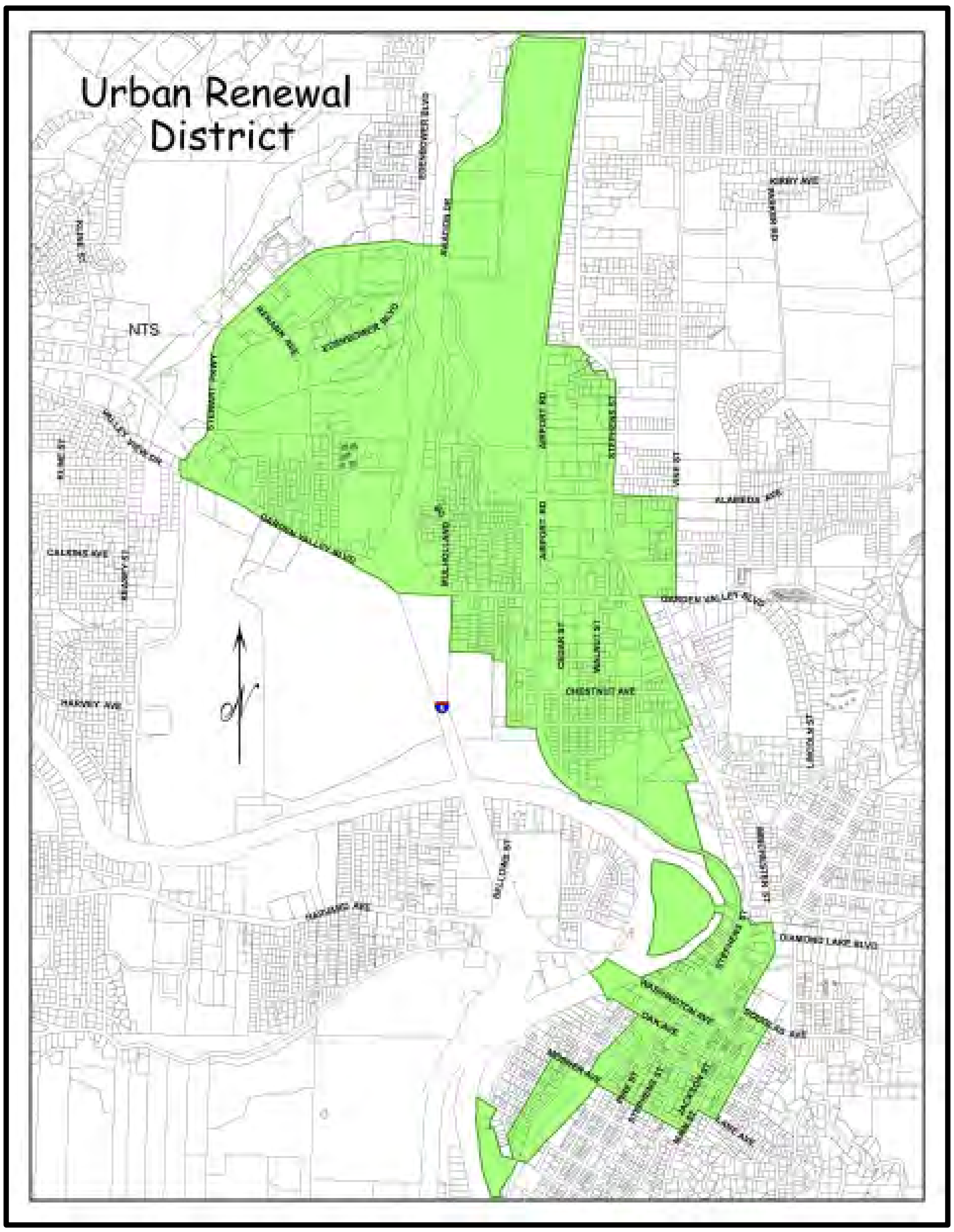
The Equipment Replacement Fund was established a number of years ago to provide assurance that funding would be available to provide for major vehicle acquisitions. By annually transferring resources from the General Fund, budget fluctuations in tax-supported funds can be minimized.

The City maintains a vehicle replacement policy that calls for replacement of different types of vehicles at different intervals. Evaluations are made based on vehicle performance, maintenance history and job requirements for which the vehicle is used. Many vehicles are reassigned after the primary use of the vehicle can no longer be accomplished.

330	EQUIPMENT REPLACEMENT						
	Project Description	**Estimated Cost**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**
	Finance						
	Fire	1,131,000	97,000	95,000	254,000	35,000	650,000
	Police	510,500	58,500	177,000	210,000	65,000	-
	Public Works - Administration	50,000	25,000	-	25,000	-	-
	Public Works - Engineering	25,000	-	25,000	-	-	-
	Public Works - Streets	1,030,000	335,000	155,000	150,000	220,000	170,000
	Parks	569,000	165,000	165,000	140,000	99,000	-
	EQUIPMENT REPLACEMENT TOTAL	**$3,315,500**	**$680,500**	**$617,000**	**$779,000**	**$419,000**	**$820,000**

URBAN RENEWAL PROJECTS

The North Roseburg Urban Renewal Plan was adopted in 1989. The principle source of funding is tax increment revenue. In 2005, the second amendment to the plan was adopted. This amendment adjusted the boundary of the Urban Renewal District to include the downtown core area. Projects included in this CIP reflect those remaining in the original plan as well as those adopted in the second amendment. This Urban Renewal District will expire in September of 2019. Projects have been programmed through fiscal year 2018-19.



URBAN RENEWAL PROJECTS

350	URBAN RENEWAL						
	Project Description	**Estimated Cost**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**
	ADA Improvements within UR district	375,000	125,000	125,000	125,000		
	Airport - FAA Grant Match	247,000	20,000	102,000	125,000		
	Airport Wetland Mitigation	100,000	100,000				
	Black Street Extension	1,250,000	150,000	500,000	600,000		
	Deer Creek Path Imp.	200,000	200,000				
	Downtown Façade Program	150,000	50,000	50,000	50,000		
	Downtown Sidewalk Program	250,000	100,000	100,000	50,000		
	Downtown Streetscape	1,125,000	125,000	1,000,000			
	Edenbower/Stewart Parkway Left Turn	1,000,000	250,000	750,000			
	Garden Valley HSIP Project Match	75,000	75,000				
	Garden Valley/Stewart Parkway Intersection Improvements	600,000	100,000	200,000	300,000		
	Micelli/Templin Improvements	125,000	125,000				
	North Valley Mall Traffic Signal Removal/Relocation	100,000	100,000				
	Parking Structure Improvements	500,000	500,000				
	Pavement Management - Overlays	1,900,000	400,000	500,000	1,000,000		
	Property Acquisition	300,000	200,000	100,000			
	Riverfront Paths/River Overlooks	350,000	100,000	250,000			
	Spruce/Parrott Street Improvements	675,000	675,000				
	Traffic Signal Coordination/Conduit/Timing	550,000	225,000	225,000	100,000		
	Riverside Park/Waterfront Improvements	350,000		350,000			
	Rose Street Courtyard/Plaza	250,000			250,000		
	West Avenue	1,250,000		350,000	900,000		
	URBAN RENEWAL TOTAL	**$11,722,000**	**$3,620,000**	**$4,602,000**	**$3,500,000**		

URBAN RENEWAL PROJECTS

ADA Improvements within UR District

The City is undertaking an effort to make accessibility improvements throughout the City. The primary focus is improving sidewalk access ramps and traffic/pedestrian signal upgrades. This will help fund improvements within the UR district.

	Total	2016/17	2017/18	2018/19
Capital Costs	**375,000**	125,000	125,000	125,000
Funding Source				
Urban Renewal	**375,000**	125,000	125,000	125,000

URBAN RENEWAL PROJECTS

Airport FAA Match

This allocation is set aside to ensure the airport can utilize FAA grant funding for future projects including obstruction removal, runway electrical reconstruction and master planning/ALP update. FAA grants pay for ninety percent of the eligible project costs. The programmed amounts represent the ten percent match.

	Total	2016/17	2017/18	2018/19
Capital Costs	**247,000**	20,000	102,000	125,000
Funding Source				
Urban Renewal	**247,000**	20,000	102,000	125,000

URBAN RENEWAL PROJECTS

Airport Wetland Mitigation

This will address existing wetlands located just west of the new north apron area. These wetlands will have to be mitigated in order to fill this area to the elevation of the rest of the airport. Mitigation will most likely involve purchasing credits from a wetland bank.

	Total	**2016/17**	**2017/18**	**2018/19**
Capital Costs	**100,000**	100,000		
Funding Source				
Urban Renewal	**100,000**	100,000		

URBAN RENEWAL PROJECTS

Black Street Extension

Black Street is a local street that parallels Garden Valley Boulevard west of Interstate Five. This project will improve the existing section of Black Street and extend the street west to Goetz Street. This project is one of the original projects included in the Urban Renewal Plan when the district was formed in 1989. Recent study of the Garden Valley Corridor has indicated that the extension of this street is an ongoing need to provide congestion relief on Garden Valley. Cost estimates below include property acquisition.

	Total	2016/17	2017/18	2018/19
Capital Costs	**1,250,000**	150,000	500,000	600,000
Funding Source				
Urban Renewal	**1,250,000**	150,000	500,000	600,000

URBAN RENEWAL PROJECTS

Deer Creek Path/Improvements

The intent of this project is to beautify the gravel area where the City purchased and removed some dilapidated buildings on Jackson Street adjacent to Deer Creek. The project will also provide a connection from Jackson Street to the path that runs north of the Public Safety Center to Stephens Street.

	Total	2016/17	2017/18	2018/19
Capital Costs	**200,000**	200,000		
Funding Source				
Urban Renewal	**200,000**	200,000		

URBAN RENEWAL PROJECTS

Downtown Façade Program

This project will extend the existing downtown façade program. The program will provide for a façade improvement matching program for the businesses located within the Downtown Business District. The intent is to provide a mechanism to facilitate rehabilitating the appearance and function of the building facades.

	Total	2016/17	2017/18	2018/19
Capital Costs	**150,000**	50,000	50,000	50,000
Funding Source				
Urban Renewal	**150,000**	50,000	50,000	50,000

URBAN RENEWAL PROJECTS

Downtown Sidewalk Program

The intent of this funding is to develop a commercial sidewalk program for the downtown area that would allow a mechanism for the City to participate in the costs of sidewalk replacement with the abutting property owner.

	Total	2016/17	2017/18	2018/19
Capital Costs	**250,000**	100,000	100,000	50,000
Funding Source				
Urban Renewal	**250,000**	100,000	100,000	50,000

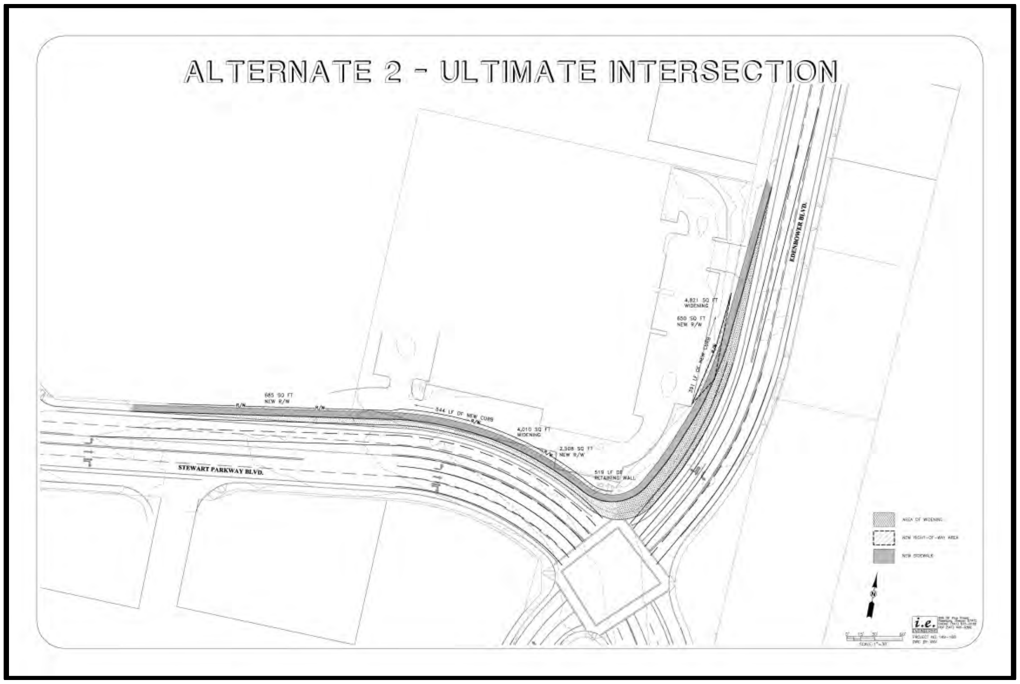
URBAN RENEWAL PROJECTS

Downtown Streetscape

This project will build on those improvements accomplished with the Washington/Oak Project. The project will focus on ADA improvements, making the area more pedestrian friendly and adding amenities that draw customers to the downtown core.

	Total	**2016/17**	**2017/18**	**2018/19**
Capital Costs				
Washington/Oak/Kane	**1,125,000**	125,000	1,000,000	
Funding Source				
Urban Renewal	**1,125,000**	125,000	1,000,000	

URBAN RENEWAL PROJECTS



Edenbower/Stewart Parkway Left Turn Lane

The City has previously studied this intersection to define future needed improvements. That study and the Intersection Area Management Plan (IAMP) for I-5 Exit 127 both indicate that a dual left turn from eastbound Stewart Parkway to northbound Edenbower should be installed.

	Total	**2016/17**	**2017/18**	**2018/19**
Capital Costs	**1,000,000**	250,000	750,000	
Funding Source				
Urban Renewal	**1,000,000**	250,000	750,000	

URBAN RENEWAL PROJECTS

Garden Valley HSIP Project Match

This project is being administered by ODOT as part of a Federal Highway Program known as the Highway Safety Improvement Program. The HSIP program is dedicated to reducing fatal and serious injury car accidents by making systemic improvements. The City project is located on Garden Valley Boulevard and will make improvements to each of the traffic signals on Garden Valley.

	Total	**2016/17**	**2017/18**	**2018/19**
Capital Costs	**75,000**	75,000		
Funding Source				
Urban Renewal	**75,000**	75,000		

URBAN RENEWAL PROJECTS

Garden Valley/Stewart Parkway Intersection Improvements

This project adds a right turn lane from northbound Stewart Parkway onto eastbound Garden Valley Boulevard and may include turn restrictions at Valley View Drive.

	Total	2016/17	2017/18	2018/19
Capital Costs	**600,000**	100,000	200,000	300,000
Funding Source				
Urban Renewal	**600,000**	100,000	200,000	300,000

URBAN RENEWAL PROJECTS

Micelli/Templin Improvements

Improvements may include the extension of the path system that now connects Micelli and Templin Beach parks. Other improvements may include upgrades to the restrooms and additional amenities within these south Roseburg parks.

	Total	**2016/17**	**2017/18**	**2018/19**
Capital Costs	**125,000**	125,000		
Funding Source				
Urban Renewal	**125,000**	125,000		

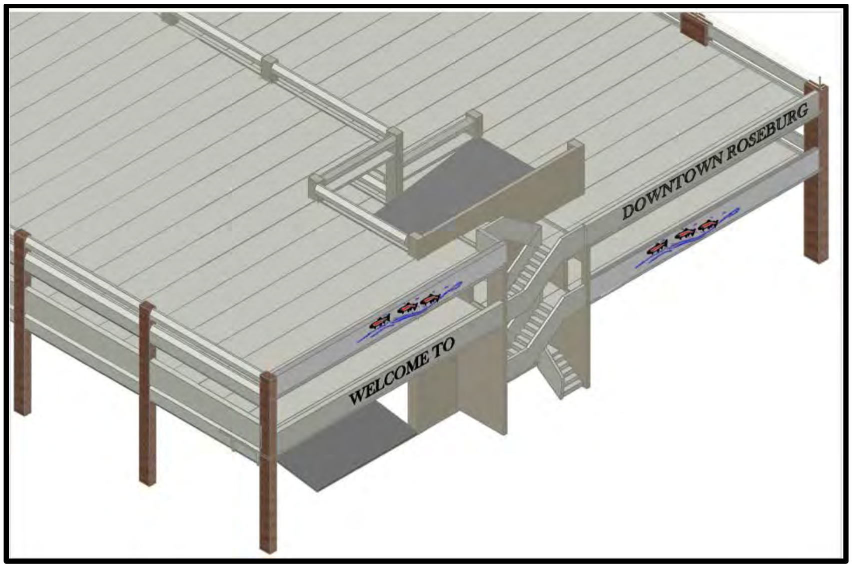
URBAN RENEWAL PROJECTS

North Valley Mall Traffic Signal Removal/Relocation

Previous studies indicate that this signal, located just south of the Garden Valley/Stephens intersection should be removed or relocated. Since the installation of the Chestnut/Stephens signal has been completed, staff would like to revisit this project, update the study and implement recommendations.

	Total	2016/17	2017/18	2018/19
Capital Costs	**100,000**	100,000		
Funding Source				
Urban Renewal	**100,000**	100,000		

URBAN RENEWAL PROJECTS



Parking Garage Improvements

This project will address both aesthetic and safety/security issues associated with the Parking Structure in Downtown. This is a valuable asset that is currently underutilized due to a perceived safety issue within the garage. It is also a landmark structure near the entrance to the Downtown, which could be greatly improved aesthetically.

	Total	**2016/17**	**2017/18**	**2018/19**
Capital Costs	**500,000**	500,000		
Funding Source				
Urban Renewal	**500,000**	500,000		

URBAN RENEWAL PROJECTS

Pavement Management - Overlays

Utilizing Urban Renewal Funding to overlay sections of arterials located within the district will help to prolong the life of the arterial street system in a way that cannot currently be accomplished utilizing transportation funding alone. Streets included are Stephens Street, Garden Valley Boulevard, Stewart Parkway, and downtown streets.

	Total	2016/17	2017/18	2018/19
Capital Costs				
Edenbower	400,000	400,000		
Garden Valley	500,000		500,000	
Stewart Parkway	750,000			750,000
Downtown	250,000			250,000
Funding Source				
Urban Renewal	**1,900,000**	400,000	500,000	1,000,000

URBAN RENEWAL PROJECTS

Property Acquisition

This project may involve acquiring parcels within the district that are blighted or underutilized in order to create larger parcels that can be redeveloped. It may also involve acquiring parcels or portions of properties that are needed to construct infrastructure or park improvements.

	Total	**2016/17**	**2017/18**	**2018/19**
Capital Costs	**300,000**	200,000	100,000	
Funding Source				
Urban Renewal	**300,000**	200,000	100,000	

URBAN RENEWAL PROJECTS

Riverfront Paths/River Overlooks

The Waterfront Master Plan calls for the development of new riverfront paths and river overlooks. Riverside Park would be the location of the first proposed overlook. Salmon can be seen migrating through the shallow waters of the South Umpqua at this location. Grant funding may be available to offset some of the costs associated with these projects.

	Total	2016/17	2017/18	2018/19
Capital Costs	**350,000**	100,000	250,000	
Funding Source				
Urban Renewal	**350,000**	100,000	250,000	

URBAN RENEWAL PROJECTS

Spruce/Parrott Street Improvements

This project will completely reconstruct both Spruce and Parrott Streets from Oak to Mosher. Parrott Street is a residential street that wyes into Spruce Street at Lane Avenue. Parrot Street serves as the alternate bicycle and pedestrian access for crossing under the Oak and Washington Street Bridges. Spruce Street serves an underdeveloped industrial area and is included within the Urban Renewal District.

	Total	2016/17	2017/18	2018/19
Capital Costs	**1,275,000**	1,275,000		
Funding Source				
Transportation	400,000	400,000		
Urban Renewal	675,000	675,000		
Storm Drainage	75,000	75,000		
Sidewalk/Streetlight	75,000	75,000		
Total	50,000	50,000		

URBAN RENEWAL PROJECTS

Traffic Signal Coordination/Conduit/Timing

These would be separate projects that would work towards coordinating traffic signals on arterials within Roseburg to increase efficiency of the transportation system.

	Total	2016/17	2017/18	2018/19
Capital Costs	**550,000**	225,000	225,000	100,000
Funding Source				
Urban Renewal	**550,000**	225,000	225,000	100,000

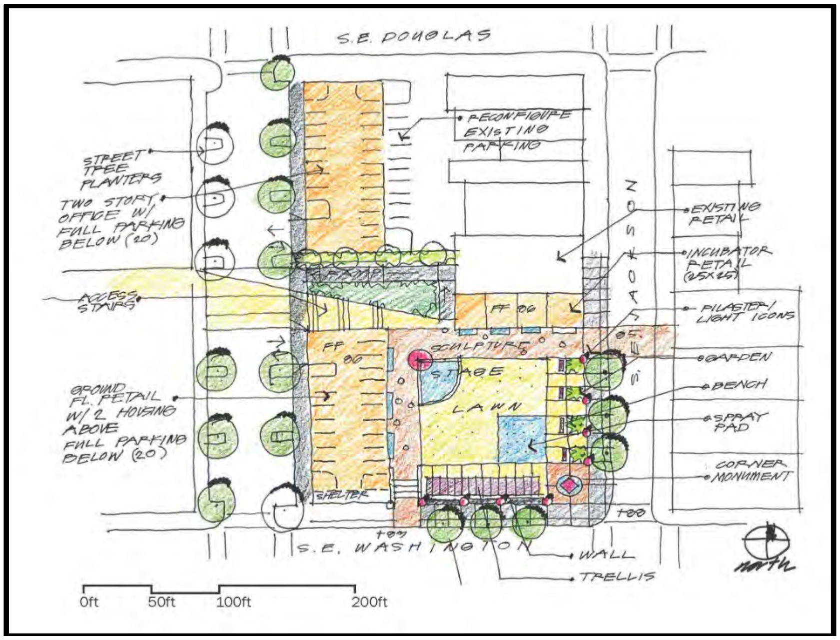
URBAN RENEWAL PROJECTS

Riverside Park/Waterfront Improvements

The Waterfront Master Plan calls for improvements to Riverside Park. Recent improvements include reconstructing and widening the multi-use path. The Hwy 138 TE project will include improved lighting of the path from its connection at Flint Street to the Visitor's Center. This funding would allow those improvements to continue.

	Total	2016/17	2017/18	2018/19
Capital Costs	**350,000**		350,000	
Funding Source				
Urban Renewal	**350,000**		350,000	

URBAN RENEWAL PROJECTS

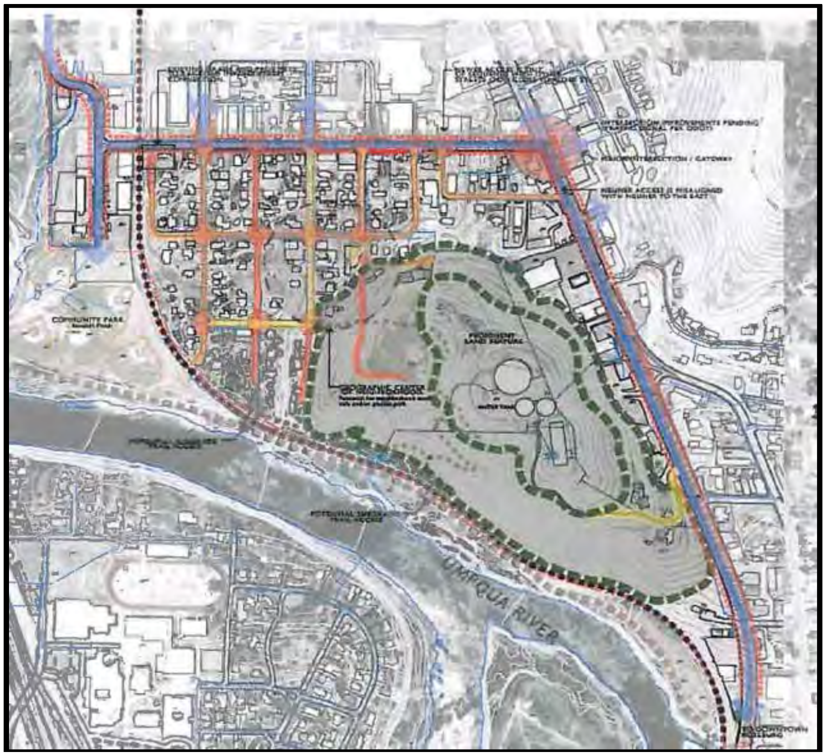


Rose Street courtyard/plaza

The City has previously studied the feasibility of a downtown plaza. The study indicated that in order to be successful, there must be private development in conjunction with the plaza development. This funding would allow the City to participate in the construction a future plaza should private development occur that would facilitate the project downtown.

	Total	2016/17	2017/18	2018/19
Capital Costs	**250,000**			250,000
Funding Source				
Urban Renewal	**250,000**			250,000

URBAN RENEWAL PROJECTS



West Avenue

The West Avenue area has been targeted in the Urban Renewal Plan for potential redevelopment. The potential project needs further refinement but may include a combination of property acquisition and infrastructure improvements.

	Total	2016/17	2017/18	2018/19
Capital Costs	**1,250,000**	350,000	900,000	
Funding Source				
Urban Renewal	**1,250,000**	350,000	900,000	

Fund 350

FACILITY PROJECTS

In 2007, the City commissioned a Facility Condition Assessment Report for all City facilities. The report included approximately $1 million in deferred or immediate maintenance needs. An additional $5 million worth of improvements over the first five years of the report was also outlined. Many of the City facilities are used past what is considered their useable life. The projects reflected in this plan are tentative. Many of the replacements outlined (such as HVAC) do not occur until necessary. The projects shown are those that are needed to keep City facilities operational and in a reasonable condition.

360	FACILITIES REPLACEMENT FUND			
	Project Description	**Estimated Cost**	**2016-2017**	**2017-2018**
	City Hall	180,000	180,000	
	Fire Station #2	1,000,000		1,000,000
	Fire Station #3	1,000,000	1,000,000	
	Fir Grove Park	10,000	10,000	
	Stewart Park	150,000	50,000	100,000
	Public Safety Center	135,000	135,000	
	ADA Improvements - TBD	25,000	25,000	
	Other Facilities	20,000	20,000	
	Paving/Sealing	20,000	20,000	
	FACILITIES REPLACEMENT FUND TOTAL	**$2,540,000**	**$1,440,000**	**$1,100,000**

FACILITY PROJECTS

Projects funded through the Facility Fund often address issues that arise with the facilities throughout the year. Examples may include HVAC repairs, elevator repairs, boiler repairs/replacement, or other items that do not fail according to a schedule. Other repairs, such as roofing projects, are scheduled during the budgeting process. Some of the facilities do not have any "scheduled" repairs, but money is budgeted to address the unknown issues that may arise. Facility Projects which may occur in FY 2016-17 include the following:

- City Hall — Second Floor Security Improvements (100k)
Council Chambers Camera Replacement (30k)
- Fire Station #1 — Police Interview Cameras (50k)
Security Upgrades (10k)
Locker Rooms for non-emergency personnel (75k)
- Fire Station #3 — Seismic upgrades (grant) (1M)
- Fir Grove Park — Theater Roofing (10k)
- Stewart Park — Riverbank Erosion Repairs (50k)
- Other Buildings — Willis House (20k)
- Paving /Sealing — Parking lots (20k)
- ADA Improvements — TBD (25k)

Facilities		16-17	17-18
Beg Fund		570,594	89,594
Rev		1,004,000	1,064,500
M&S		45,000	45,000
Capital		1,440,000	1,100,000
End Bal		89,594	9,094

AIRPORT PROJECTS

The Airport Fund was separated from Economic Development Fund in 2002 to account for revenues and expenditures of the Roseburg Regional Airport. Primary operating revenues are from fuel sales and lease income. The fund depends on federal grants from the Federal Aviation Administration for most airport construction and major improvements. The airport is located within the Urban Renewal District. Matching funds for FAA grants have often been provided by the Urban Renewal Fund.

520	AIRPORT FUND						
	Project Description	**Estimated Cost**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**
	Approach Procedure Update	10,000	10,000				
	Obstruction Removal	100,000	100,000				
	Master Plan / ALP Update/Runway Justification	247,223		247,223			
	ODA Pavement Mgt	20,000		20,000			
	Runway Lighting Rehab	620,000			620,000		
	Taxiway Extension	1,250,000				1,250,000	
	AIRPORT TOTAL	**$2,247,223**	**$110,000**	**$267,223**	**$620,000**	**$1,250,000**	**-**

Fund 520

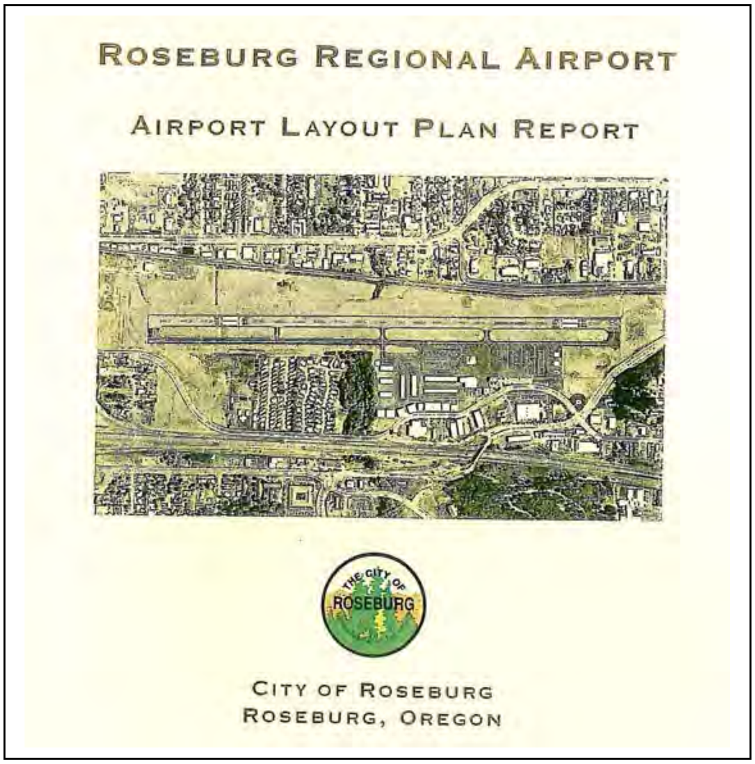
AIRPORT PROJECTS

Obstruction Removal/Mitigation
Approach Procedure Update

The City has completed an airspace analysis to identify obstructions within various airport surfaces. This project will correct, light or remove some airport and airspace hazards to air navigation. Related work may include correcting or removing abrupt surface irregularities, trees, equipment, and other identified hazards to aviation within the Runway Safety Area, Runway Protection Zone, Object Free Zone, Obstacle Free Area, etc. Having the approach procedure flown and having the Visual Approach Slope Indicator certified by the FAA is another method to mitigate ground obstructions, but is not eligible for reimbursement by FAA.

	Total	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**
Capital Costs						
Approach Procedure Update	10,000	10,000				
Obstruction Removal	100,000	100,000				
Funding Source						
FAA	**90,000**	90,000				
Urban Renewal	**20,000**	20,000				

AIRPORT PROJECTS



Master Plan / ALP Update /Runway Justification

With completion of the taxiway relocation, runway extension and other airport improvements, the Airport Master Plan and Airport Layout Plan will need to be updated. In order to qualify for any future FAA support for the runway extension completed in 2012, the City must justify its new length through a study to verify usage.

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Costs						
Master Plan/ALP Update	222,223		222,223			
Runway Justification	25,000		25,000			
Funding Source						
FAA	**200,000**		200,000			
Urban Renewal	**47,223**		47,223			

AIRPORT PROJECTS

Runway Lighting Rehabilitation

Runway 16/34 has an aging electrical infrastructure constructed in the 1970's. The project will include new LED medium intensity runway lights (MIRLs), runway end identifier lights (REILs), LED wind cones and a new Precision Approach Path Indicator (PAPI) to replace the existing Visual Approach Slope Indicator (VASI).

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Costs	**620,000**			620,000		
Funding Source						
FAA	**558,000**			558,000		
Urban Renewal	**62,000**			62,000		

AIRPORT PROJECTS

Taxiway Extension

The runway was extended 400 feet in 2009 utilizing a ConnectOregon 3 Grant. Due to funding constraints, the parallel taxiway was not constructed. The proposed project will extend the taxiway 400 feet to eliminate the back taxi required on Runway 16. In order to be eligible for FAA participation, the City must first justify the runway extension. The justification study is scheduled to be completed in parallel with the Master Plan Update in FY 17-18.

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Costs	**1,250,000**				1,250,000	
Funding Source						
FAA	**1,125,000**				1,125,000	
Urban Renewal	**125,000**				1,250,000	

WATER PROJECTS

The Water Service Fund accounts for the operation of the City's domestic drinking water utility. The operations, debt and capital outlay are totally supported by charges for services. The City purchased the utility from Oregon Water Corporation in 1977, and has since been upgrading the system in the course of normal depreciation as well as to correct major existing deficiencies within the system. Once undertaken, these projects are designed to accommodate anticipated growth and changes in design standards.

An updated Water System Master Plan and Capital Improvement Plan was adopted in 2010. A long range Water Supply Plan and Water Treatment Facilities Preliminary Design Report were completed in 2009. Together, these documents outline the high priority projects for the next decade. The short term capital improvement projects from the Master Plan have been included in this document.

530	WATER FUND						
	Project Description	**Estimated Cost**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**
	Land	25,000	5,000	5,000	5,000	5,000	5,000
	Buildings and Structures	50,000	10,000	10,000	10,000	10,000	10,000
	Equipment	285,000	70,000	-	130,000	-	85,000
	Water Vehicles	345,000	135,000	40,000	65,000	70,000	35,000
	Mapping/Plans	30,000	5,000	10,000	5,000	5,000	5,000
	Main Replacements	2,910,000	235,000	575,000	600,000	750,000	750,000
	New Mains	25,000	5,000	5,000	5,000	5,000	5,000
	Plant Improvements	2,160,000	525,000	410,000	466,000	342,000	417,000
	Reservoir Improvements	1,185,000	100,000	710,000	125,000	125,000	125,000
	Transmission Main	3,275,000	575,000	800,000	600,000	700,000	600,000
	LID	-	-	-	-	-	
	WATER TOTAL	**$10,290,000**	**$1,665,000**	**$2,565,000**	**$2,011,000**	**$2,012,000**	**$2,037,000**

Fund 530

WATER FUND
FINANCIALS

Water		16-17	17-18	18-19	19-20	20-21
Beg Fund		4,717,515	4,854,571	4,351,463	4,491,554	4,802,970
Rev		5,657,780	6,110,402	6,477,027	6,865,648	7,002,961
M&S		3,855,724	4,048,510	4,325,936	4,542,232	4,769,344
Capital		1,665,000	2,565,000	2,011,000	2,012,000	2,037,000
End Bal		4,854,571	4,351,463	4,491,554	4,802,970	4,999,587

Assumptions:

- Materials & Services (M&S) increase 5% annually
- Revenues increase between 6 - 8% annually

WATER PROJECTS

Land

This is money budgeted annually for purchase of easements or small parcels of property needed to facilitate the water system, pump stations, and/or reservoirs.

	Total	2014/15	2015/16	2016/17	2017/18	2018/19
Capital Costs	**25,000**	5,000	5,000	5,000	5,000	5,000
Funding Source						
Water Fund	**25,000**	5,000	5,000	5,000	5,000	5,000

WATER PROJECTS

Buildings and Structures

Money budgeted annually for improvements or capital maintenance for the City maintenance facility on Fulton Street. Money is budgeted in Storm Drainage, Facilities and Water Funds for this purpose.

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Costs	**50,000**	10,000	10,000	10,000	10,000	10,000
Funding Source						
Water	**50,000**	10,000	10,000	10,000	10,000	10,000

WATER PROJECTS

Equipment

Money budgeted for equipment purchase and/or replacement according to the replacement schedule.

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Costs						
Excavator (1/2)	70,000	70,000				
Dump Truck	130,000			130,000		
Skid Steer	85,000					85,000
Funding Source						
Water Fund	**285,000**	70,000	0	130,000	0	85,000

Fund 530

WATER PROJECTS

Water Vehicles

Money budgeted to replace Water Division vehicles.

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Costs						
Pick ups	310,000	135,000	40,000	65,000	70,000	
Go-4 Scooter	35,000					35,000
Funding Source						
Water Fund	**345,000**	135,000	40,000	65,000	70,000	35,000

WATER PROJECTS

Mapping/Plans

Money budgeted annually for maintaining the City's GIS system related to water transmission and distribution. Funds will be used for maintaining/upgrading the computer system, handheld GPS units, related software and technical support. Money is also budgeted every five years to update the City's aerial photos.

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Costs	**30,000**	5,000	10,000	5,000	5,000	5,000
Funding Source						
Water	**30,000**	5,000	10,000	5,000	5,000	5,000

WATER PROJECTS

Main Replacement

This budgeted item is to replace existing transmission and distribution mains annually for the following purposes: increase fire flows, replace aged/leaking pipes or to accommodate street improvements.

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Costs						
Parrott/Spruce	**50,000**	50,000				
Pioneer Way	**60,000**	60,000				
Sunshine Rd	**75,000**	75,000				
Washington Bridge Ends	**250,000**		250,000			
Military Ave	**200,000**		200,000			
Peggy Ave	**75,000**		75,000			
TBD	**1,950,000**			550,000	700,000	700,000
Miscellaneous	**250,000**	50,000	50,000	50,000	50,000	50,000
Funding Source						
Water Fund	**2,910,000**	235,000	575,000	600,000	750,000	750,000

Fund 530

WATER PROJECTS

New Mains

Description:

It is the City's policy for developers to build new mains to serve new areas and for the City to operate and maintain the system after initial construction. Piping gaps left by private extensions are now a minor problem, and expenditures for this purpose are minimal.

	Total	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**
Capital Costs	**25,000**	5,000	5,000	5,000	5,000	5,000
Funding Source						
Water Fund	**25,000**	5,000	5,000	5,000	5,000	5,000

WATER PROJECTS

Plant Improvements

The Water Treatment Facilities Preliminary Design Report lists capital improvement recommendations to be constructed prior to the expansion of the plant. Improvements will include updating the telemetry system that allows the plant operators to control the pump stations and reservoir levels.

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Costs						
Telemetry Upgrades	**1,300,000**	300,000	250,000	250,000	250,000	250,000
River Shoaling	**50,000**	50,000				
Misc/Pump replacement/upgrades	**200,000**	75,000	50,000	25,000	25,000	25,000
Chlorine generation upgrades	**130,000**	10,000	50,000	50,000	10,000	10,000
Chemical Feed	**60,000**		60,000			
Replace Filter Media	**141,000**			141,000		
Floc Basin	**82,000**				82,000	
HVAC – high head PS	**37,000**					37,000
Sedimentation Basin	**70,000**					70,000
Funding Source						
Water Fund	**2,070,000**	525,000	410,000	466,000	342,000	417,000

WATER PROJECTS

Reservoir Improvements

This budget line item includes major reservoir construction, upgrades, replacements, re-coatings, and other capital improvements.

	Total	2016/17	2017/18	2018/19		
Capital Costs						
Kline Res Slide	20,000	20,000				
Joanne PS	15,000	15,000				
Rocky Ridge PS	40,000	40,000				
Military PS	105,000		105,000			
N.C. Reservoir*	500,000		500,000			
Rocky Ridge Floor	80,000		80,000			
Vermillion PS	100,000			100,000		
TBD	200,000				100,000	100,000
Misc.	125,000	25,000	25,000	25,000	25,000	25,000
Funding Source						
Water Fund	**1,185,000**	100,000	710,000	125,000	125,000	125,000

**Development Driven*

WATER PROJECTS

Transmission Main

This capital item includes transmission main replacements, upgrades and installation of cathodic protection.

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Costs						
Reservoir Hill Yard Piping Ph 2	**400,000**	400,000				
Hooker Rd Intertie	**175,000**	175,000				
West Ave – Res #7	**800,000**		800,000			
Misc. Improvements	**250,000**			50,000	50,000	50,000
TBD	**1,750,000**			550,000	650,000	550,000
Funding Source						
Water Fund	**3,275,000**	575,000	800,000	600,000	700,000	600,000

WATER PROJECTS

LID

Water main extensions through semi-developed areas can be financed by the Water Fund on a project specific basis, usually upon a petition from the benefitting property owners. No projects are identified at this time.

Fund 530

STORM DRAINAGE PROJECTS

This fund was created in 1989-90 to account for the revenues and operations of the City's storm drainage system. The principal source of revenue to this fund is user fees and system development charges. Grant revenues will be applied for when appropriate.

The Fund is managed by the Public Works Department using the City's Storm Drainage Master Plan as a general guideline. General oversight is provided by the Public Works Commission. An update of the Storm Drainage Master Plan was completed in 2011. The projects included in this five year plan are based on the Master Plan. User fees were reviewed in 2013, and a series of fee increases has been adopted by Council and programed. System development charges may be reviewed in the near future based on capital improvement needs identified in the Storm Drainage Master Plan.

560	STORM DRAINAGE						
	Project Description	**Estimated Cost**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**
	Ballf Area Storm Drainage Phase 2	500,000	100,000	400,000			
	Cascade Court Drainage	75,000	75,000				
	Fairmont/Garden Valley Improvements	150,000	150,000				
	Harvard repairs	425,000	425,000				
	Kenwood Extension	150,000	150,000				
	Spruce/Parrott Street Improvements (UR)	75,000	75,000				
	Stewart Parkway Flood Mitigation	750,000	250,000	500,000			
	Stormwater Mgt Manual/Update Standards	25,000	25,000				
	Calkins Area Phase 2A, 4 - Troost Street	525,000	75,000	450,000			
	Lookingglass Area Improvements	900,000		100,000	800,000		
	Rifle Range Street LID (T)	150,000			150,000		
	Broccoli -Tie In	160,000			160,000		
	Nash/Jackson Area	1,000,000			100,000	900,000	
	Valley View LID (T)	100,000			100,000		
	Cardinal Street	560,000				100,000	460,000
	Hickory/Chateau/Shasta	450,000				50,000	400,000
	Military Avenue Storm Improvements	450,000				200,000	250,000
	Diamond Lake Blvd/Fulton Street Drainage Improvements	250,000					250,000
	TMDL Implementation	25,000	5,000	5,000	5,000	5,000	5,000
	Misc Storm Improvements	250,000	50,000	50,000	50,000	50,000	50,000
	Buildings and Structures	50,000	10,000	10,000	10,000	10,000	10,000
	Equipment Acquisition	65,000	10,000	25,000	10,000	10,000	10,000
	Improvements - Mapping	30,000	5,000	10,000	5,000	5,000	5,000
	STORM DRAINAGE TOTAL	**$7,115,000**	**$1,405,000**	**$1,550,000**	**$1,390,000**	**$1,330,000**	**$1,440,000**

Fund 560

STORM DRAINAGE FUND FINANCIALS

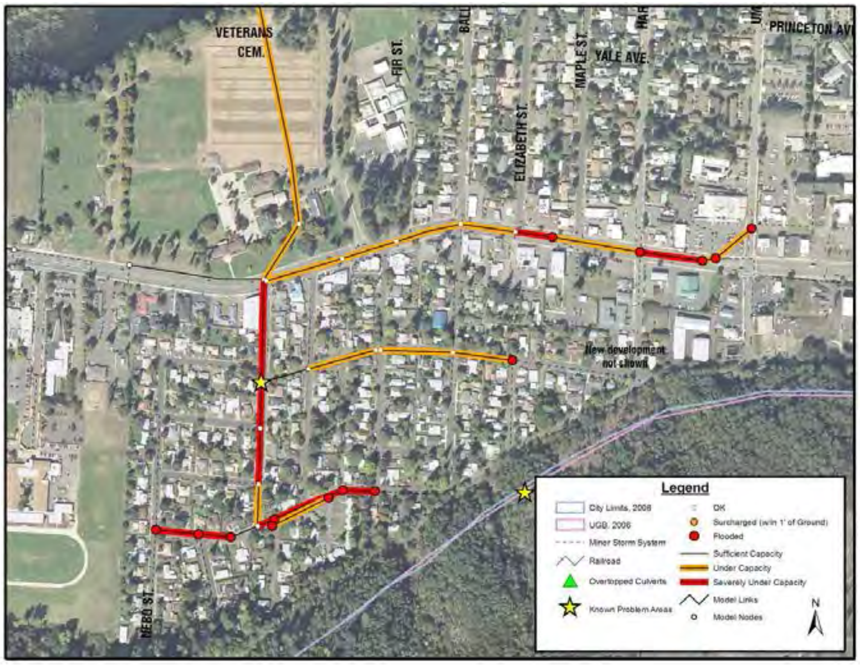
Storm Drainage		16-17	17-18	18-19	19-20	20-21
Beg. Fund Balance		1,786,800	1,460,204	1,113,461	1,064,198	1,226,248
Revenue		1,773,326	1,932,925	2,106,889	2,296,509	2,342,439
M&S		694,922	729,668	766,152	804,459	844,682
Capital		1,405,000	1,550,000	1,390,000	1,330,000	1,440,000
Ending Fund Balance		1,460,204	1,113,461	1,064,198	1,226,248	1,284,005

Assumptions:

Materials & Services (M&S) increase 5% annually

Revenues increase 9% annually due to adopted rate increases

STORM DRAINAGE PROJECTS



Ballf Area Storm Drainage Phase 2

The City completed a study of this area in 2013 to identify alternatives to alleviate drainage issues identified in the Storm Drainage Master Plan. The first phase was constructed in 2014. The next phase will upsize existing storm drainage piping on Ballf Street, Myrtle Avenue and Fairhaven Street as identified in the Balff Street Storm Sewer Improvements Study.

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Cost						
Design	**50,000**	50,000				
Construction	**450,000**	50,000	400,000			
Funding Source						
Storm Drainage	**500,000**	100,000	400,000			

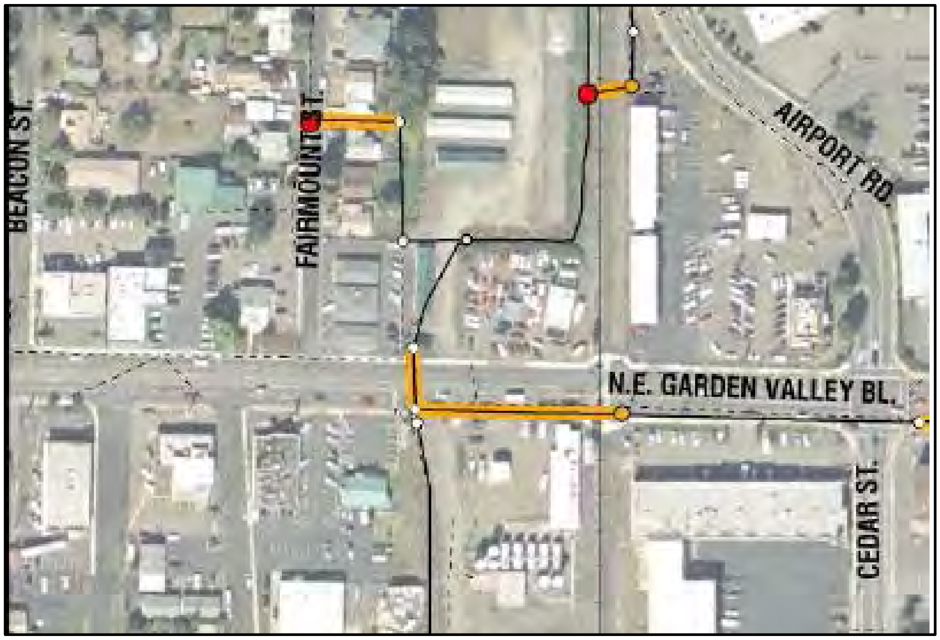
STORM DRAINAGE PROJECTS

Cascade Court Storm Separation

This project will install a new storm line to pick up drainage collected in a catch basin on Cascade Court. The current system is a combined storm/sanitary piping. The project will remove the storm drainage from the sanitary sewer system in this area.

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Costs						
Construction	75,000	75,000				
Funding Source						
Storm Drainage	**75,000**	75,000				

STORM DRAINAGE PROJECTS

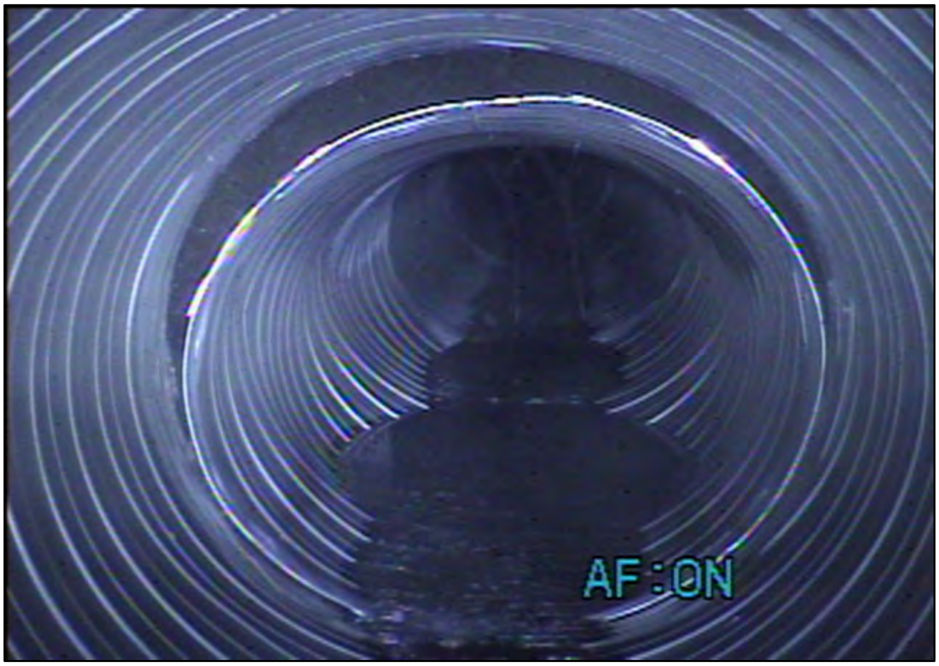


Fairmount/Garden Valley Improvements

This project will include the installation of a new 18-inch line on Fairmount Street to Garden Valley and on Garden Valley to Park Street. This project is identified in the Storm Drainage Master Plan as problem area #5. The project does not address all of the areas identified, but does move the drainage out of private backyards east of Fairmont Street.

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Costs						
Construction	150,000	150,000				
Funding Source						
Storm Drainage	**150,000**	150,000				

STORM DRAINAGE PROJECTS



Harvard Repairs

In January 2015, staff discovered that the flow line of the existing 48-inch storm line in Harvard south of Lookingglass Street was corroded, causing the pipe to fail structurally. This failure was causing sink holes to form along the south edge of Harvard Avenue. An emergency project was constructed to replace approximately 250 feet of the worst pipe. This project will replace the remaining sections of the aluminized steel pipe.

	Total	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**
Capital Costs	**425,000**	425,000				
Funding Source						
Storm Drainage	**425,000**	425,000				

Fund 560

STORM DRAINAGE PROJECTS

Kenwood Storm Extension

This project will extend an existing pipe in Kenwood Street to Harvard. This will abandon a section of existing piping that runs between private properties to the east.

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Costs	**150,000**	150,000				
Funding Source						
Storm Drainage	**150,000**	150,000				

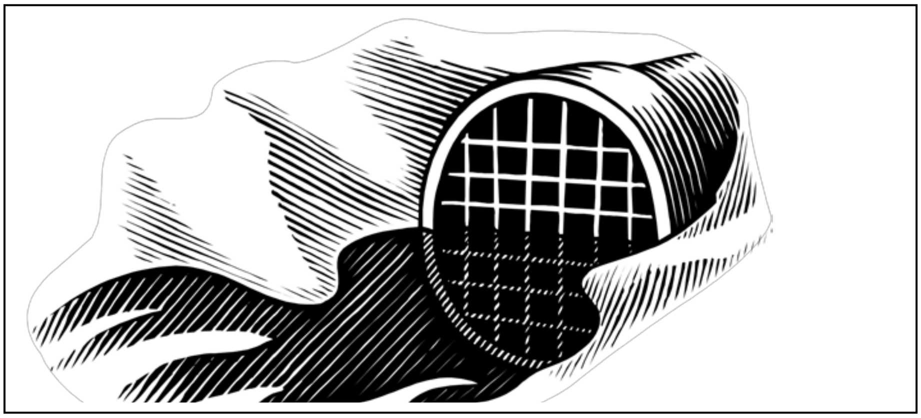
STORM DRAINAGE PROJECTS

Stewart Parkway Flood Mitigation

This project is necessary to resolve flooding issues on Newton Creek at Stewart Parkway. The project will involve creating detention for Newton Creek to alleviate the flashiness of the creek during significant rainfall events. The project will be constructed as part of the Stewart Parkway Widening – Valley View to Harvey project (see Transportation section).

	Total	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**
Capital Costs						
Construction	750,000	250,000	500,000			
Funding Source						
Storm Drainage	**750,000**	250,000	500,000			

STORM DRAINAGE PROJECTS



Stormwater Management Manual/Update Standards

As part of the master planning effort in 2009, the City's consultant updated the City standards related to storm drainage and created a stormwater management manual. The manual was not adopted. This effort needs to be completed to ensure that facilities are being designed and maintained as recommended in the Storm Drainage Master Plan.

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Costs	**25,000**	25,000				
Funding Source						
Storm Drainage	**25,000**	25,000				

Fund 560

STORM DRAINAGE PROJECTS

Calkins Area Drainage Phase 2A, 4

This project was identified in the Calkins Hydraulic Report completed in 2005. This will be the third phase of construction. This phase will include installing a 36-inch pipe on Troost Street, north of Calkins Avenue to Witherspoon and installing drainage on Calkins Avenue parallel to Troost Street to eliminate drainage through back yards. Previous phases included installing the sections in El Dorado Court, Calkins Avenue, Wannell, and Luth Streets.

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Cost						
Design	**50,000**	50,000				
Construction	**450,000**	25,000	450,000			
Funding Source						
Storm Drainage	**500,000**	75,000	450,000			

STORM DRAINAGE PROJECTS

Lookingglass Area Improvements

The Storm Drainage Master plan identifies two areas of concern near Lookinglass Road, problem areas #14 and 15. This project would involve additional study to refine the improvement plan and then phased construction.

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Cost						
Design	**100,000**		100,000			
Construction	**800,000**			800,000		
Funding Source						
Storm Drainage	**900,000**		100,000	800,000		

STORM DRAINAGE PROJECTS

Broccoli Tie-in

There is an existing storm drainage line that runs overland within the unimproved right-of-way of Brocolli Street. This project will bury, extend and tie that piping in at Lorraine Street.

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Costs	**160,000**			160,000		
Funding Source						
Storm Drainage	**160,000**			160,000		

Fund 560

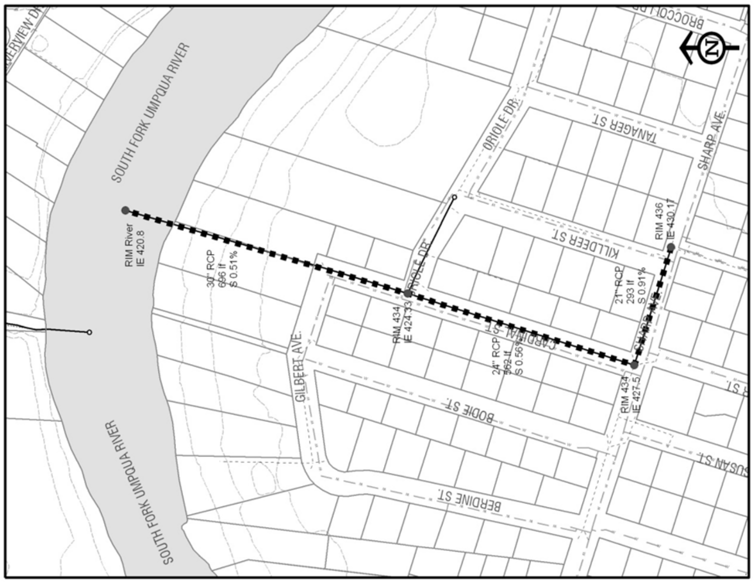
STORM DRAINAGE PROJECTS

Nash/Jackson Area Improvements

This project is identified in the Storm Drainage Master Plan as problem area #7. The project will involve further analysis to refine the required improvements, and then phased construction to address capacity issues within this area. This project will also replace aging pipe within the area.

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Costs						
Design	100,000			100,000		
Construction	900,000				900,000	
Funding Source						
Storm Drainage	**1,000,000**			100,000	900,000	

STORM DRAINAGE PROJECTS



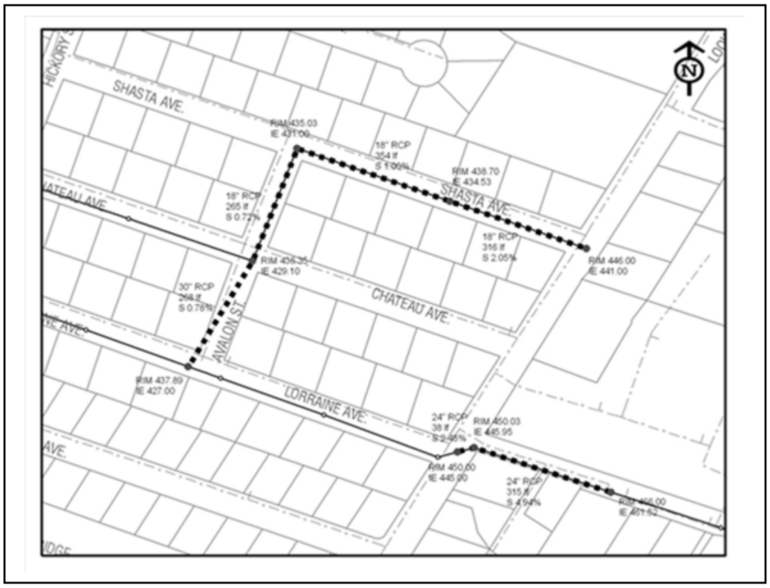
Cardinal Street Storm Improvements

The storm drain system along Sharp Ave and Cardinal St. is identified in the Storm Drainage Master Plan as severely under capacity. This project will install 1500 feet of new storm piping in this area.

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Costs						
Design	75,000				75,000	
Construction	485,000				25,000	460,000
Funding Source						
Storm Drainage	**560,000**				50,000	460,000

Fund 560

STORM DRAINAGE PROJECTS



Hickory/Chateau/Shasta Storm Improvements

This project will upsize and re-route drainage in this neighborhood west of Lookingglass Road to take eliminate undersized pipes and take advantage of existing capacity in other pipes.

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Costs						
Design	50,000				50,000	
Construction	400,000					400,000
Funding Source						
Storm Drainage	**450,000**				50,000	400,000

STORM DRAINAGE PROJECTS

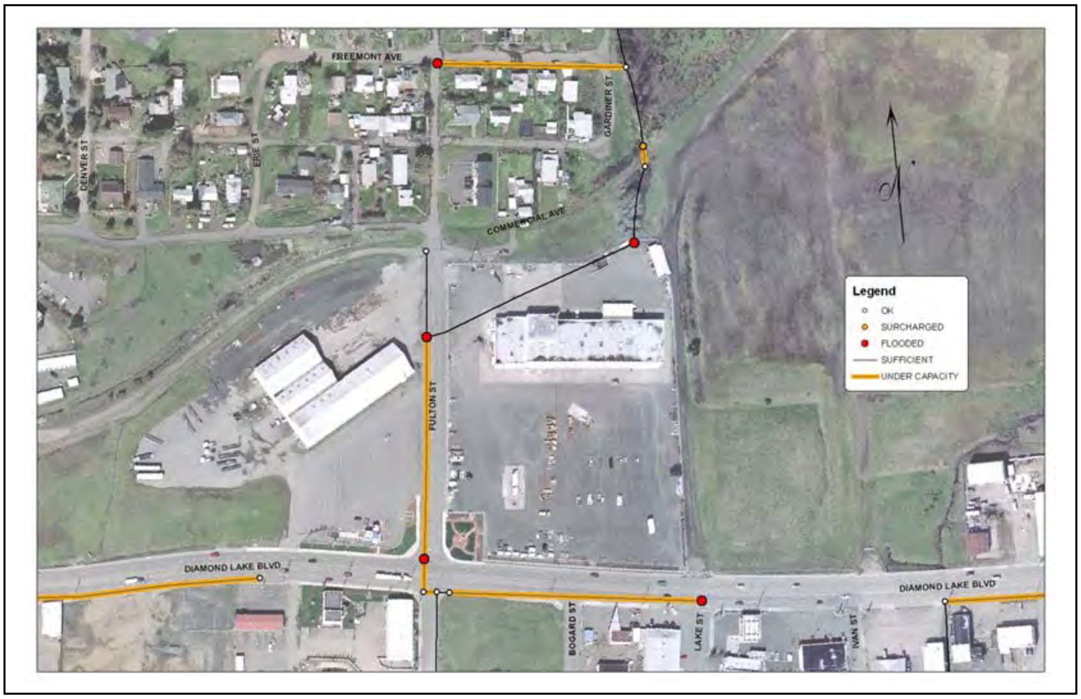
Military Avenue Storm Improvements

This project upsizes existing culverts crossing Military at nine different locations. The intent is to reduce flooding and erosion. This project is identified in the Storm Drainage Master Plan as problem area #1. Additional funding has been programmed to identify and address any downstream impacts that may occur.

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Costs						
Design	75,000				75,000	
Construction	375,000				125,000	250,000
Funding Source						
Storm Drainage	**450,000**				200,000	250,000

Fund 560

STORM DRAINAGE PROJECTS

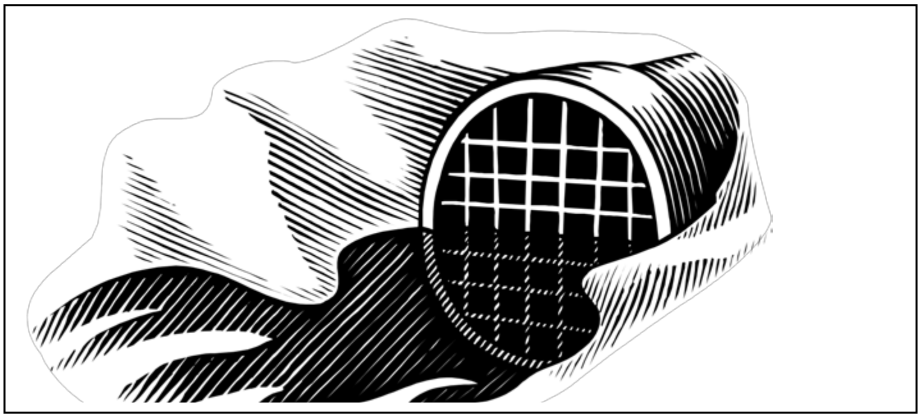


Diamond Lake/Fulton Street Drainage Improvements

The existing storm drainage system on Freemont Avenue, Fulton Street and Diamond Lake Boulevard is undersized. This project will include installation of 387 lineal feet of 18 inch pipe, 457 lineal feet of 42 inch pipe, 519 lineal feet of 21 inch pipe, and 42 lineal feet of 42 inch pipe. This project is identified in the Storm Drainage Master Plan as problem area #3. This will be a multi-year project and will most likely be development driven.

	Total	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**
Capital Costs	**250,000**					250,000
Funding Source						
Storm Drainage	**250,000**					250,000

STORM DRAINAGE PROJECTS



TMDL Implementation

Money budgeted annually to implement the City's adopted plan to limit pollutants entering the South Umpqua River.

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Costs	**25,000**	5,000	5,000	5,000	5,000	5,000
Funding Source						
Storm Drainage	**25,000**	5,000	5,000	5,000	5,000	5,000

STORM DRAINAGE PROJECTS

Miscellaneous Storm Improvements

This is money budgeted annually to address small problems or improvements within the system. The money may not be spent every year.

	Total	2016/17	2017/18	2018/19	2019/20	2020/21
Capital Costs	**250,000**	50,000	50,000	50,000	50,000	50,000
Funding Source						
Storm Drainage	**250,000**	50,0000	50,000	50,000	50,000	50,000

Fund 560

STORM DRAINAGE PROJECTS

Buildings and Structures

Money budgeted annually for improvements or capital maintenance for the City maintenance facility on Fulton Street. Money is budgeted in Storm Drainage, Facilities and Water Funds for this purpose.

	Total	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**
Capital Costs	**60,000**	10,000	10,000	10,000	10,000	10,000
Funding Source						
Storm Drainage	**60,000**	10,000	10,000	10,000	10,000	10,000

STORM DRAINAGE PROJECTS

Equipment Acquisition

This money is budgeted annually for purchase of equipment necessary to maintain the storm drainage system. Purchases are typically made for equipment required for either the storm drainage vacuum truck or the camera truck used for inspecting the system. When required, replacement of these two pieces of equipment is budgeted in this line item. This line item may also be used for specialized attachments for the backhoe or bobcats when appropriate.

	Total	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**
Capital Costs	**65,000**	10,000	25,000	10,000	10,000	10,000
Funding Source						
Storm Drainage	**65,000**	10,000	25,000	10,000	10,000	10,000

STORM DRAINAGE PROJECTS

Improvements - Mapping

Money budgeted annually for maintaining the City's GIS system related to storm drainage. Funds will be used for maintaining/upgrading the computer system, handheld GPS units and related software and technical support. Money is also budgeted every five years to update the City's aerial photos, next scheduled for 2017/18.

	Total	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**
Capital Costs	**30,000**	5,000	10,000	5,000	5,000	5,000
Funding Source						
Storm Drainage	**30,000**	5,000	10,000	50,000	5,000	5,000

THE CITY OF

ROSEBURG

TIMBER CAPITAL OF THE NATION

City of Roseburg
Transportation System Plan Update

Technical Memorandum #5
(Task 7.4 – Multimodal System Project Concepts)

Prepared for

City of Roseburg
900 SE Douglas Avenue
Roseburg, Oregon

Prepared by

David Evans and Associates, Inc.
2100 SW River Parkway
Portland, Oregon

July 2019

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Table of Contents

List of Tables

List of Figures[1]

[1] Concept figures (not numbered) come from a variety of sources: Oregon Bicycle and Pedestrian Design Guide, Google Maps and the Synchro software.

Appendices

Appendix A: Concept Transportation System Operational Analysis

Appendix B: Concepts from area Interchange Area Management Plans

Introduction

This memorandum suggests refinements to the City's transportation design guidelines and outlines potential concepts to address transportation needs identified previously in the evaluation of existing and future conditions. The suggested transportation guidelines provide the framework for future development of the transportation system, while the potential concepts work to address identified deficiencies in connectivity, amenities, safety, and operations[2].

The transportation design guidelines and concepts provided here are intended to help the City take a balanced approach to enhancing and managing the transportation system while accommodating future growth. This includes transportation system management practices to extend the life of investments made in transportation infrastructure, projects to improve the bicycle, pedestrian and motor vehicle systems, options to support a growing transit system, and transportation demand management opportunities to reduce single occupancy motor vehicle travel.

The development of draft of multimodal system project concepts was an interactive process to develop a menu of potential improvements that will be prioritized into financially constrained and aspirational project lists. Stakeholder feedback and fatal flaw analysis helped to refine the list of concepts presented in this memorandum. The refined list of recommended projects is summarized at the end of this document and will eventually be included in the draft TSP.

Note: The images provided in this document are conceptual and for planning purposes only.

Transportation Guidelines

This section highlights areas for potential modifications to the standards as part of the Transportation System Plan update.

System and Demand Management

Transportation System Management (TSM)

TSM measures are designed to make maximum use of existing transportation facilities. Efficient management of the transportation system can reduce costs by avoiding the need for more expensive roadway expansion

[2] Detailed traffic analysis and operational results are summarized in Appendix A.

projects. TSM strategies include traffic control improvements, traffic signal coordination, traffic calming, access management, local street connectivity, and intelligent transportation systems (ITS).

Traffic Calming: Uses physical design and other measures to improve safety for motorists, pedestrians and cyclists. It aims to encourage safer, more responsible driving and potentially reduce traffic flow. Examples: bike boulevard/neighborhood greenway, neighborhood traffic circle, curb bulb-outs (roadway narrowing), and raised crosswalks/medians.

Access Management: Includes the management of vehicular access points to enhance safety and potentially improve traffic operations. Examples: access and driveway spacing standards, channelized turn lanes, median treatments, and turn restrictions

Intelligent Transportation Systems (ITS): Includes collecting and conveying information regarding roadway operations to improve the operations and efficiency of a facility. Examples: variable message signs, ramp metering, adaptive signal timing, and variable speed limit signs. The City would like to consider flashing yellow left-turn arrows at signalized intersections when improvements are planned.

The proposed concept list in the next chapter of this memorandum includes several projects that support TSM, such as improved bicycle wayfinding, access management, mid-block crossings, and bicycle sharrows (pavement marking indicating bikes share road with motorists – see TSM Toolbox below).

TSM Toolbox

This section provides a "toolbox" of alternatives to address multimodal connectivity and neighborhood traffic related concerns. This toolbox provides guidance to the Cities on various tools that could be implemented as needs arise and when funding is available.

Traffic Calming (Encouraged for developing a bicycle boulevard or neighborhood greenway)

Gateway (Curb Bulb-Out)

Google, May 2018 image capture

Pinch Point (Curb Extension)

Nacto.org Urban Street Design Guide

Diverters

Nacto.org Urban Bikeway Design Guide

Raised crosswalk

pedbikeimages.org/PennsylvaniaDOT

Speed Cushions

Nacto.org Urban Street Design Guide

Speed Management Median

Nacto.org Urban Bikeway Design Guide

Traffic Calming (continued)

Pedestrian Median Refuge

pedbikeimages.org/DanBurden

Chicanes

Nacto.org Urban Street Design Guide

Traffic Circle (Mini)

Oregon Bicycle and Pedestrian Design Guide

Signing and Striping

Sharrow

Nacto.org Urban Bikeway Design Guide

Wayfinding

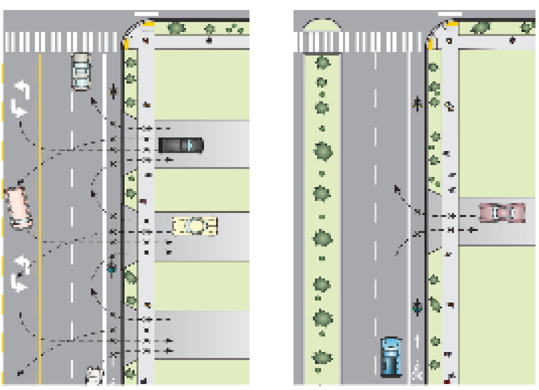
Nacto.org Urban Bikeway Design Guide

Share the Road

Mutcd.fhwa.dot.gov

Access Management

Access Consolidation and Non-traversable Median



Oregon Bicycle and Pedestrian Design Guide (Figure I-9)

Turn Restrictions

Mutcd.fhwa.dot.gov

ITS

Radar Speed Signs

Radarsign.com

Transportation Demand Management (TDM)

Transportation Demand Management (TDM) measures include various strategies that change travel behavior (how, when and where people travel) in order to increase efficiency and achieve specific planning objectives. TDM measures encourage the use of alternative, non-single-occupancy-vehicle travel modes. Changing travel behavior and providing alternative mode choices will help reduce the need to build new or expanded roadways.

Potential projects, such as sidewalks, bicycle routes, and transit enhancements, which support TDM, are detailed as part of the Multimodal System Concepts section. However, other TDM strategies described below should be pursued as well.

TDM measures that could be applicable for Roseburg include:

- Employer basedrip reduction strategies (e.g. parking management/pricing, carpool spaces, telecommuting, transit allowance)[3]
- Transit improvements
- Investing in pedestrian/bicycle facilities and amenities
- Comprehensive performance indicators (examples: multi-modal level of traffic stress, accessibility, land use density)
- Mass communication/marketing to increase awareness of transportation options
- Safe routes to school

Street Functional Classification

Street functional classification indicates purpose, design and function. The assigned functional classification ensures a street network with features that support demand from both the surrounding land uses and travel needs at a regional level.

Consistency with Federal Naming Conventions

It is important to align Roseburg's functional classification naming conventions with federal naming conventions as it may facilitate future efforts to obtain federal funding for local improvement projects. Suggested updates to the City's classification designations are shown in Table 1. All functional classifications are considered "Urban" because the Federal Aid Urban Boundary (FAUB) includes all lands inside the Roseburg UGB. Inside a FAUB, only local streets are not Federal Aid eligible. Currently the City does not distinguish the difference between collectors and minor collectors. The proposed classification change would differentiate between major and minor collectors. Freeways would be identified as interstates to be consistent with federal naming conventions. Pathways are for non-motorized traffic and will not be identified as part of the street system.

[3] The City can encourage local employers to implement trip reduction strategies though education and engagement, including connecting employers with available resources, such as the carpool matching tool that will be made possible by ODOT's partnership with RideAmigos. In addition, the City can administer or support programs such as a vanpool program to encourage higher vehicle occupancy rates among local employees.

TABLE 1. PROPOSED FUNCTIONAL CLASSIFICATION NAMING

Existing Classification Name	Proposed Classification Name
Freeway	Interstate
Arterial	Principal Arterial
	Minor Arterial
Collector	Major Collector
Minor Collector	Minor Collector
Local Street	Local Street
Cul-de-sac	Cul-de-sac
Pathways	Not included in street system[1]

Notes:

1. Guidelines for pathways will be included in the draft TSP

Suggested Functional Classification System

The suggested functional classification system for roadways in Roseburg is described below. The changes are meant to reflect the underlying and adjacent land use serviced by the street as a primary factor in determining changes. The functional classification map, Figure 1, shows the suggested classification for all roadways in the city, including new street extensions proposed as part of the Street Connectivity plan.

Interstate

Interstates are the highest classification of arterials and were designed and constructed with mobility and long-distance travel in mind. Interstates are divided highways offering high levels of mobility while linking the major urban areas. Roadways in this functional classification category are officially designated as Interstates by the Secretary of Transportation.

Principal and Minor Arterials

Principal arterial streets form the primary roadway network within and through a region. They provide a continuous roadway system that distributes traffic between different neighborhoods and districts. They provide limited access to abutting land with a greater focus on mobility and through traffic movement. Principal arterial streets carry the highest volumes on the network and typically maintain higher posted speeds. Inside urban growth boundaries, speeds may be reduced to reflect the roadside environment and surrounding land uses.

Minor arterials provide service for trips of moderate length and serve geographic areas that are smaller than their higher-volume principal arterial counterparts. Minor arterials are intended to be 2- or 3-lane streets.

Major and Minor Collectors

Major Collector streets are primarily intended to serve abutting lands and local access needs of neighborhoods. They serve either residential, commercial, industrial, or mixed land uses.

Minor Collector streets serve mostly residential or mixed land uses. While through traffic connectivity is not a typical function, they may carry limited amounts.

Local Streets

Local streets are intended to serve the adjacent land without carrying through traffic. These streets are designed to carry less than 1,200 vehicles per day. To maintain low volumes, local residential streets should be designed to encourage low speed travel. Narrower streets generally improve the neighborhood aesthetics, and discourage speeding as well. They also reduce right-of-way needs, construction cost, storm water run-off, and vegetation clearance. If the forecast volume exceeds 1,200 vehicles per day, as determined in the design stage, the street system configuration should either be changed to reduce the volume through neighborhood traffic calming design features, or the street shall be designed as a collector route.

Cul-de-sac streets are a type of local street. They are intended to serve only the adjacent land in residential neighborhoods. These streets shall be short, serving a maximum of 20 single family houses. Because the streets are short and the traffic volumes relatively low, the street width can be narrow, allowing for the passage of two lanes of traffic when no vehicles are parked at the curb or one lane of traffic when vehicles are parked at the curb. To encourage local street circulation capability, the use of cul-de-sac streets shall be discouraged, and shall not be permitted if future connections to other streets are likely. Sidewalk connections from a new cul-de-sac shall be provided to other nearby streets and sidewalks.

Suggested Functional Classification Changes for Roseburg Streets

Table 2 summarizes the suggested changes to the existing functional classification of specific streets in Roseburg.

TABLE 2. PROPOSED FUNCTIONAL CLASSIFICATION CHANGES FOR EXISTING ROSEBURG STREETS

Street	Existing Functional Classification	Proposed Functional Classification
Edenbower Blvd (Steward Pkwy to north end)	Arterial	Minor Arterial
Washington Avenue (Stephens St to east end)[1]	Arterial	Major Collector
Oak Ave (Stephens St to east end)[1]	Arterial	Major Collector
Stewart Park Dr/Centennial Dr	Local	Minor Collector
Jackson St (Diamond Lake Blvd to Douglas Rd)	Local	Minor Collector
Fowler St (Diamond Lake Blvd to Douglas Rd)	Local	Minor Collector
Spruce St	Local	Minor Collector
SE Rifle Range Rd (Oakbriar Ave to Waldon Ave)	Collector	Minor Collector
SE Lane Ave (east of SE Terrace Dr)	Minor Collector	Local

Notes:

1. This section of road is outside the OR 138 limits.

Street Connectivity

An important element of a TSP is to establish a plan for a connected system of existing and future streets. By planning for future connectivity, all modes can benefit. Much of Roseburg's existing street connectivity is constrained by features such as rivers, railroads, highways, and topography. Planning for future street connections can help reserve the appropriate right-of-way to construct facilities that meet the City's street guidelines. The proposed Street Connectivity Plan shown in Figure 1 identifies approximate locations where new local street connections could be constructed as areas continue to develop. The locations consider the current street system and undeveloped lands, but any environmental and design constraints would have to be vetted during the design process.

National Highway System (NHS) Routes

The NHS includes the Interstate Highway System as well as other roads important to the nation's economy, defense, and mobility.[4] NHS routes are identified at the federal level and are designated as such to encourage the jurisdictions maintaining those roadways to prioritize maintaining them in a good state of repair. The road owner should consider how NHS guidelines affect proposed improvements. I-5 and portions of OR 99 and OR 138 in Roseburg are classified as part of the NHS network. Figure 2 shows the NHS routes in the Roseburg area. The City has jurisdiction over OR 99 (Stephens Street and Pine Street) and Garden Valley Boulevard within city limits and ODOT has jurisdiction over the remaining NHS routes within the UGB[5].

[4] https://www.fhwa.dot.gov/planning/national_highway_system/nhs_maps/

[5] A portion of OR 99 north of City limits is in the process of being jurisdictionally transferred to the City from Douglas County.

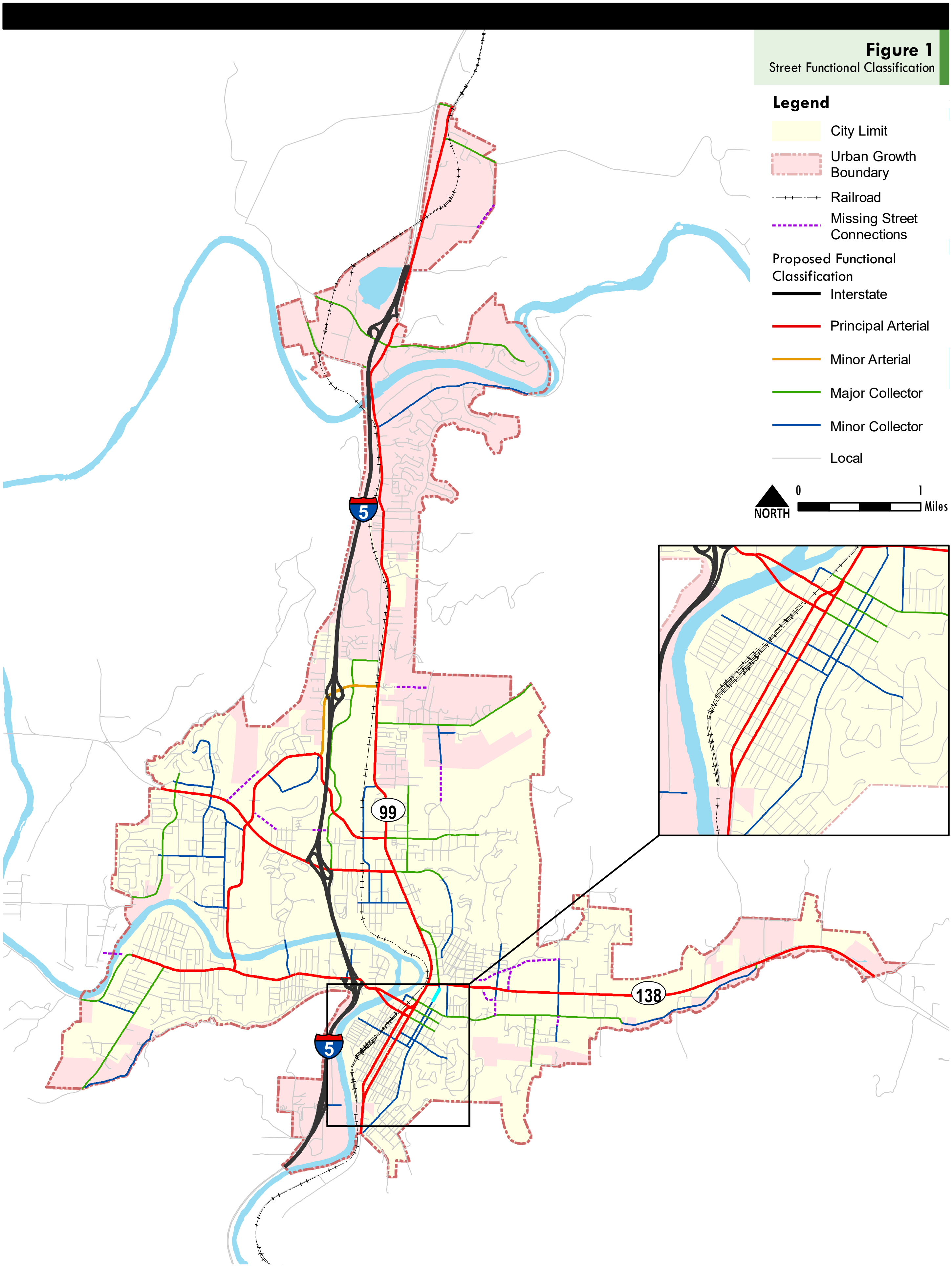
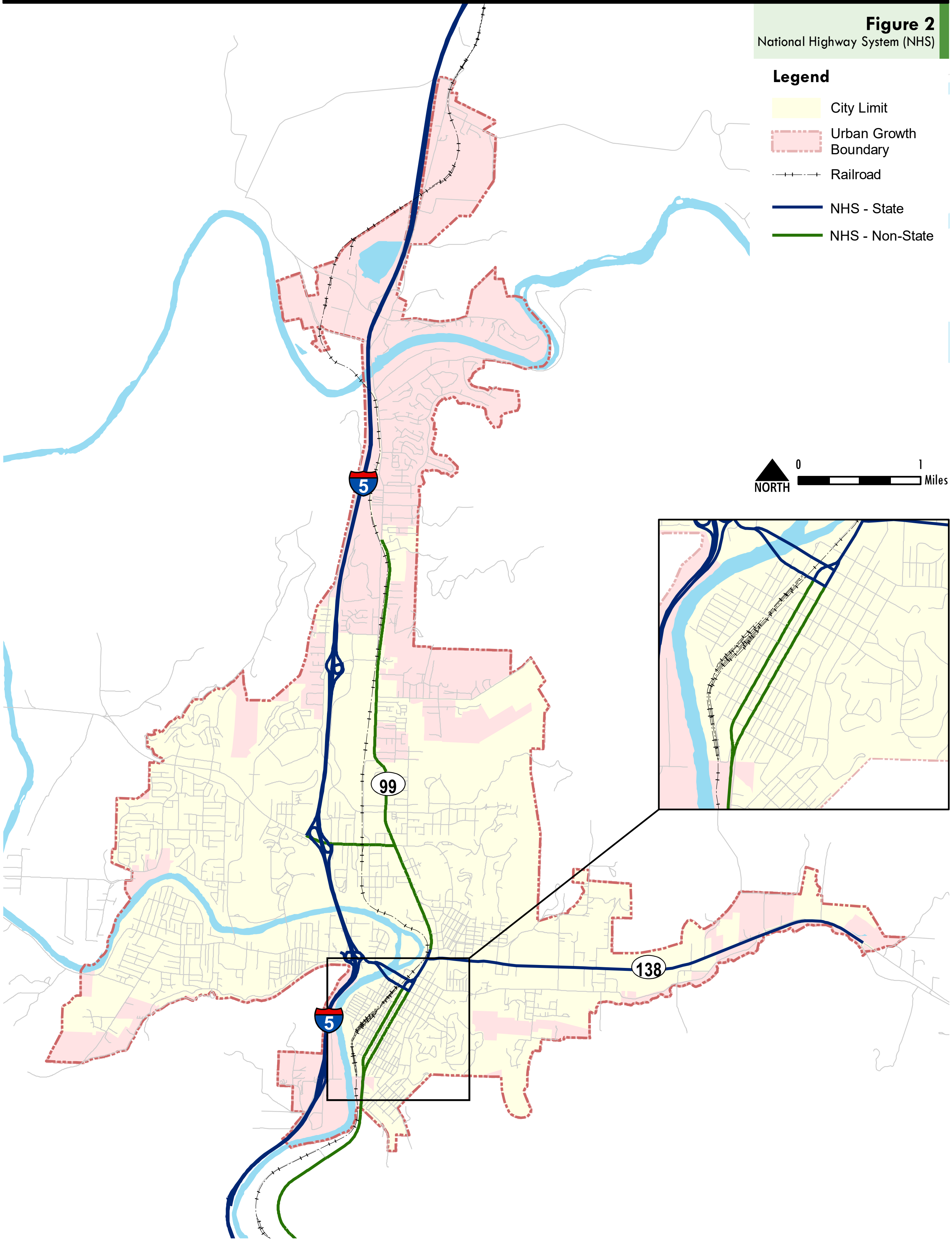


Figure 1
Street Functional Classification
Legend
City Limit
Urban Growth Boundary
Railroad
Missing Street Connections
Proposed Functional Classification
Interstate
Principal Arterial
Minor Arterial
Major Collector
Minor Collector
Local
NORTH
0
1
Miles
5
99
138

Figure 2
National Highway System (NHS)



Typical Street Cross-Sections

Roadway cross-section standards establish minimum requirements for design of the street system. Table 3 summarizes Roseburg's current standard street widths and design features as noted in the Roseburg Municipal Code (RMC).

The suggestion of the TSP Update is to revise note [4] and add a new note [7] (changes noted in **bold**). Note [4] has been revised to clarify that bicycle facilities are required on new collectors and arterials, but the code allows for sharrows on existing facilities where right-of-way is not available. Note [7] provides a reference to the Oregon Highway Design Manual for state facilities. The Draft TSP would provide sample cross-sections for guidelines in the development of new roadways and the modernization of existing roadways.[6]

TABLE 3. PROPOSED ROSEBURG STANDARD STREET WIDTHS

Type of Street	Minimum Right-of-Way Width
Arterials [3][4][5][7]	70'—120' [1]
Collector Streets and All Business Streets Other than Arterials [3][4][5]	60'—70' [2]
Local Streets in Single-Family Density Areas [3]	60'
Circular Ends of Cul-de-Sacs where allowed under Paragraph 12.12.010(F)(7)	96' Diameter
All Streets Not Specifically Provided for Above	60'

Standard Street Pavement Width and Design Features			
Type of Street	**Parking Both Sides**	**Parking One Side**	**No Parking**
Local [3]	34-36'	26-28'*	20'*
Collector [3]	48-50'	40-42'	32-34'
Arterial [4][5][6]**[7]**	N/A	N/A	
3 lane			48-50'
5 lane			70-74'

Source: Roseburg Municipal Code Title 12 - Land Use Development Regulations (Sec. 12.12.010, Table 6-1)

* Where allowed

[1] The Approving Authority may require a width within the limits shown, based upon adjacent physical conditions, safety of the public and the traffic needs of the community, sidewalk width, and in accordance with other specifications of this Code.

[2] Right-of-way to 70 feet may be required with wider sidewalks; where other design features are included, additional right-of-way may be required.

[3] Pavement width in excess of that shown may be required for other road configurations, such as for turn lanes, etc.

[4] Collector and arterial streets require bike lanes. **For existing facilities where right of way is not available and vehicle speeds are sufficiently low, sharrows may be used.** Local streets utilize shared lanes.

[5] Freight route shall have minimum lane width of 12 feet.

[6] Bus route shall have minimum lane width of 11 feet.

[7] Design Standards for State Highways are found in the Oregon Highway Design Manual (HDM).

[6] The ODOT Highway Design Manual provides guidance for lane widths, but ultimately leaves design decisions to the local jurisdiction for projects on National Highway System routes under local jurisdiction that do not have any state or federal funding associated with the project.

Proposed Shared-Use Path Typical Cross-Section

The 2006 TSP recommended a multi-use path typical section, requiring 10 to 18 feet of right of way, with a paved width of 6 to 12 feet.

To be consistent with how paths are constructed by Roseburg Parks and Recreation, the TSP recommends right of way of 14 to 16 feet with a paved width of 8 to 12 feet (10 feet is preferred).

Mobility Targets

Traffic mobility targets are thresholds set by a jurisdiction to help measure how an intersection functions. The City's performance measure standards have varying targets depending on the functional classification and location in the City of Roseburg.

The current mobility targets and the proposed changes are summarized in table below. The recommended changes allow for consistency across the city.

TABLE 4. PROPOSED MOBILITY TARGETS FOR CITY OF ROSEBURG FACILITIES

Current Mobility Targets			Proposed Mobility Targets		
Functional Classification	**V/C**	**LOS**	**Functional Classification**	**V/C[2]**	**LOS[2]**
Outside of Downtown District Boundary			All	0.95	E
Arterial	0.85	D/E[1]			
Collector	0.90	D/E[1]			
Local	0.95	D/E[1]			
Within Downtown District Boundary					
All	0.95	E			

Notes:

1. LOS D for signalized intersections; LOS E for unsignalized intersections
2. City intersections shall be analyzed at a peak hour factor of 1.0.
3. For roadways within the City of Roseburg that are under ODOT or Douglas County jurisdiction, the mobility standards/targets of those agencies will apply.

Access Management

Access management can be an important tool for protecting the function of roadway. There is a common understanding for the need of property owners to maintain roadway access to their businesses and residences. However, a proliferation of driveways and minor street intersections multiplies the number of conflicts along a roadway segment, thus reducing the capacity of intersections, increasing the probability of crashes, and generally degrading service for all system users. Hence, access management must balance the competing needs of compatible land uses, private access, and the function of the transportation system.

Table 5 summarizes Roseburg's current access (driveway) spacing standards. State Access Management Standards are found in OAR 734.051. At the time this memorandum was written, Douglas County's access management policies and standards were not available. The TSP should include new policy to coordinate the City's street and driveway spacing standards for consistency. New policy may outline that new land access points shall meet or exceed these minimum spacing requirements, and where no reasonable alternatives exist or where strict application of the standards would create a safety hazard, the City may allow a variance.

TABLE 5. ROSEBURG DRIVEWAY SPACING STANDARDS

Land Use	Street Type		
	Arterial	**Collector**	**Local**
Industrial	500'	200'	150'
Commercial/ Public Land	500'	200'	75'
Multi-family Residential	500'	200'	75'
Single-family Residential and Duplexes	500'	200'	30'

Source: Roseburg Municipal Code Title 12 - Land Use Development Regulations (Sec. 12.06.020, Table 3-1)

Land Use Considerations

Land use plays an important role in developing a comprehensive transportation system. Within the city limits, land uses adjacent to arterials and collectors are generally automobile-oriented in nature, and include mostly industrial and commercial uses. Along local routes, the designated land uses change to residential. Since the residential areas are segregated from the commercial areas, the distance and topography can be a barrier to walking and bicycling between these locations. The greater the distance between home and work, the greater the concern over exposure to the elements, interaction with vehicular traffic, and safety (especially if there are limited dedicated bicycle and pedestrian facilities).[7]

The amount of land that is planned to be developed, the type of land uses, and how the land uses mix together directly influence how the transportation system will be used in the future. As part of the development of the TSP, the TSP could consider land use solutions[8]:

- Increased or minimum densities
- Changing the mix of land uses
- Neighborhood shopping or service districts
- Improved job housing balance and connections
- Comprehensive plan policies for infill/redevelopment of urbanizable land

The recommendation for the TSP update is to encourage infill and redevelopment over expanding into the fringes of the urban growth boundary, which creates traffic stress on already constrained intersections.

Bicycle Network Enhancements

Throughout Roseburg, there are a number of locations where enhancements to the bicycle network may:

1. Improve safety (by increasing the visibility of cyclists for motorists, and increasing separation between the modes, as conditions warrant), and,

[7] Federal Highway Administration National Bicycling and Walking Study, https://safety.fhwa.dot.gov/ped_bike/docs/case1.pdf

[8] Land use considerations during TSP development could be considered, particularly in communities of large metropolitan areas. ODOT Transportation System Plan Guidelines, July 2018

2. Encourage an increase in non-motorized trips.

By improving safety and creating a more inviting network and environment for cyclists, the city can promote increased levels of bicycle and pedestrian activity. Roseburg has established a goal of providing improved bicycle facilities throughout the city where right-of-way allows. Examples of bicycle network enhancements are shown below.

Bicycle Network Enhancements

Bicycle Lanes

Nacto.org Urban Bikeway Design Guide

Buffered Bicycle Lanes

Nacto.org Urban Bikeway Design Guide

Shared-Use Paths

FHWA.dot.gov

Cycle Tracks

Nacto.org Urban Bikeway Design Guide

Sharrows

Nacto.org Urban Bikeway Design Guide

Multimodal System Concepts

The following section presents draft multimodal system concepts to address transportation needs across all modes. Included is a summary of the process used to develop and evaluate the concepts, descriptions of the concepts and their potential impacts.

Concept Development

The improvements and strategies identified for consideration in the TSP were developed from multiple sources:

- Review of projects in 2006 TSP Update and other Local and Regional Plans[9]
- New Projects based on identified deficiencies and feedback from TSP public and advisory committees
- System and Demand Management strategies[10]

[9] See Roseburg TSP Technical Memorandum #1: Goals and Objectives/Review of Plans & Policy
[10] Online TDM Encyclopedia – Victoria Transport Policy Institute: https:// www.vtpi.org/tdm/tdm12.htm

Review of Existing Plans

The review of the projects from existing plans includes:

- Projects from the 2006 Roseburg Transportation System Plan Update
- Projects from Other Planning Documents
    - 2009 Roseburg Bike and Pedestrian Plan
    - Adopted Interchange Area Management Plans (IAMPs): 123, 127 and 129
- Projects in Capital Plans
    - 2018-2023 Roseburg Capital Improvement Program
    - 2018-2021 Oregon (Final as Amended) Statewide Transportation Improvement Program (STIP)
    - Urban Renewal Plan

Where still relevant during the 20-year planning horizon, solutions from these plans are considered for inclusion in the TSP. Appendix B summarizes the projects from the area IAMPs and the suggested revisions by the TSP Update. Additionally, ODOT facility plans will be included by reference as part of the TSP update.

Summary of Concepts

This section provides detailed descriptions of the concepts developed to address existing and anticipated future deficiencies within the Roseburg UGB. The concepts are broken out into the following themes: Bicycle and pedestrian, transit, and roadway. In instances where there are multiple choices to address deficiencies, options are provided for consideration of the project team to determine the preferred concept for the TSP.

For each concept, the following are identified (where applicable):

- Planning-level concept sketches
- Planning-level cost opinion
- Natural and historic resources conflicts
- Title VI and Environmental Justice impacts
- Potential for vehicle miles travelled (VMT) reduction
- Bicycle Level of Traffic Stress (BLTS) assessment
- Qualitative assessment of pedestrian and transit
- Benefits/impacts to various modal networks (bicycle/pedestrian, vehicular, transit, rail/freight)
- Whether concept addresses a known collision trend.

Bicycle and Pedestrian Concepts

Figure 3 summarizes the bicycle and pedestrian system concepts identified to resolve existing and future deficiencies.

Pedestrian facilities serve all users. For concepts on exciting facilities, it is assumed that the sidewalk ramps will be ADA compliant and this cost is included in the cost opinion.

In general, if a project adds a new, wider or separated bike facility it will improve the bicycle level of traffic stress (BLTS).

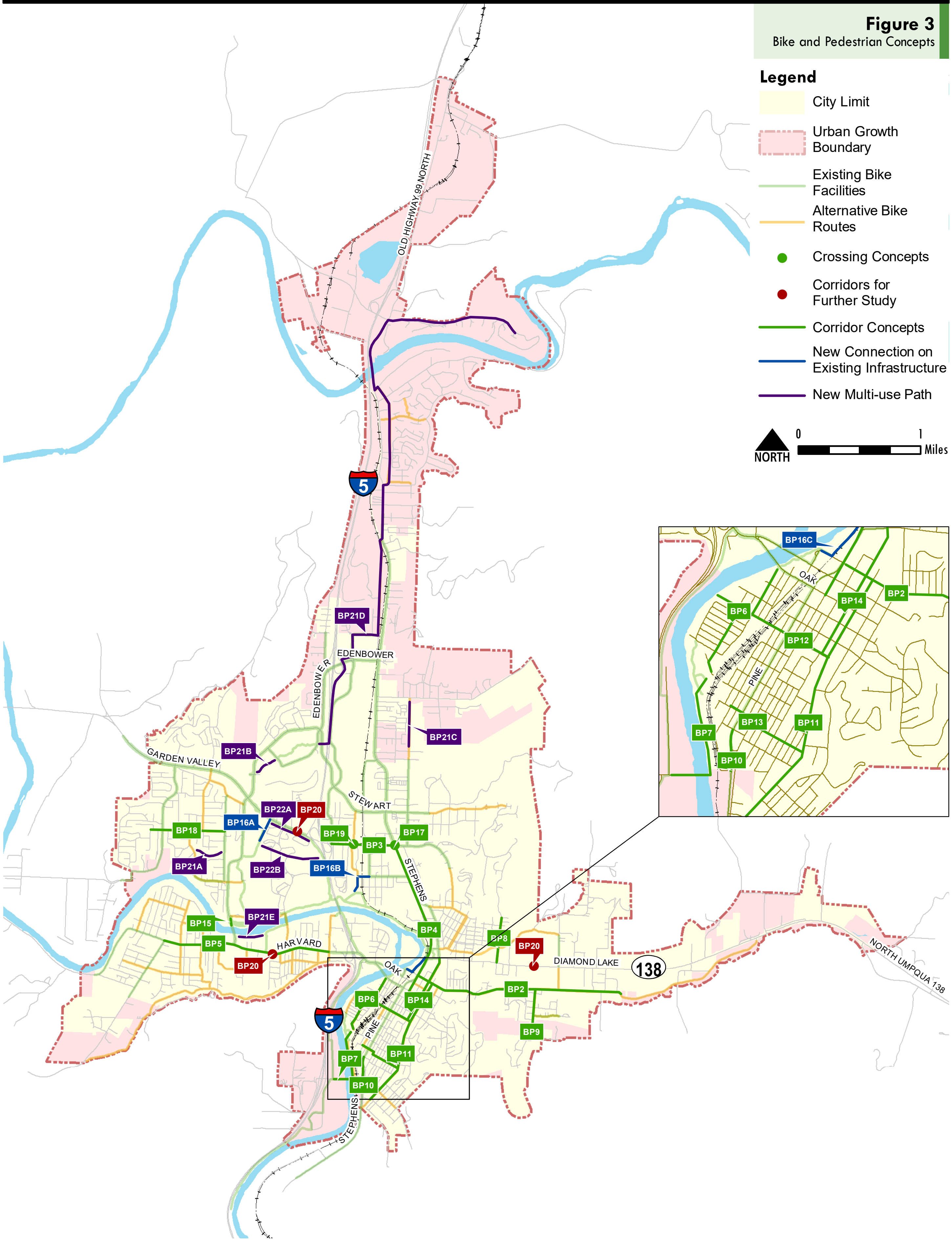


Figure 3
Bike and Pedestrian Concepts

BP1: Roseburg Bicycle Route Wayfinding

The City of Roseburg's current system of bicycle facilities includes a network of multi-use paths and striped bicycle lanes. In many cases, the striped bicycle lanes exist on streets are directly adjacent to travel lanes with a steady stream of motor vehicles traveling at speeds greater than 30 mph. This creates an uncomfortable environment for the 'average' cyclist – defined as prospective cyclists who are "interested but concerned" and will only ride along a roadway if they perceive conditions as sufficiently safe[11].

This concept identifies streets outside of the arterial system that could serve as alternative routes for bicyclists to access important destinations such as schools, parks, and public/semi-public facilities. The intent of this concept is to work toward signing and striping these routes with consistent messaging to highlight their role in serving bicycle traffic.

Wayfinding signs could provide cyclists with direction, distance and/or estimated travel times to destinations or could be as simple as identifying the direction of the bicycle route. The presence of the wayfinding signage informs motorists to expect cyclists and passively markets the bicycle network. Wayfinding signage should not be the same color as regulatory and warning signs (red, yellow, orange); green or purple are commonly used bicycle route sign colors.

To supplement the wayfinding signs, pavement markings such as sharrows can be used to serve as a reminder that the street should be a shared space for cyclists and motorists. Pavement markings also encourage proper positioning by bicyclists on shared roadways with motor vehicles and can act as a wayfinding route for cyclists.

<u>Cost Opinion:</u> Cost will vary based on selected treatment. Production and installation could range from $1,000 to $3,000 per sign.


Wayfinding


Pavement Markings

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	Impacts to be determined by location, but anticipated to be none or minimal.
Title VI and Environmental Justice	Improves wayfinding to community features (parks, employment, etc.)	N/A

[11] Using guidance provided by ODOT's Bicycle Level of Traffic Stress (BLTS) methodology, a target BLTS score of 2 or better should be used to ensure bicycle facilities are comfortable and inviting to the 'average' cyclists. Facilities with BLTS scores of 2 or better are generally fully separated from the roadway or, if not, implemented along low-speed, low-volume roadways. Where vehicular speeds on a roadway are 30 mph or greater, bike facilities that are not sufficiently buffered or separated from vehicles will generally discourage use among 'average' cyclists and only attract more confident cyclists.

Area of Interest	Benefits	Impacts
Vehicle Miles Traveled (VMT)	Provides improved bicycle route options, with possible VMT reduction.	N/A
Bicycle Level of Traffic Stress (BLTS)	Not anticipated to change BLTS rating of existing facilities, but could route bicycles onto roads that are lower stress.	N/A
Qualitative pedestrian/ transit assessment	Pedestrian: No change Transit: No change	N/A
Bicycle/Pedestrian facilities and network	Improves bicycle connectivity.	N/A
Vehicular transportation facilities and network	Notifies vehicles to presence of cyclists.	N/A
Transit system	Could improve access to transit through wayfinding.	N/A
Rail and freight networks	N/A	N/A
Safety	Benefits safety by directing bicyclists to facilities with less vehicular volumes and lower posted speeds.	N/A

BP2: Douglas Avenue Bike Facilities and Sidewalks

Douglas Avenue from Fowler Street east to Roseburg's city limits is a two-lane collector street that lacks bicycle facilities. Douglas Avenue provides access to a number of commercial businesses in Roseburg's downtown area as well as several residential areas. Douglas Avenue parallels Diamond Lake Boulevard, the main east-west route east of I-5 in the city.

Bike facilities and sidewalks on Douglas Avenue would provide an important connection from downtown Roseburg to future planned development and existing neighborhoods. This concept would add sidewalk on one side from Deer Creek to city limits and bike facilities from Fowler Street to city limits. Given the slopes found along Douglas Avenue, a mix of bike facility types may be most appropriate. Bike lanes should be used where space allows and for all uphill sections. Sharrows may be used on downhill and flat sections in conjunction with traffic calming measures to slow down vehicle speeds to enhance cyclist safety and comfort. To implement these improved bike and pedestrian accommodations, it will be necessary to widen the Douglas Avenue bridge over Deer Creek. The City has already received a grant to complete preliminary design of the replacement bridge.

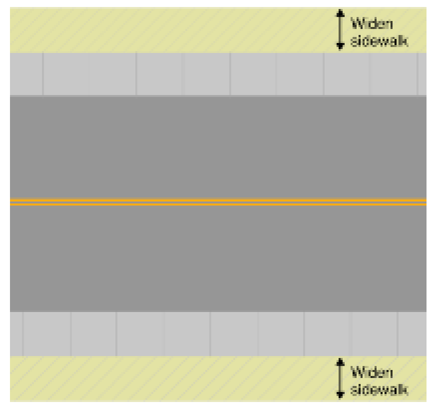
<u>Cost Opinion:</u> $375,000 (Matching funds from Roseburg 2018-2023 Capital Improvement Plan, does not include bridge widening)

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	Impacts likely. Site of bridge widening located in floodplain.
Title VI and Environmental Justice	Provides bicycle and pedestrian connectivity to area of low income and youth population.	N/A
Vehicle Miles Traveled (VMT)	Provides additional bike access with possible VMT reduction.	N/A
Bicycle Level of Traffic Stress (BLTS)	Improves from LTS 4 to LTS 3 or LTS 2, depending on use of bike lane vs. sharrows, the width of the bike lanes, and traffic calming improvements implemented.	Bicycle sharrows are less desirable than bicycle lanes.
Qualitative pedestrian/ transit assessment	Pedestrian: Improves from 'poor' to 'good' Transit: No change	Transit: No change
Bicycle/Pedestrian facilities and network	Provides bicycle connectivity east of downtown, where no formal facilities currently exist, and fills gaps in the Douglas Avenue pedestrian network.	N/A
Vehicular transportation facilities and network	N/A	Uphill bike lanes requires narrowing of travel lanes and/or removal of on-street parking.
Transit system	N/A	N/A

Area of Interest	Benefits	Impacts
Rail and freight networks	N/A	N/A
Safety	Does not specifically address a documented safety concern, but has safety benefits for bicycles and pedestrians.	Protected bicycle lanes are safer than sharrows for bicyclists.

BP3: Garden Valley Boulevard Shared Use Sidewalks

Garden Valley Boulevard lacks on-street bike lanes east of I-5 and there are no immediate parallel streets or pathways to provide bicycle circulation and access in this highly traveled corridor. Pedestrian crossings along the Garden Valley Boulevard corridor are limited to those at signalized intersections. The segment between I-5 and Stephens Street is missing a bike facility for an important east-west connection.



This concept would provide widened sidewalks on both sides of Garden Valley Boulevard. The roadway is constrained and instead of repurposing or narrowing travel lanes for bike lanes, a widened sidewalk would provide a better facility for bicyclists and pedestrians. Adding an additional five feet to the existing sidewalk would provide a ten-foot wide facility on both sides of the street. This improvement would require substantial utility relocation.

Cost Opinion: $2.3 million

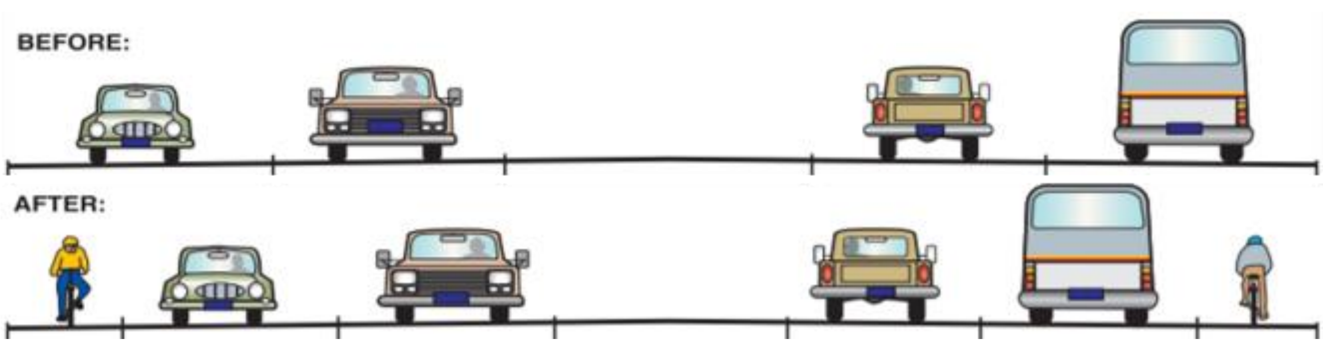
Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	Significant land use and driveway/access impacts.
Title VI and Environmental Justice	Increases bike and pedestrian connectivity.	N/A
Vehicle Miles Traveled (VMT)	Provides additional bike and pedestrian access with possible VMT reduction.	N/A
Bicycle Level of Traffic Stress (BLTS)	Improves from BLTS 4 to BLTS 2	May introduce conflict points with vehicles at driveways.
Qualitative pedestrian/ transit assessment	Pedestrian: Wider travel way Transit: No change	May introduce conflict points between bikes and pedestrians
Bicycle/Pedestrian facilities and network	Fill gaps in bike network	N/A
Vehicular transportation facilities and network	N/A	May introduce conflict points with bicycles at driveways.

Area of Interest	Benefits	Impacts
Transit system	Improves bike access to bus stops on the Red and Green Lines.	N/A
Rail and freight networks	Separates cyclists from freight traffic on road.	May introduce conflict points with bicycles at driveways.
Safety	Does not specifically address a documented safety concern, but has safety benefits for bicycles by providing separated facilities.	May introduce conflict points between bikes and pedestrians

BP4: Stephens Street Bike Facility

Stephens Street lacks on-street bike lanes and only Winchester Street provides a parallel route for bicycle circulation and access in this north-south corridor. Stephens Street is an arterial street and bicycle facilities along the roadway will fill the gap between Garden Valley Boulevard and Diamond Lake Boulevard. This north-south connection would provide an important corridor for pedestrians and bicyclists on the east side of Roseburg.

This concept would add bike lanes on Stephens Street from Garden Valley Boulevard to Diamond Lake Boulevard. To provide bike lanes within the current width of the roadway, some space would have to be repurposed from vehicles to bicycles, likely by narrowing the lane widths from 12 feet to no less than 10 feet.



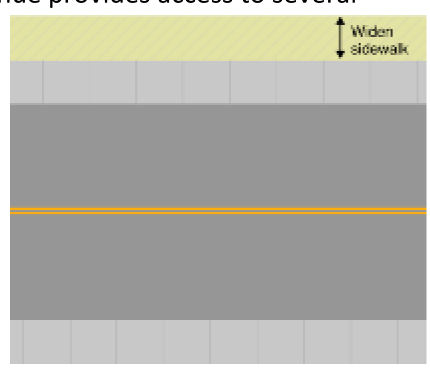
Cost opinion: $220,000.

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	N/A
Title VI and Environmental Justice	Benefits populations by increasing non-auto transportation connectivity.	N/A
Vehicle Miles Traveled (VMT)	This facility would provide additional bike access with possible VMT reduction.	N/A
Bicycle Level of Traffic Stress (BLTS)	Improves from BLTS 4 to BLTS 3.	N/A

Area of Interest	Benefits	Impacts
Qualitative pedestrian/ transit assessment	Pedestrian: No change Transit: No change	N/A
Bicycle/Pedestrian facilities and network	Fills gaps in arterial bicycle network.	N/A
Vehicular transportation facilities and network	N/A	Non-state NHS route. Narrowing of travel lanes could impact vehicular operations depending on the cross-section design.
Transit system	Improved multimodal access to the bus stops on the Red, Green, and Yellow Lines.	N/A
Rail and freight networks	N/A	Would require coordination with truck freight to ensure adequate widths are available.
Safety	Does not specifically address a documented safety concern, but has safety benefits for bicycles and pedestrians by providing separated facilities and a buffer from live traffic, respectively.	N/A

BP5: West Harvard Avenue Shared Use Sidewalk

Harvard Avenue is a five-lane road without bicycle lanes between Lookingglass Road and Umpqua Street. This important connection would provide east-west travel options. Harvard Avenue provides access to several schools and parks whose users would benefit from improved bicycle and pedestrian connectivity.



This concept would expand the existing sidewalk on the north side by 5 feet to create a 10 foot wide shared use sidewalk. This provides a direct connection to the two facilities on the north side of Harvard Avenue that provide north-south access. Additional wayfinding signage would be here to guide people to these connections, complementing the current wayfinding signage project.

Cost Opinion: $3.9 million

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	Would likely have driveway/access implications.

Area of Interest	Benefits	Impacts
Title VI and Environmental Justice	Provides bicycle and pedestrian connectivity to area of low income and minority populations. Provides increased connectivity along routes to schools.	N/A
Vehicle Miles Traveled (VMT)	This facility would provide additional bike and pedestrian access with possible VMT reduction.	N/A
Bicycle Level of Traffic Stress (BLTS)	Improves from BLTS 4 to BLTS 2	May introduce conflict points with vehicles at driveways.
Qualitative pedestrian/ transit assessment	Pedestrian: Improves from 'fair' to 'good' Transit: No change	May introduce conflict points between bikes and pedestrians
Bicycle/Pedestrian facilities and network	Fill gaps in bike network	N/A
Vehicular transportation facilities and network	N/A	May introduce conflict points with bicycles at driveways.
Transit system	Improves bike access to bus stops on the Red and Green Lines.	N/A
Rail and freight networks	Separates cyclists from freight traffic on road.	May introduce conflict points with bicycles at driveways.
Safety	Does not specifically address a documented safety concern, but has safety benefits for cyclists.	May introduce conflict points between bikes and pedestrians

BP6: South Umpqua River Sharrow Connections through Downtown

This concept would build upon the existing multi-use path network by providing sharrows paralleling the South Umpqua River on local roads in downtown, east of the river and west of the railroad tracks.

These sharrows would continue south from the north end of Flint Street, where the existing multi-use path terminates, and extend to Micelli Park via Flint Street, Mosher Avenue, and Fullerton Street. Eventually, a crossing of the South Umpqua River at Portland Avenue could provide additional connectivity (see BP7).

<u>Cost Opinion:</u> $14,000

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	N/A

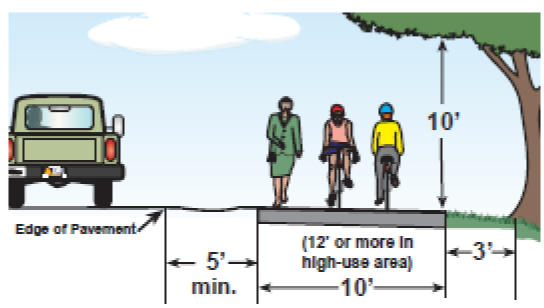
Area of Interest	Benefits	Impacts
Title VI and Environmental Justice	Provides continuous bicycle and pedestrian connectivity between areas of youth populations and expands existing trail system access to community features.	N/A
Vehicle Miles Traveled (VMT)	This facility would provide additional bike access with possible VMT reduction.	N/A
Bicycle Level of Traffic Stress (BLTS)	BLTS would be 2 for bike boulevards.	N/A
Qualitative pedestrian/ transit assessment	Pedestrian: No change Transit: No change	N/A
Bicycle/Pedestrian facilities and network	Fills gaps in bike network.	N/A
Vehicular transportation facilities and network	Notifies vehicles to presence of cyclists.	N/A
Transit system	N/A	N/A
Rail and freight networks	N/A	N/A
Safety	Does not specifically address a documented safety concern, but has safety benefits for cyclists.	N/A

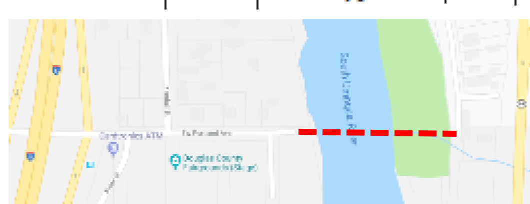
BP7: South Umpqua River Multi-Use Path and Portland Avenue River Crossing

This concept would build upon the existing multi-use path network to provide improved bike/pedestrian connectivity with new facilities south of Micelli Park and across the South Umpqua River.

This concept would build a new multi-use path river crossing at Portland Avenue and a new multi-use path connection from this bridge to the new bike boulevard facilities in Micelli Park (see BP6). It will likely be easier to secure right of way for this new path due to the lack of private homes.

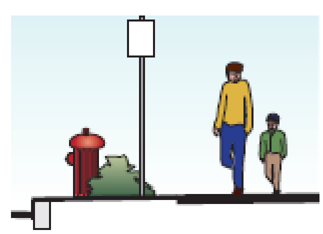
<u>Cost Opinion:</u> $3.2 million





Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	This path would closely parallel the South Umpqua River and travel through 100-year floodplain. May need to acquire right of way.
Title VI and Environmental Justice	Provides continuous bicycle and pedestrian connectivity between areas of youth populations and expands existing trail system access to community features.	N/A
Vehicle Miles Traveled (VMT)	This facility would provide additional bike and pedestrian access with possible VMT reduction.	Could increase VMT if bridge also serves vehicles.
Bicycle Level of Traffic Stress (BLTS)	BLTS would be 1 for multi-use path.	N/A
Qualitative pedestrian/ transit assessment	Pedestrian: Likely ‘good’ with opportunities for ‘excellent’ during design refinement Transit: No change	N/A
Bicycle/Pedestrian facilities and network	Expands separated bike and pedestrian network.	May introduce conflict points between bikes and pedestrians.
Vehicular transportation facilities and network	Could improve connectivity if bridge also serves vehicles.	N/A
Transit system	N/A	N/A
Rail and freight networks	N/A	N/A
Safety	Does not specifically address a documented safety concern, but has safety benefits for cyclists and pedestrians.	N/A

BP8: Fulton Street Sidewalks and Bike Facility



Fulton Street is classified as a minor collector; however, it currently has substandard width north of Commercial Avenue. The residential area north of Commercial Avenue lacks sidewalks, curb and gutter.

This concept would upgrade the street to minor collector standards and provide important bicycle and pedestrian facilities on both sides of Fulton Street from Diamond Lake Boulevard north to the end of the public street (Fulton Street becomes a private street north of Tahoe Avenue).

<u>Cost Opinion:</u> $1.3 million

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	Will have right of way impacts to privately owned residential lots.
Title VI and Environmental Justice	Benefits populations by increasing non-auto transportation connectivity.	N/A
Vehicle Miles Traveled (VMT)	This facility would provide additional bike and pedestrian access with possible VMT reduction.	N/A
Bicycle Level of Traffic Stress (BLTS)	Could improve from BLTS 4 to BLTS 2 depending on cross-section design.	N/A
Qualitative pedestrian/ transit assessment	Pedestrian: Improves from 'poor' to 'good'. Transit: No change	N/A
Bicycle/Pedestrian facilities and network	Fills gap in pedestrian network and potential for increased bicycle connectivity.	N/A
Vehicular transportation facilities and network	Modernizes collector to current standards.	N/A
Transit system	There is improved pedestrian access to transit routes along Diamond Lake Blvd (Green line).	N/A
Rail and freight networks	N/A	N/A
Safety	Does not specifically address a documented safety concern, but has safety benefits for cyclists and pedestrians.	N/A

BP9: Ramp Road Sidewalk

Ramp Road serves residential neighborhoods and the Eastwood Elementary School in southeast Roseburg. This concept would add sidewalks on the west side of Ramp Road.

Cost Opinion: $1.8 million

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	Likely right of way impacts to privately owned residential lots.
Title VI and Environmental Justice	Benefits populations by increasing non-auto transportation connectivity near senior living facility and elementary school.	N/A

Area of Interest	Benefits	Impacts
Vehicle Miles Traveled (VMT)	This facility would provide additional pedestrian access with possible VMT reduction.	N/A
Bicycle Level of Traffic Stress (BLTS)	N/A	N/A
Qualitative pedestrian/ transit assessment	Pedestrian: Improves from 'fair' to 'good' Transit: No change	N/A
Bicycle/Pedestrian facilities and network	Fills gap in pedestrian network.	N/A
Vehicular transportation facilities and network	N/A	N/A
Transit system	N/A	N/A
Rail and freight networks	N/A	N/A
Safety	Does not specifically address a documented safety concern, but has safety benefits for pedestrians.	N/A

BP10: Pine Street Sidewalks

Pine Street is part of the downtown couplet and is an arterial street that serves southbound traffic. New sidewalks on the east side of Pine Street south of existing sidewalks to the city limit provide access south of Rice Street. This would fill a minor gap in the existing sidewalk system.

<u>Cost Opinion:</u> $165,000

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	N/A
Title VI and Environmental Justice	Benefits populations by increasing non-auto transportation connectivity, but this concept is short segment without access to significant community features.	N/A
Vehicle Miles Traveled (VMT)	This facility would provide additional pedestrian access with minimal VMT reduction.	N/A
Bicycle Level of Traffic Stress (BLTS)	N/A	N/A

Area of Interest	Benefits	Impacts
Qualitative pedestrian/ transit assessment	Pedestrian: Improves from 'fair' to 'good' Transit: No change	N/A
Bicycle/Pedestrian facilities and network	Fills gap in pedestrian network.	N/A
Vehicular transportation facilities and network	N/A	N/A
Transit system	N/A	N/A
Rail and freight networks	N/A	N/A
Safety	Does not specifically address a documented safety concern, but has safety benefits for pedestrians.	N/A

BP11: Main Street Sidewalks and Bike Facility

Main Street is a minor collector that extends north-south through downtown from Douglas Avenue to dead end near Old Hwy 99, south of Marsters Avenue. Parking exists on both sides between Douglas Avenue and Mosher Avenue and only on the west side south of Mosher Avenue. Existing marked bicycle facilities need to be reconfigured, and south of Rice Avenue, sidewalks are limited to the west side or none at all.

This concept would add new sidewalk on the east side of Main Street from Rice Avenue to Marsters Avenue, and on the west side from Hamilton Street to Marsters Avenue as well as sharrows along Main Street from Douglas Avenue to Lane Street. This facility would be implementable given the current striping, since sharrows do not provide a separate facility for bicyclists.

<u>Cost Opinion:</u> $720,000

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	N/A
Title VI and Environmental Justice	Provides bicycle and pedestrian connectivity to area of low income and youth population.	N/A
Vehicle Miles Traveled (VMT)	This facility would provide additional bike and pedestrian access with possible VMT reduction.	N/A
Bicycle Level of Traffic Stress (BLTS)	No change in BLTS	N/A

Area of Interest	Benefits	Impacts
Qualitative pedestrian/ transit assessment	Pedestrian: Improves from 'fair' to 'good' south of Lane Ave Transit: No change	N/A
Bicycle/Pedestrian facilities and network	- Provides bicycle connectivity through downtown on road with lower traffic speeds and volumes. -Fills existing gap in Main St pedestrian network.	N/A
Vehicular transportation facilities and network	Notifies vehicles to presence of cyclists.	N/A
Transit system	N/A	N/A
Rail and freight networks	N/A	N/A
Safety	Does not specifically address a documented safety concern, but has safety benefits for bicycles and pedestrians.	N/A

BP12: Mosher Avenue Bike Facility and Railroad Crossing Improvements

Mosher Avenue is a minor collector that travels east-west from the South Umpqua River to Main Street in downtown Roseburg. Mosher Avenue is one of four at-grade rail crossings in downtown and it does not have any marked bicycle facilities.

This concept would add a sharrows to Mosher Avenue and provide improved pedestrian facilities at the railroad crossing to provide an important east-west connection east of the South Umpqua River, connecting residences with commercial areas. Signage would be added to provide guidance to bicyclists and motorists to share the road.

Cost Opinion: $632,000

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	Mosher Avenue has a hazardous waste site/generator and environmental cleanup site near the couplet.
Title VI and Environmental Justice	Provides bicycle connectivity to area of youth population and low income households.	N/A
Vehicle Miles Traveled (VMT)	This facility would provide additional bike access with possible VMT reduction.	N/A

Area of Interest	Benefits	Impacts
Bicycle Level of Traffic Stress (BLTS)	No change in BLTS	N/A
Qualitative pedestrian/ transit assessment	Pedestrian: Improves from ‘fair’ to ‘good’ Transit: No change	N/A
Bicycle/Pedestrian facilities and network	Provides east-west bicycle connectivity through downtown on road with lower traffic speeds and volumes.	N/A
Vehicular transportation facilities and network	Notifies vehicles to presence of cyclists.	N/A
Transit system	Improves bicycle access to transit facilities on Mosher Ave (Red line).	N/A
Rail and freight networks	Provides additional delineation of bicyclists near rail line.	May require coordination with ODOT Rail.
Safety	Does not specifically address a documented safety concern, but has safety benefits for bicycles and pedestrians.	N/A

BP13: Burke Street/Roberts Avenue Sharrows

Burke Street and Roberts Avenue are local streets that travel east-west at the south end of downtown. Burke Street extends from Mill Street to Stephens Street. Roberts Avenue is offset from Burke Street to the south and extends from Stephens Street to Main Street.

This concept would provide sharrows on Burke Street and Roberts Avenue. This would provide an east-west connection to the southbound bicycle lane that already exists on Pine Street and links residences west of the couplet with commercial businesses on Stephens Street and the school east of the couplet on Roberts Avenue. Enhanced wayfinding signage may be necessary to direct travelers to the existing crossings of Pine Street and Stephens Street.

Cost Opinion: $420,000 (includes curb ramp upgrades)

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	No significant impact.
Title VI and Environmental Justice	Provides bicycle connectivity to area of youth population and connecting to a Head Start program at the elementary school.	N/A

Area of Interest	Benefits	Impacts
Vehicle Miles Traveled (VMT)	This facility would provide additional bike access with possible VMT reduction.	N/A
Bicycle Level of Traffic Stress (BLTS)	No change (currently BLTS 2)	N/A
Qualitative pedestrian/ transit assessment	Pedestrian: No change Transit: No change	N/A
Bicycle/Pedestrian facilities and network	Provides east-west bicycle connectivity through downtown on road with lower traffic speeds and volumes.	N/A
Vehicular transportation facilities and network	Notifies vehicles to presence of cyclists.	N/A
Transit system	N/A	N/A
Rail and freight networks	N/A	N/A
Safety	Does not specifically address a documented safety concern, but has safety benefits for bicycles.	N/A

BP14: Jackson Street Bike Facility

Jackson Street is a currently a local facility, but proposed as a minor collector between Diamond Lake Boulevard and Mosher Avenue in downtown Roseburg. From Diamond Lake Boulevard to Douglas Avenue, it is a two-lane, two-way facility with on-street parking on both sides. From Douglas Avenue to Mosher Avenue, it is a two-lane, one-way facility with on-street parking on both sides. There are no bicycle facilities, but sidewalks are present. South of Mosher Avenue it is a local street.

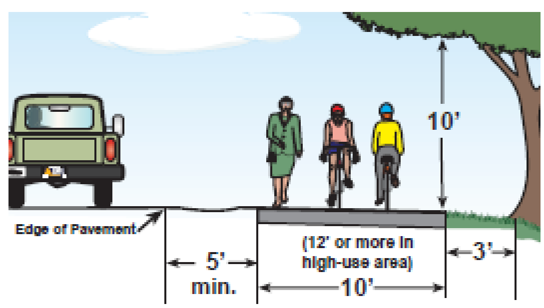
This concept would provide sharrows along Jackson Street from Diamond Lake Boulevard to Douglas Avenue as well as along the one-way portion of Jackson Street from Douglas Avenue to Mosher Avenue. Sharrows on Jackson Street from Diamond Lake Boulevard to Douglas Avenue would provide an important connection over Deer Creek.

Cost Opinion: $87,000 (includes curb ramp upgrades)

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	This project would traverse the 100-year floodplain.
Title VI and Environmental Justice	Benefits populations by increasing non-auto transportation connectivity to public services (City Hall).	N/A

Area of Interest	Benefits	Impacts
Vehicle Miles Traveled (VMT)	This facility would provide additional bike access with possible VMT reduction.	N/A
Bicycle Level of Traffic Stress (BLTS)	No change (currently BLTS 2)	N/A
Qualitative pedestrian/ transit assessment	Pedestrian: No change Transit: No change	N/A
Bicycle/Pedestrian facilities and network	Provides striped bicycle facilities across Deer Creek and extends bicycle network south from existing facilities on Winchester St.	N/A
Vehicular transportation facilities and network	Notifies vehicles to presence of cyclists.	N/A
Transit system	N/A	N/A
Rail and freight networks	N/A	N/A
Safety	Does not specifically address a documented safety concern, but has safety benefits for bicycles.	N/A

BP15: Stewart Parkway Multi-Use Path



Stewart Parkway is an arterial street providing a crossing of the South Umpqua River and connecting northwest and southwest Roseburg. North of the South Umpqua River is a path connection to the existing trail system traveling east-west along the river, through Stewart Park.

This concept would enhance the existing bicycle and pedestrian network by creating a multi-use path on the east side of Stewart Parkway between the north end of the Stewart Parkway bridge and the existing trails paralleling Stewart Park Drive. The Steward Parkway bridge is scheduled to be replaced. The replaced bridge will feature improved bicycle and pedestrian facilities.

Cost Opinion: $210,000

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	This path would span the South Umpqua River and traverse 100-year floodplain.

Area of Interest	Benefits	Impacts
Title VI and Environmental Justice	Benefits populations by increasing non-auto transportation connectivity and enhanced connections to community features.	N/A
Vehicle Miles Traveled (VMT)	This facility would provide additional bike and pedestrian access with possible VMT reduction.	N/A
Bicycle Level of Traffic Stress (BLTS)	BLTS would be 1 for multi-use path.	N/A
Qualitative pedestrian/ transit assessment	Pedestrian: Improves from 'fair' to 'good' Transit: No change	N/A
Bicycle/Pedestrian facilities and network	Expands separated bicycle and pedestrian network and connections to existing trail system.	N/A
Vehicular transportation facilities and network	N/A	N/A
Transit system	Provides enhanced connectivity to existing transit lines (Red and Green) on Harvard Avenue.	N/A
Rail and freight networks	N/A	N/A
Safety	Does not specifically address a documented safety concern.	N/A

BP16: Trail Wayfinding and Connections on Existing Infrastructure

This concept would increase wayfinding and potentially create new connections to existing trail system by building upon existing infrastructure with directional signs or markings. Three options are described below that increase access to existing trail facilities to provide an extension of facilities throughout the community. The locations are highlighted in Figure 4.

Concept BP16 – Option A: Duck Pond Street

This option would provide a connection between the existing facilities along Garden Valley Boulevard to the multi-use path through Stewart Park. The path on the west side of the parking would be formalized with signage to establish the area as a multi-use path. The remaining connection to Garden Valley Boulevard would be a continuation of the multi-use path on the west side of Duck Pond Street.

Concept BP16 – Option B: Gaddis Park

This option would create a sharrows connection along Chestnut Avenue and Highland Street between existing facilities on Cedar Street (north of Chestnut Avenue) and Chestnut Avenue (east of Cedar Street) and the trails in Gaddis Park. To provide this facility along Chestnut Avenue and Highland Street to the existing trail south of the parking lot.

Concept BP16 – Option C: Pine Street

This option links the trail through Deer Creek Park along Pine Street, Douglas Avenue, and Spruce Street to the existing one-way bike lane along Stephens Street. The multi-use path would continue on the north side of Pine Street, and then a bike lane along Douglas Avenue to connect to the existing multi-use path along the South Umpqua River.

FIGURE 4. POSSIBLE TRAIL CONNECTIONS

Cost Opinion (Option A): $350,000

Cost Opinion (Option B): $110,000

Cost Opinion (Option C): $180,000

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	A portion of the paths described in options A and B would closely parallel one or more of the following natural resources: freshwater pond, emergent wetland, and forested wetland. Additionally, the path geometries shown for options B and C intersects the 100-year floodplain.
Title VI and Environmental Justice	Benefits populations by increasing non-auto transportation connectivity and enhanced connections to community features.	N/A

Area of Interest	Benefits	Impacts
Vehicle Miles Traveled (VMT)	This facility would provide additional bike and pedestrian access with possible VMT reduction.	N/A
Bicycle Level of Traffic Stress (BLTS)	BLTS would be 1 for multi-use path.	N/A
Qualitative pedestrian/ transit assessment	Pedestrian: 'good', with potential for 'excellent' depending on design features Transit: No change	N/A
Bicycle/Pedestrian facilities and network	Expands separated bicycle and pedestrian network and connections to existing trail system.	N/A
Vehicular transportation facilities and network	No change	N/A
Transit system	Options A and C provide enhanced connectivity to existing transit lines.	N/A
Rail and freight networks	Option B would require crossing the existing rail line and may require coordination with ODOT Rail. Option C would parallel existing rail line.	N/A
Safety	Options do not specifically address a documented safety concern.	N/A

BP17: Garden Valley Boulevard and Stephens Street Transit Stops

This concept would involve a code change to require developers to provide transit stop amenities and an update to the include in-lane far-side transit stops at least 30 feet from intersection to avoid bus interference with side street traffic flow.

<u>Cost Opinion:</u> $710,000

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	Locations not yet determined, but could have right-of-way impacts.
Title VI and Environmental Justice	Benefits populations by increasing non-auto transportation connectivity and enhanced connections to community features. Transit provides increased accessibility for older populations when compared to active transportation improvements.	N/A

Area of Interest	Benefits	Impacts
Vehicle Miles Traveled (VMT)	This facility would provide enhanced transit access with possible VMT reduction.	N/A
Bicycle Level of Traffic Stress (BLTS)	No change	N/A
Qualitative pedestrian/ transit assessment	Pedestrian: No change Transit: New facilities would improve the transit assessment. Increased service and shorter headways would improve existing service.	N/A
Bicycle/Pedestrian facilities and network	Could connect pedestrians and bicyclists where there are gaps in the network.	N/A
Vehicular transportation facilities and network	Could improve operations at intersections by reducing interference with side street traffic flow.	N/A
Transit system	Enhanced amenities could result in improved comfort and safety.	N/A
Rail and freight networks	N/A	N/A
Safety	Does not specifically address a documented safety concern.	N/A

BP18: Calkins Avenue Sharrows

Calkins Avenue is a minor collector street that provides an east-west connection linking existing sidewalks and bike routes. It serves residential neighborhoods and provides access to schools.

This concept would add sharrows on Calkins Avenue between Grove Lane and Keasey Street. This road is also an ideal candidate for a bicycle boulevard, which is street facility that features sharrows as well as various traffic calming measures to slow down and reduce vehicle cut-through traffic. Improved signage could be used to direct bicyclists to nearby bicycle facilities.

<u>Cost Opinion</u>: $330,000 (includes curb ramp upgrades)

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	N/A
Title VI and Environmental Justice	Provides bicycle connectivity to area of youth population and schools.	N/A
Vehicle Miles Traveled (VMT)	This facility would provide additional bike access with possible VMT reduction.	N/A

Area of Interest	Benefits	Impacts
Bicycle Level of Traffic Stress (BLTS)	No change (currently BLTS 2)	N/A
Qualitative pedestrian/ transit assessment	Pedestrian: No change Transit: No change	N/A
Bicycle/Pedestrian facilities and network	Provides east-west connection between two existing facilities on Troost St and Keasey St.	N/A
Vehicular transportation facilities and network	Notifies vehicles to presence of cyclists.	N/A
Transit system	N/A	N/A
Rail and freight networks	N/A	N/A
Safety	Does not specifically address a documented safety concern, but has safety benefits for bicycles.	N/A

BP19: Garden Valley Boulevard Midblock Crossing

Garden Valley Boulevard is a five-lane arterial traveling east-west with sidewalks and multiple vehicular access points. Between I-5 and Cedar Street, there are no protected crossings of Garden Valley Boulevard. Fairmont Street and Highland Street run north-south and are local streets that provide a connection from Stewart Parkway to Garden Valley Boulevard and also to Gaddis Park, but lack formalized bicycle facilities.

This concept proposes installing a signalized midblock crossing near Garden Valley Boulevard at Fairmount Avenue/Highland Street, providing an interconnect with the I-5 Exit 125 ramp signal. It would also widen the sidewalks on Garden Valley to more comfortably accommodate cyclists and install sharrows on Fairmount Avenue and Highland Street to formalize a bicycle route.

<u>Cost Opinion</u>: $440,000

Source: Nacto.org

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	N/A
Title VI and Environmental Justice	Provides bicycle connectivity to community features.	N/A

Area of Interest	Benefits	Impacts
Vehicle Miles Traveled (VMT)	This facility would provide additional bike access with possible VMT reduction.	N/A
Bicycle Level of Traffic Stress (BLTS)	No change (currently LTS 2).	N/A
Qualitative pedestrian/ transit assessment	Pedestrian: Benefits pedestrian system Transit: No change	N/A
Bicycle/Pedestrian facilities and network	Provides north-south bicycle connection between Stewart Parkway and Gaddis Park. Provides protected bicycle and pedestrian crossing where limited crossings exist.	N/A
Vehicular transportation facilities and network	Notifies vehicles to presence of cyclists.	Mid-block crossing would delay east-west vehicular traffic while crossing is in use.
Transit system	N/A	Mid-block crossing would delay east-west vehicular traffic while crossing is in use.
Rail and freight networks	N/A	Mid-block crossing would delay east-west vehicular traffic while crossing is in use.
Safety	This section of roadway is within a top 10% Safety Priority Index System (SPIS) site. Expected to benefit pedestrian safety by providing a protected crossing of a busy 5-lane road.	Rear end collisions are common in this stretch of road, which could be compounded by a traffic signal.

BP20: Further Study of Diamond Lake Boulevard, Garden Valley Boulevard, and Harvard Avenue Bike and Pedestrian Accommodations

Diamond Lake Boulevard, Garden Valley Boulevard, and Harvard Avenue are all major east-west corridors in Roseburg. For these corridors, on-street bike facilities are not advised without additional right of way given traffic speeds and volumes as well as the importance of maintaining the two-way left turn lanes, where they are present. In addition, particularly for Diamond Lake Boulevard, opportunities to improve existing pedestrian accommodations should be pursued. Currently, the sidewalks along Diamond Lake Boulevard are narrow in places and utility poles in the sidewalk provide a significant obstacle to pedestrian movement.

This concept proposes more detailed study of opportunities to improve bike accommodations on these three corridors (including separated multi-use paths) and improved pedestrian accommodations Diamond Lake Boulevard.

The benefits and impacts of a project concept on one or more of these corridors would be determined as a result of further study of these improvements. Generally providing bicycle and pedestrian facilities benefit transportation disadvantaged populations, improve multi-modal connectivity and provide safety benefits.

Cost Opinion: $50,000 - $100,000 per study

BP21: New Multi-Use Paths

This concept would provide new multi-use path connections throughout Roseburg. Five options are summarized below.

Concept BP21 – Option A: YMCA (Harvey) to Hucrest Elementary, via Newton Creek

This concept would add a new multi-use path paralleling Newtown Creek between Jefferson Street and Keasey Street. This connection, in addition to existing bike facilities in the area (for example along Troost Street and Keasey Street), will improve pedestrian and cyclist access to the surrounding neighborhoods and community destinations such as Stewart Park, the YMCA, and Hucrest Elementary School.

Cost Opinion (Option A): $400,000

Concept BP21 – Option B: Charles Gardiner Park Connection to Stewart Parkway and Garden Valley Boulevard

This concept would extend the existing multi-use path that parallels Newton Creek through Charles Gardiner Park. This existing path begins at Edenbower Boulevard and terminates at Renann Street. This option would extend this path west of Renann Street, paralleling Newton Creek to the Stewart Parkway access to the Walmart Supercenter. At this access, cyclists and pedestrians may optionally be directed to existing facilities along Stewart Parkway or a new multi-use path along the east side of Stewart Parkway between the Walmart access and Garden Valley Boulevard. The latter option will provide pedestrians and cyclists with improved separation and therefore will create a more inviting environment for active users. At the intersection of Stewart Parkway and Garden Valley Boulevard, an improved accommodation for cyclists would provide access to the Garden Valley underpass about 500 feet east of the intersection.

Cost Opinion (Option B): $180,000

Concept BP21 – Option C: North end of Vine Street to Newton Creek Road

This concept would add a new multi-use path between the north end of Vine Street and Newton Creek Road, providing a north-south pedestrian and cyclist route paralleling Stephens Street.

Cost Opinion (Option C): $370,000

Concept BP21 – Option D: North-south through City along I-5 frontage on west side

This concept would add new multi-use path connections to provide improved north south connectivity for cyclists between Umpqua Community College and downtown Roseburg. This path would roughly parallel I-5 and Stephens Street and provide connections to existing facilities in the existing bike network where possible, including the existing path paralleling I-5 between Garden Valley Boulevard and the river. This would create new north-south separated bike facilities that will be inviting to the average cyclist.

Cost Opinion (Option D): $920,000

Concept BP21 – Option E: Fir Grove Park to Stewart Parkway, along south bank of the South Umpqua River

This concept would add a short multi-use path connection paralleling the river between Fir Grove Park and Stewart Parkway.

Cost Opinion (Option E): $640,000

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	Locations not yet determined, but could have right-of-way impacts.
Title VI and Environmental Justice	Provides bicycle connectivity to community features.	N/A
Vehicle Miles Traveled (VMT)	Each facility would provide additional bike access with possible VMT reduction.	N/A
Bicycle Level of Traffic Stress (BLTS)	Separated multi-use paths will have a BLTS of 1.	N/A
Qualitative pedestrian/ transit assessment	Pedestrian: Multi-use paths would be ‘good’ or ‘excellent’ depending on design elements and topography. Transit: N/A	N/A
Bicycle/Pedestrian facilities and network	Provides new separated bike and pedestrian connections to community features.	N/A
Vehicular transportation facilities and network	N/A	N/A
Transit system	N/A	N/A
Rail and freight networks	N/A	N/A
Safety	Has safety benefits for pedestrians and cyclists.	Proper lighting and public safety measures may be needed to enforce prohibited uses.

BP22: New Bike Connection – Duck Pond Street to I-5 Multi-use Path

This concept would provide improved connectivity between existing bike facilities. There are existing bike facilities along Duck Pond Street and parallel to I-5 between Garden Valley Boulevard and the river. Bike lanes along Garden Valley Boulevard provide a connection between these facilities currently; however, traffic volumes and speeds along Garden Valley discourage use of these bike lanes by average cyclists.

This concept would provide a separated bike facility, such as a multi-use path or two-way cycle track, to connect the existing multi-use path facilities found along Duck Pond Street and I-5.

Concept BP22 – Option A: Within the Garden Valley Boulevard Right-of-Way

This option would provide a two-way cycle track or multi-use path along the south side of Garden Valley Boulevard. This option would require additional ROW analysis.

Cost Opinion (Option A): $680,000

Concept BP22 – Option B: Through the Veterans Affairs (VA) Campus

This option would provide a multi-use path from Duck Pond Street to the existing path west of I-5 through the VA campus.

Cost Opinion (Option B): $430,000

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	Locations not yet determined, but could have right-of-way impacts.
Title VI and Environmental Justice	Provides bicycle connectivity to community features.	N/A
Vehicle Miles Traveled (VMT)	This facility would provide additional bike access with possible VMT reduction.	N/A
Bicycle Level of Traffic Stress (BLTS)	BLTS would be 1 for both Options A and B. Existing bike lanes on Garden Valley have a BLTS of 3.	N/A
Qualitative pedestrian/ transit assessment	Pedestrian: Multi-use paths would be 'good' or 'excellent' depending on design elements and topography. Transit: N/A	N/A
Bicycle/Pedestrian facilities and network	Provides new separated bike and pedestrian connections to community features.	N/A
Vehicular transportation facilities and network	N/A	N/A
Transit system	N/A	N/A
Rail and freight networks	N/A	N/A
Safety	Has safety benefits for pedestrians and cyclists.	Proper lighting and public safety measures may be needed to enforce prohibited uses.

Transit Concepts

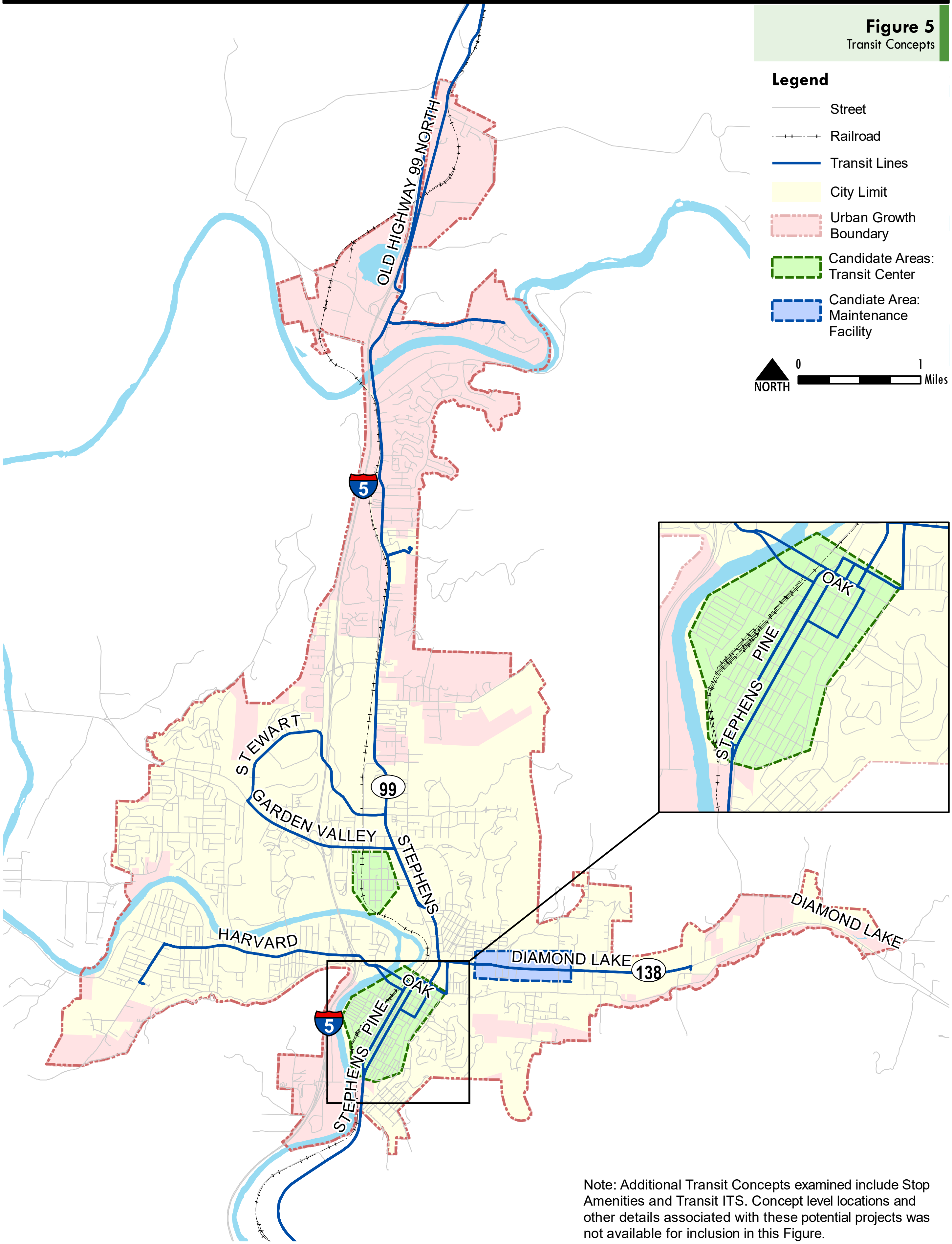
The following concepts are suggested as opportunities for the City to collaborate with, or otherwise support, the Douglas County Transit District (Transit District) in order to improve public transportation services in the greater Roseburg area. Where applicable, the concepts are mapped in Figure 5.

Transit in Roseburg is provided through Transit District and not funded directly by Roseburg. This document suggests multimodal concepts to support transit through improved access and connectivity of the bicycle and pedestrian system. A TSP can also support transit by identifying projects identified in the transit agency plans. In coordination with the Transit District, eight transit-specific concepts were identified. Table 6 summarizes the concepts, responsible Agency and how the City can support the concept. In addition to these concepts, the City recommends the Transit District pursue improved coordination with City, County, state services and Qualified Transit Entities[12].

TABLE 6. AGENCY/CITY RESPONSIBILITY FOR TRANSIT ENHANCEMENTS IN THE CITY OF ROSEBURG

	Transit District	Roseburg	Nature of City Support
Capital Improvements			
T1: Purchase of Additional Buses	Lead	N/A	None
T2: New Transit Center	Lead	Support	**Potential** planning and financing partnership (e.g., through Tax increment financing (TIF)), assistance securing needed land and ROW
T3: New Maintenance Facility	Lead	Support	**Potential** planning and financing partnership (e.g., through TIF), assistance securing needed land and ROW
T4: Stop Amenities and Accessibility	Support	Support	Assistance securing needed ROW, City implementation of bike and pedestrian improvements
Operations and Service Improvements			
T5: Increased Frequencies	Lead	N/A	None
T6: New Routes	Lead	N/A	None
T7: Transit ITS	Support	Support	Coordination of City/ODOT operated traffic controls
T8: Increased Dial-a-Ride Service	Lead	N/A	None

[12] Cow Creek Band of Umpqua Indians is considered a Qualified Transit Entity



Note: Additional Transit Concepts examined include Stop Amenities and Transit ITS. Concept level locations and other details associated with these potential projects was not available for inclusion in this Figure.

Capital Improvements

T1: Purchase of Additional Buses

Transit District would lead the implementation of this concept.

Transit District would like to add buses to their existing fleet. Purchase of additional buses would provide Transit District the ability to deliver major service improvements, such as new routes and increased frequencies, which would contribute to making Transit District service more competitive with use of private vehicles. Procurement of low-emission and electric transit vehicles could be prioritized in order to meet goals related to the environmental impact of transit operations.

Cost opinion: Not applicable. This concept would not be an added cost to the City.

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	N/A
Title VI and Environmental Justice	Increased access and frequency of transit is a benefit to Title VI and Environmental Justice populations.	N/A
Vehicle Miles Traveled (VMT)	This would add transit miles travelled but has potential to decrease overall VMT by providing alternatives to single occupancy vehicle use.	N/A
Bicycle Level of Traffic Stress (BLTS)	N/A	N/A
Qualitative pedestrian/ transit assessment	Pedestrian: No change Transit: Increased access and frequency of transit could result in 'good' service (currently 'fair')	N/A
Bicycle/Pedestrian facilities and network	N/A	N/A
Vehicular transportation facilities and network	N/A	N/A
Transit system	Expands transit system.	May require additional maintenance and storage capacity.
Rail and freight networks	N/A	N/A
Safety	N/A	N/A

T2: New Transit Center in or near Downtown Roseburg

Transit District would lead the implementation of this concept.

Construction of a new transit center in or near the downtown area could facilitate improvements in transit operations and the customer experience. The transit center can serve to increase the efficiency of timed transfers among greater numbers of coordinated routes, as well as make these connections more intuitive and comfortable from the riders' perspective.

Example: Transit Center

Cost opinion: Not applicable. This concept would not be an added cost to the City.

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	N/A: Site location not yet determined.
Title VI and Environmental Justice	Increased access to transit is a benefit to Title VI and Environmental Justice populations.	N/A
Vehicle Miles Traveled (VMT)	Likely decreases overall VMT by providing alternatives to single occupancy vehicle use.	N/A
Bicycle Level of Traffic Stress (BLTS)	N/A	N/A
Qualitative pedestrian/ transit assessment	Pedestrian: No change Transit: Increased access of transit could result in 'good' service (currently 'fair')	N/A
Bicycle/Pedestrian facilities and network	N/A	N/A
Vehicular transportation facilities and network	Separates transit transfer locations from vehicular traffic.	N/A
Transit system	Expands transit system.	N/A
Rail and freight networks	N/A	N/A
Safety	N/A	N/A

T3: New Maintenance Facility with Bus Wash and Electric Charging Stations

Transit District would lead the implementation of this concept.

Example: Maintenance Facility

Having the appropriate tools and staff to maintain, repair, clean, and fuel buses is critical to delivering a high quality of transit service. A new maintenance facility could increase Transit District's capacity to perform these tasks in order to support a growing fleet and provide the agency with the tools to more adequately accommodate electric buses.

Cost opinion: Not applicable. This concept would not be an added cost to the City.

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	N/A: Site location not yet determined.
Title VI and Environmental Justice	Enhanced transit amenities benefit Title VI and Environmental Justice populations.	N/A
Vehicle Miles Traveled (VMT)	Likely decreases overall VMT by providing alternatives to single occupancy vehicle use.	N/A
Bicycle Level of Traffic Stress (BLTS)	N/A	N/A
Qualitative pedestrian/ transit assessment	Pedestrian: No change Transit: Benefits transit, but does not improve the qualitative assessment as a standalone project.	N/A
Bicycle/Pedestrian facilities and network	N/A	N/A
Vehicular transportation facilities and network	N/A	N/A
Transit system	Expands transit system and provides ability to accommodate electric buses.	N/A
Rail and freight networks	N/A	N/A
Safety	N/A	N/A

T4: Stop Amenities

Transit District would support the implementation of this concept through financial support and/or coordination on grant pursuits. The City will provide assistance to secure needed right-of-way and increase bike and pedestrian connections to transit stops.

Stop amenities, including shelters, seating, lighting, waste bins, and traveler information and wayfinding (e.g. wayfinding signs and real-time bus arrival information) enhance the quality of the experience for transit riders by providing increased security, comfort, and information.

Transit riders' experience is also greatly influenced by the quality of their journey to and from transit stops. At some stage of their journey, every transit rider is either a bicyclist or pedestrian; safe and attractive bike and pedestrian facilities to stops are critical in order to make transit accessible.

<u>Cost opinion:</u> Not applicable. This concept would not be an added cost to the City.

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	N/A: Site location not yet determined.
Title VI and Environmental Justice	Enhanced transit amenities benefit Title VI and Environmental Justice populations by increasing comfort, safety and accessibility.	N/A
Vehicle Miles Traveled (VMT)	Likely decreases overall VMT by providing alternatives to single occupancy vehicle use.	N/A
Bicycle Level of Traffic Stress (BLTS)	N/A	N/A
Qualitative pedestrian/ transit assessment	Pedestrian: No change Transit: Increased amenities could result in 'good' assessment (currently 'fair')	N/A
Bicycle/Pedestrian facilities and network	Increases comfort and safety of pedestrians.	N/A
Vehicular transportation facilities and network	N/A	N/A
Transit system	Improves amenities.	N/A
Rail and freight networks	N/A	N/A
Safety	Does not specifically address a documented safety concern, but has safety benefits for pedestrians.	N/A

Operations and Service Improvements

T5: Increased Frequency

Transit District would lead the implementation of this concept.

Frequency has been shown to be among the most important service characteristics in determining the attractiveness of transit. Increased frequency provides riders with an improved quality of service by providing numerous benefits, which include reduced transit journey times and improved resilience to service disruptions. Most importantly, frequent services provide riders with significantly more flexibility and choice as it relates to their use of transit to access destinations, making transit more accessible to more riders. Currently, transit service in Roseburg has hourly frequencies.

Cost opinion: Not applicable. This concept would not be an added cost to the City.

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	N/A
Title VI and Environmental Justice	Increased frequency of transit decreases transit journey times, enhanced mobility, and increased resilience to service disruptions.	N/A
Vehicle Miles Traveled (VMT)	This would add transit miles travelled but has potential to decrease overall VMT by providing alternatives to single occupancy vehicle use.	N/A
Bicycle Level of Traffic Stress (BLTS)	N/A	N/A
Qualitative pedestrian/ transit assessment	Pedestrian: No change Transit: Increased access and frequency of transit could result in 'good' service (currently 'fair')	N/A
Bicycle/Pedestrian facilities and network	N/A	N/A
Vehicular transportation facilities and network	N/A	N/A
Transit system	Enhances transit system, reduces transit journey times and increases flexibility. May require additional maintenance.	N/A
Rail and freight networks	N/A	N/A
Safety	Does not specifically address a documented safety concern, but has safety benefits for pedestrians.	N/A

T6: New Routes

Transit District would lead the implementation of this concept.

The addition of new routes would allow Transit District to provide additional connections for riders and expand or improve transit service in areas that historically may have been underserved. Additionally, the development of new routes may provide Transit District with opportunity to improve customer experience and operations at the system level. Through careful coordination of the development of a service plan for the new routes and that of the existing system, Transit District could provide improved mobility for riders, system-wide.

Cost opinion: Not applicable. This concept would not be an added cost to the City.

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	N/A
Title VI and Environmental Justice	Expands service to Title VI and Environmental Justice populations.	N/A
Vehicle Miles Traveled (VMT)	This would add transit miles travelled but has potential to decrease overall VMT by providing alternatives to single occupancy vehicle use.	N/A
Bicycle Level of Traffic Stress (BLTS)	N/A	N/A
Qualitative pedestrian/ transit assessment	Pedestrian: No change Transit: New route could result in ‘good’ service with adequate service and frequency (currently ‘fair’).	N/A
Bicycle/Pedestrian facilities and network	N/A	N/A
Vehicular transportation facilities and network	N/A	N/A
Transit system	Enhances transit system and increases flexibility. May require additional maintenance. Increases system complexity/coordination.	N/A
Rail and freight networks	N/A	N/A
Safety	Does not specifically address a documented safety concern, but has safety benefits for pedestrians.	N/A

T7: Transit ITS (Intelligent Transportation Systems)

Transit District and the City would support the implementation of this concept.

Transit ITS projects involve implementation of technologies and infrastructure in order to improve transit performance or customer experience. Examples include Transit Signal Priority (systems that seek to improve schedule adherence by reducing bus delay at signalized interactions) and communication of real-time bus arrival information to riders. For this concept, the City is most likely to support concepts in the form of updating coordinated signal timing and any future detection or transit signal priority.

Cost opinion: Not applicable. No specific ITS concepts identified at this time.

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	N/A
Title VI and Environmental Justice	N/A	N/A
Vehicle Miles Traveled (VMT)	N/A	N/A
Bicycle Level of Traffic Stress (BLTS)	N/A	N/A
Qualitative pedestrian/ transit assessment	Pedestrian: N/A Transit: Can improve service to 'good' from 'fair' by improving rider expectations and improved service	N/A
Bicycle/Pedestrian facilities and network	N/A	N/A
Vehicular transportation facilities and network	N/A	N/A
Transit system	Enhances travel time reliability and reduced travel times.	N/A
Rail and freight networks	N/A	N/A
Safety	N/A	N/A

T8: Additional Dial-a-Ride Service and Increased Integration with Fixed Route

Transit District would lead the implementation of this concept.

This concept would provide increased Dial-a-Ride service hours and increased coordination with existing and future fixed route services.

Cost opinion: Not applicable. This concept would not be an added cost to the City.

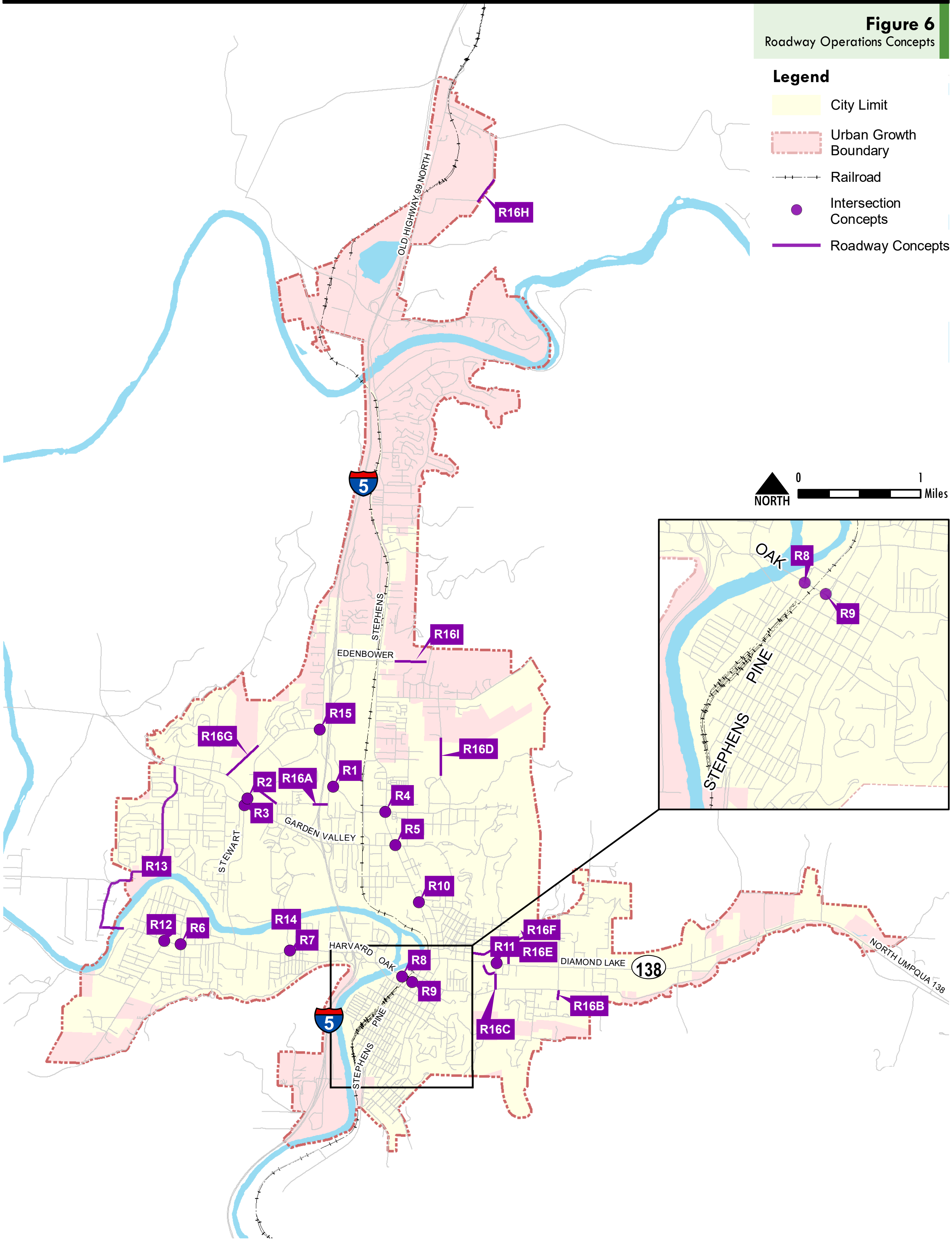
Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	N/A

Area of Interest	Benefits	Impacts
Title VI and Environmental Justice	Expands service to Title VI and Environmental Justice populations.	N/A
Vehicle Miles Traveled (VMT)	This would add transit miles travelled but has potential to decrease overall VMT by providing alternatives to single occupancy vehicle use.	N/A
Bicycle Level of Traffic Stress (BLTS)	N/A	N/A
Qualitative pedestrian/ transit assessment	Pedestrian: No change Transit: Can improve service to 'good' from 'fair' by improving rider expectations and improved service	N/A
Bicycle/Pedestrian facilities and network	N/A	N/A
Vehicular transportation facilities and network	N/A	N/A
Transit system	Enhances transit services for riders requiring special accommodations or connections between points not well served by fixed route.	N/A
Rail and freight networks	N/A	N/A
Safety	Does not specifically address a documented safety concern, but has safety benefits for pedestrians.	N/A

Roadway Concepts

The following concepts have been identified as opportunities for the City to address operational concerns at intersections or corridors. Where applicable, the concepts are mapped in Figure 6.

Figure 6
Roadway Operations Concepts

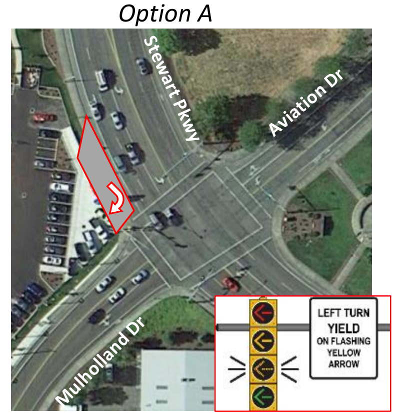


R1: Stewart Parkway at Aviation Drive/Mulholland Drive

The intersection of Stewart Parkway at Aviation Drive/Mullholland Drive services nearby business and the Roseburg Airport. Mulholland Drive also connects to Garden Valley Boulevard and the I-5 interchange. Future traffic through the intersection is expected to exceed adopted standards.

The crash history at this intersection revealed a pattern of left-turning related collisions and a higher than average crash rate when compared to other similar study area intersections. The majority of the crashes occurred when vehicles traveling southeast on Stewart Parkway attempted to turn left onto Aviation Drive, failing to yield the right-of-way to oncoming traffic. Two options were developed at this intersection to address the operational and safety concerns.

Option A



Option B

Concept R1 – Option A: Dedicated southeast right-turn lane
Option A would add a dedicated southeast right-turn lane from Stewart Parkway to Mulholland Drive to serve the high volume of right-turning vehicles. This option addresses the operational deficiency, but does not address the safety concern.

Cost opinion: $905,000

Concept R1 – Option B: Dedicated southeast right-turn lane and flashing yellow left-turn arrows
Option B includes the same improvements as Option A, but installs protected-permitted flashing left-turn arrows on all approaches to provide some protection to left-turning vehicles, specifically to those turning off Stewart Parkway.

Cost opinion: $925,000

Concept R1 – Option C: Dedicated southeast right-turn lane and realign intersection
Option C includes the same improvements as Option A, but realigns intersection to improve sight distance

Cost opinion: $2.3 million

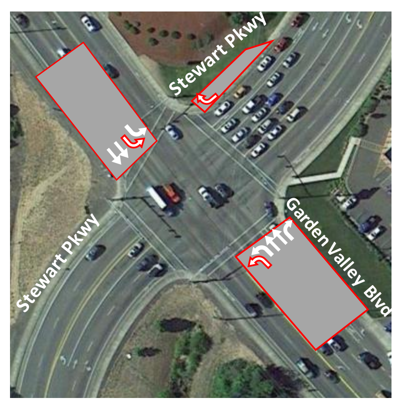
Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	N/A
Title VI and Environmental Justice	N/A	N/A
Vehicle Miles Traveled (VMT)	N/A	Unlikely to decrease VMT.
Bicycle Level of Traffic Stress (BLTS)	N/A	N/A

Area of Interest	Benefits	Impacts
Qualitative pedestrian/ transit assessment	Pedestrian: N/A Transit: No change	Pedestrian: Does not improve pedestrian qualitative assessment.
Bicycle/Pedestrian facilities and network	N/A	All options increase pedestrian crossing distance on northwest leg.
Vehicular transportation facilities and network	All options improve vehicular operations. Options B and C improve existing safety concern.	N/A
Transit system	Enhances travel time reliability and reduced travel times.	N/A
Rail and freight networks	All options improve vehicular operations. Options B and C improve existing safety concern.	N/A
Safety	- This intersection exceeds the critical crash rate. - Options B and C address the documented safety concern.	May introduce conflict between bicycles and vehicles at the start of new right-turn lane.

R2: Garden Valley Boulevard at Stewart Parkway Dual eastbound and westbound left-turn lanes and dual southbound right-turn lanes

Garden Valley Boulevard at Stewart Parkway is one of the busiest intersections in Roseburg. A significant amount of the residents on the west side travel through this intersection during their daily commute as it is one of only two east-west routes connecting to the commercial center, I-5 and downtown.

The addition of the dedicated northbound right-turn (2017) and optimization of signal timing have alleviated some of the existing operational concerns, however this intersection is expected exceed adopted targets by 2040. Traffic turning off Garden Valley Boulevard will continue to experience delays without additional capacity, although the need is not immediate.



The crash history at this intersection revealed a pattern of rear end related collisions and a higher than average crash rate when compared to other similar study area intersections.

The concept proposes adding eastbound and westbound dual left-turns from Garden Valley Boulevard to Stewart Parkway and dual southbound right-turn lanes from Stewart Parkway to Garden Valley Boulevard. This level of improvement would allow the intersection to operate within the City's mobility target.

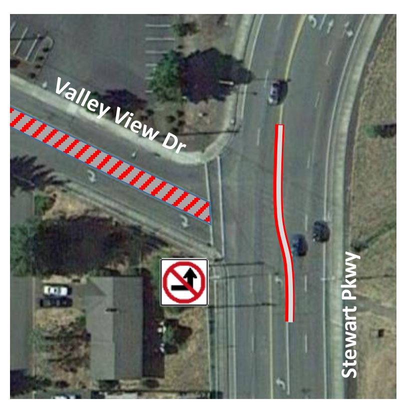
Cost Opinion: $1.4 million

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	There are forested wetland resources south of the intersection.
Title VI and Environmental Justice	N/A	N/A
Vehicle Miles Traveled (VMT)	N/A	Unlikely to decrease VMT.
Bicycle Level of Traffic Stress (BLTS)	N/A	Will remain BLTS 3.
Qualitative pedestrian/ transit assessment	Pedestrian: N/A Transit: N/A	Pedestrian: Will remain 'fair' Transit: N/A
Bicycle/Pedestrian facilities and network	N/A	Increases pedestrian crossing distance and exposure.
Vehicular transportation facilities and network	Increases the capacity and reduces the delay for westbound and eastbound left-turning movement.	N/A
Transit system	Reduces delay for transit movement.	N/A
Rail and freight networks	Increases the capacity and reduces the delay for westbound and eastbound left-turning movement.	N/A
Safety	This intersection exceeds the critical crash rate.	Increases pedestrian crossing distance and exposure.

R3: Stewart Parkway at Valley View Drive Prohibit eastbound left-turns off Valley View Drive

The stop-controlled movements of Valley View Drive at the T-intersection with Stewart Parkway experiences delays while vehicles wait for a gap in traffic to turn on to Stewart Parkway. The eastbound left-turn is expected to exceed adopted operational targets by 2040.

The crash history at this intersection suggests a pattern of turning-related collisions. This intersection is closely spaced to the intersection of Stewart Parkway with Garden Valley Boulevard (to the north) and is impacted by queuing upstream. This intersection exceeded the critical crash rate and the statewide 90th percentile crash rate and would benefit from turn restrictions.



To improve safety and reduce delay at the intersection, this concept proposes restricting the eastbound left-turns from Valley View Drive to Stewart Parkway; all other movements would still be permitted.

Cost Opinion: $87,000

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	N/A
Title VI and Environmental Justice	N/A	N/A
Vehicle Miles Traveled (VMT)	N/A	May increase VMT due to out of direction travel.
Bicycle Level of Traffic Stress (BLTS)	No change	No change, remains BLTS 2.
Qualitative pedestrian/ transit assessment	Pedestrian: No change Transit: No change	Pedestrian: Will remain 'poor' on Valley View Dr Transit: N/A
Bicycle/Pedestrian facilities and network	Eliminates conflicts between eastbound left-turning movements and southbound bike traffic.	N/A
Vehicular transportation facilities and network	Improves the eastbound capacity.	- Impacts the traffic pattern and potentially increases the traffic volume on northbound Kline St. - Increases the travel time for off peak period for eastbound left-turn movement.
Transit system	N/A	
Rail and freight networks	Improves the eastbound capacity.	- Impacts the traffic pattern and potentially increases the traffic volume on northbound Kline St. - Increases the travel time for off peak period for eastbound left-turn movement.
Safety	- This intersection exceeds the critical crash rate and statewide 90th percentile crash rate. - This concept would reduce the number of collisions and improve safety.	May create new safety concerns at other intersections due to traffic re-routing.

R4: Stewart Parkway at Stephens Street

The intersection of Stewart Parkway at Stephens Street is a signalized intersection that provides an important connection into and out of downtown Roseburg. Although the intersection currently operates within the City's mobility targets, by 2040 it is expected to exceed them and the northbound left-turn lane is approaching the available capacity. Two options were developed to mitigate to the City's mobility targets.

Concept R4 – Option A: Dual northbound left-turn lanes
Option A would add dual northbound left-turn lanes from Stephens Street to Stewart Parkway.

Cost Opinion (Option A): $1.5 million

Concept R4 – Option B: Dedicated westbound and southbound right-turn lanes
Option B improve operations by creating dedicated westbound and southbound right-turn lanes.

Cost Opinion (Option B): $1.9 million

Option A

Option B

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	Right-of-way acquisition is required (more for Option B).
Title VI and Environmental Justice	N/A	N/A
Vehicle Miles Traveled (VMT)	N/A	Unlikely to decrease VMT.
Bicycle Level of Traffic Stress (BLTS)	No change	No change, remains BLTS 3 at best.
Qualitative pedestrian/ transit assessment	Pedestrian: No change Transit: No change.	Pedestrian: Will remain 'fair' Transit: No change
Bicycle/Pedestrian facilities and network	N/A	- Increases pedestrian crossing distance and exposure. - Option B: Right turners have to cross the bike lane to enter the right-turn lane.
Vehicular transportation facilities and network	Both options increase the overall capacity of the intersection.	N/A
Transit system	N/A	N/A

Area of Interest	Benefits	Impacts
Rail and freight networks	Both options increase the overall capacity of the intersection.	N/A
Safety	N/A	- Increases pedestrian crossing distance and exposure. - Option A creates the possibility of sideswipe collisions between the dual left-turn lane traffic.

R5: Garden Valley Boulevard at Stephens Street Dual eastbound left-turn lanes, dedicated southbound and northbound right-turn lanes

Garden Valley Boulevard at Stephens Street is a signalized intersection providing an important connection from downtown to the commercial businesses on Garden Valley Boulevard. The intersection is currently approaching the City's mobility target and is expected to exceed it by 2040. The intersection could be mitigated back to the City's target with some substantial capacity improvements; this intersection would require additional capacity on three of the four legs.

This concept proposes adding dual eastbound left-turns on Garden Valley Boulevard and dedicated southbound and northbound right-turn on Stephens Street. Project would provide an opportunity for access management of impacted driveways.

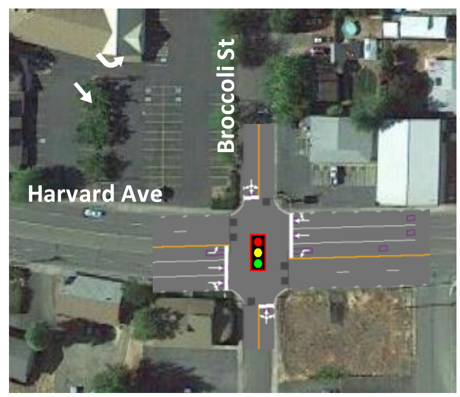
<u>Cost Opinion:</u> $3.2 million

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	Right-of-way acquisition is required
Title VI and Environmental Justice	N/A	N/A
Vehicle Miles Traveled (VMT)	N/A	Unlikely to decrease VMT.
Bicycle Level of Traffic Stress (BLTS)	No change	No change, remains BLTS 3 at best.
Qualitative pedestrian/ transit assessment	Pedestrian: No change Transit: No change.	Pedestrian: Will remain 'fair' Transit: No change

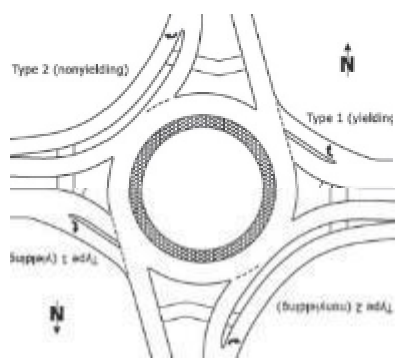
Area of Interest	Benefits	Impacts
Bicycle/Pedestrian facilities and network	N/A	- Increases pedestrian crossing distance and exposure. - Right turners have to cross the bike lane to enter the right-turn lane.
Vehicular transportation facilities and network	Increases the overall capacity of the intersection.	N/A
Transit system	N/A	N/A
Rail and freight networks	Increases the overall capacity of the intersection.	N/A
Safety	N/A	- Increases pedestrian crossing distance and exposure. - Creates the possibility of sideswipe collisions between the dual left-turn lane traffic

R6 Harvard Avenue at W Broccoli Street

This two-way stop-controlled intersection serves as access to residences, churches and an elementary school. Although this intersection currently operates well within applicable mobility targets, the anticipated growth in southwest Roseburg is expected to increase traffic on Harvard Avenue, which will make it more difficult to make turns from Broccoli Street. This intersection should continue to be monitored and may require different intersection control in the future.



Option A



Option B

Concept R6 – Option A: Traffic Signal
Option A would install a four-phase traffic signal with permitted lefts. This would allow the side street volumes an opportunity to turn onto Harvard Avenue and provide a protected crossing of Harvard Avenue for pedestrians. Although ODOT's preliminary signal warrants were not met, future conditions may warrant signalization.

<u>Cost Opinion (Option A):</u> $570,000

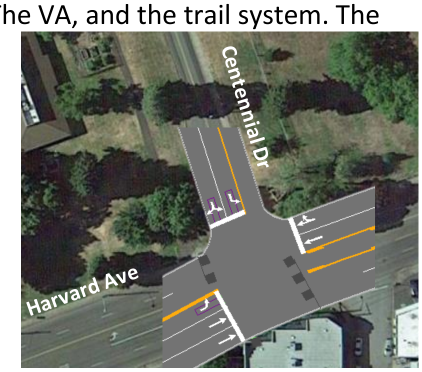
Concept R6 – Option B: Roundabout
Option B provides an alternative to signalization by installing a roundabout.

<u>Cost Opinion (Option B):</u> $940,000

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	Option B likely has right of way impacts.
Title VI and Environmental Justice	Option A would enhance pedestrian connectivity to community features.	N/A
Vehicle Miles Traveled (VMT)	Roundabouts (option B) result in less vehicular idling.	Unlikely to decrease VMT.
Bicycle Level of Traffic Stress (BLTS)	No change	No change, remains BLTS 4 on Harvard Ave
Qualitative pedestrian/ transit assessment	Pedestrian: No change Transit: No change	Pedestrian: Will remain 'fair' Transit: No change
Bicycle/Pedestrian facilities and network	Option A provides a protected crossing of Harvard Ave for pedestrians.	N/A
Vehicular transportation facilities and network	- Option A decreases queuing and the delay for southbound and northbound left-turning movement.	- Option A would increase delay for east-west traffic. - Option B would create a bottleneck at this location due to the high east-west volumes.
Transit system	N/A	N/A
Rail and freight networks	- Option A decreases queuing and the delay for southbound and northbound left-turning movement.	- Option A would increase delay for east-west traffic. - Option B would create a bottleneck at this location due to the high east-west volumes. -Option B would need to be designed to accommodate freight.
Safety	- Both options would reduce the number of broadside collisions. - Option B reduces the number of vehicular conflict points.	N/A

R7 Harvard Avenue at Centennial Drive/Stewart Park Drive Restripe southbound right-turn lane to a shared southbound left/right-turn lane

The intersection of Harvard Avenue at Centennial Drive/Stewart Park Drive serves as an access to several community features: Schools, Stewart Park, athletic fields (Fir Grove Park), The VA, and the trail system. The intersection currently operates within the City's mobility targets, with occasional queuing on the side street experienced during community events. The operations are expected to worsen as increased traffic on Harvard Avenue demands more of the traffic signal's available green time.



The proposed concept would utilize the existing right-of-way and restripe the north leg of the intersection to allow for dual southbound left-turns. Centennial Drive/Stewart Park would be striped as a southbound left and southbound left/right-turn lane. The proposed concept would provide additional capacity for the traffic leaving Centennial Drive/Stewart Park Drive and traveling east.

Cost Opinion: $76,000

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	Option B likely has right of way impacts.
Title VI and Environmental Justice	N/A	N/A
Vehicle Miles Traveled (VMT)	N/A	Unlikely to decrease VMT.
Bicycle Level of Traffic Stress (BLTS)	N/A	N/A
Qualitative pedestrian/ transit assessment	Pedestrian: N/A Transit: N/A	Pedestrian: N/A Transit: N/A
Bicycle/Pedestrian facilities and network	N/A	N/A
Vehicular transportation facilities and network	Increases the overall capacity as well as the capacity for southbound left-turning movement.	Reduces the capacity for southbound right-turning movement.
Transit system	N/A	N/A
Rail and freight networks	Increases the overall capacity as well as the capacity for southbound left-turning movement.	Reduces the capacity for southbound right-turning movement.
Safety	N/A	Creates the possibility of sideswipe collisions between dual left-turn lane traffic.

R8 Washington Avenue at Spruce Street

This two-way stop controlled intersection has seen modernization improvements in 2017, including bike lanes, curb bulb-outs, and repaving, and has become an attractive route for drivers wanting to avoid the Stephens Street/Oak Street couplet[13]. The northbound movements are congested during the PM peak hour. This intersection should continue to be monitored and may require different intersection control or access management in the future.

Concept R8 – Option A: Traffic Signal

This option would install a traffic signal to provide opportunities for the side street volumes to cross Washington Avenue. Although ODOT's preliminary signal warrants were not met, future conditions may warrant signalization. Due to the proximity of the intersection to a railroad crossing, additional analysis is required for this option.

<u>Cost Opinion (Option A):</u> $570,000

Concept R8 – Option B: Access management

This option would attempt to combat the cut-through drivers attempting to avoid the traffic signals in the Stephens Street/Oak Street couplet by eliminating the ability to make northbound movements from Spruce across or onto Washington Avenue. This would be done by creating a curb extension or bulb-out to prevent the movements and adding "No outlet" signage at the intersection of Oak Avenue and Spruce Street. Another variation of this option may be to prohibit vehicles from turning left from Oak Street onto Spruce Street, which would dramatically reduce the number of northbound vehicles at the Washington Avenue intersection.

<u>Cost Opinion (Option B):</u> $140,000

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	Option B likely has right of way impacts.
Title VI and Environmental Justice	Option A would enhance pedestrian connectivity to community features.	N/A
Vehicle Miles Traveled (VMT)	N/A	VMT could increase due to traffic rerouting, but impacts are offset by reduction in idling.
Bicycle Level of Traffic Stress (BLTS)	No change	No change, remains BLTS 3 on Washington Ave

[13] OR 138 corridor improvement project – check for details

Area of Interest	Benefits	Impacts
Qualitative pedestrian/ transit assessment	Pedestrian: No change Transit: No change	Pedestrian: Will remain 'good' Transit: No change
Bicycle/Pedestrian facilities and network	Option A provides a protected crossing of Washington Ave for pedestrians.	N/A
Vehicular transportation facilities and network	- Decreases the queuing and the delay for southbound and northbound through and left-turning movement.	- Option A disrupts the flow of traffic on Washington Ave and increases the delay for east-west traffic. - Option B would alter vehicular travel patterns to reroute traffic.
Transit system	N/A	N/A
Rail and freight networks	Increases the overall capacity as well as the capacity for southbound left-turning movement.	- Option A may create back-ups over RR crossing. - Option A disrupts the flow of traffic on Washington Ave and increases the delay for east-west traffic. - Option B would alter vehicular travel patterns to reroute traffic.
Safety	This intersection exceeds the critical crash rate and the statewide 90th percentile crash rate; crash history may not be representative of recent improvements to this intersection.	N/A

R9 Stephens Street at Washington Avenue Pedestrian Timnig

The current configuration of the signalized intersection of Stephens Street at Washington Avenue requires pedestrians traveling east-west cross multiple lanes of traffic to get to an island, and then cross more lanes. The operations of this intersection currently meet ODOT mobility targets and are expected to do so by 2040. The concept proposed at this intersection is intended to improve the pedestrian experience.

This concept extends the pedestrian time from 23 to 30 seconds for pedestrians traveling east-west.

Cost Opinion: $7,000

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	N/A
Title VI and Environmental Justice	N/A	N/A
Vehicle Miles Traveled (VMT)	N/A	Idling of vehicles could increase slightly; impacts to VMT are negligible.
Bicycle Level of Traffic Stress (BLTS)	No change	No change, remains BLTS 2 on Washington Ave at best

Area of Interest	Benefits	Impacts
Qualitative pedestrian/ transit assessment	Pedestrian: No change Transit: No change	Pedestrian: Will remain 'good' Transit: No change
Bicycle/Pedestrian facilities and network	Increases comfort and convenience for pedestrians.	N/A
Vehicular transportation facilities and network	N/A	May increase queuing and related delays, especially during peak hours.
Transit system	N/A	N/A
Rail and freight networks	N/A	May increase queuing and related delays, especially during peak hours.
Safety	Increases time for pedestrians to safely cross.	N/A

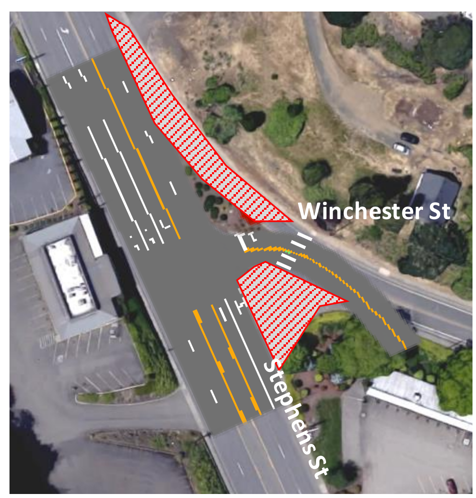
R10 Stephens Street at Winchester Street[14]

The intersection of Stephens Street at Winchester Street is a non-standard stop-controlled intersection in which all movements are free or yielding with the exception of the northbound right-turn. The intersection serves a high number of southbound left-turning vehicles in the PM peak hour as drivers often use Winchester Street as an alternate route to Stephens Street to travel downtown and to Diamond Lake Boulevard. Driver behavior has not changed since the improvements of the OR 138 Solutions Project.

Although the traffic operations currently meet and are expected to meet mobility targets by 2040, the configuration is not friendly to pedestrians and there is a trend in the crash history that indicates a high number of rear end collisions for northbound vehicles where Winchester Street connects to Stephens Street. Currently there are no pedestrian crossings of either Stephens Street or Winchester Street at this intersection. Two concepts were developed.

Concept R10 – Option A: Realign intersection to a T-intersection

This option realigns the Winchester Street approach to Stephens Street and utilizes STOP-control for the side street. The realignment would improve visibility of bicyclists and pedestrians, and more clearly define routes and a Winchester Street crossing for bicyclists and pedestrians. The realignment would also improve sight distance for northbound drivers along Winchester Street as they turn to join northbound Stephens Street vehicles, however the stopped movement of



Option A

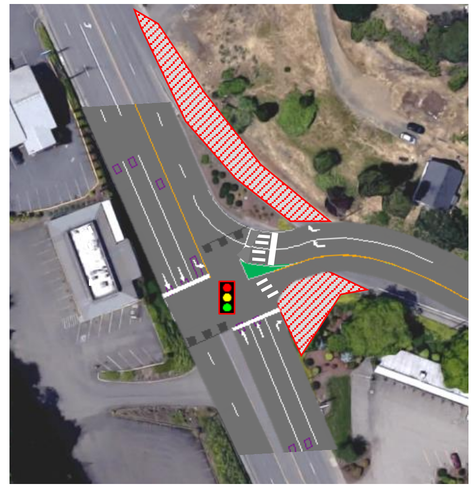
[14] The intersection of Stephens Street and Winchester Street was identified for upgrades in the Diamond Lake Urban Renewal Plan.

these vehicles would cause the intersection to exceed applicable mobility targets unless travel patterns change.

Cost Opinion (Option A): $850,000

Concept R10 – Option B: Signalize, realign and provide dual westbound right turns

This option would realign the Winchester Street approach to Stephens Street and signalize the intersection. Traffic volumes would benefit from dual westbound right turn lanes to serve the previously free-flow movement. The realignment would improve sight distance for northbound drivers along Winchester Street as they merge with northbound Stephens Street vehicles, improve visibility of bicyclists and pedestrians, and more clearly define routes and crossings for bicyclists and pedestrians, across both Stephens Street and Winchester Street. Preliminary signal warrants are met at this intersection. This option should be analyzed further to determine levels of congestion related to truck acceleration and deceleration at this intersection.



Option B

Cost Opinion (Option B): $1.3 million

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	Both options impact existing right of way and repurpose existing pavement.
Title VI and Environmental Justice	Protected pedestrian crossings benefit Title VI and Environmental Justice populations.	N/A
Vehicle Miles Traveled (VMT)	N/A	Unlikely to decrease VMT.
Bicycle Level of Traffic Stress (BLTS)	No change	No change, remains BLTS 3 at best
Qualitative pedestrian/ transit assessment	Pedestrian: May improve to ‘good’ at intersection Transit: No change	Pedestrian: N/A Transit: No change
Bicycle/Pedestrian facilities and network	Options A and B improve visibility of pedestrians and bicyclists and provides more clearly defined routes.	N/A
Vehicular transportation facilities and network	- Options A and B improve the sight distance vehicles traveling from Winchester St north to Stephens St. - Option B provides additional capacity for westbound right-turn movement	- Option A would not meet mobility targets.
Transit system	N/A	N/A

Area of Interest	Benefits	Impacts
Rail and freight networks	- Options A and B improve the sight distance vehicles traveling from Winchester St north to Stephens St. - Option B provides additional capacity for westbound right-turn movement	- Option A would not meet mobility targets.
Safety	Options B and C reduce the likelihood of northbound angle collisions.	N/A

R11 Fulton Street or Lake Street at Diamond Lake Boulevard[15, 16] Traffic Control

At this intersection, Diamond Lake Boulevard is a five-lane cross-section with a posted speed of 35 mph. Fulton Street is a two-lane road where traffic must cross Diamond Lake Boulevard at a two-way stop controlled intersection. Conversations with the City and stakeholders indicated future opportunities for redevelopment near this intersection and a need for safe pedestrian crossings of Diamond Lake Blvd.

This concept would install a traffic signal at Fulton Street at Diamond Lake Boulevard to provide a protected pedestrian crossing of Diamond Lake Blvd and anticipate future development. Although the preliminary signal warrants are not met at this location, future traffic demand may warrant a change in traffic control.[17]

Cost Opinion: $570,000

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	N/A
Title VI and Environmental Justice	Protected pedestrian crossings benefit Title VI and Environmental Justice populations.	N/A
Vehicle Miles Traveled (VMT)	N/A	Unlikely to decrease VMT.
Bicycle Level of Traffic Stress (BLTS)	No change	No change, remains BLTS 4 on Diamond Lake Blvd

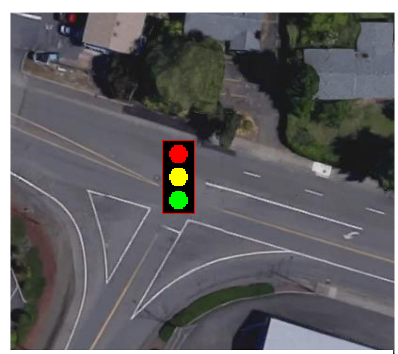
[15] Alternatively, the traffic control proposed in concept R11 can be instead installed at the intersection of Diamond Lake Boulevard and Lake Street.
[16] The intersection of Diamond Lake Boulevard at Fulton St or Lake St was identified for upgrades in the Diamond Lake Urban Renewal Plan.
[17] A roundabout could also be evaluated here although a signal is preferred for the purpose of providing protected pedestrian crossings.

Area of Interest	Benefits	Impacts
Qualitative pedestrian/ transit assessment	Pedestrian: May improve from 'fair' to 'good' at intersection Transit: No change	Pedestrian: N/A Transit: No change
Bicycle/Pedestrian facilities and network	Provides a protected crossing of Diamond Lake Blvd.	
Vehicular transportation facilities and network	Decreases the queuing and the delay for southbound and northbound through and left-turn movements.	Disrupts the flow of traffic on Diamond Lake Blvd and increases the delay for east-west traffic.
Transit system	N/A	N/A
Rail and freight networks	Decreases the queuing and the delay for southbound and northbound through and left-turn movements.	Disrupts the flow of traffic on Diamond Lake Blvd and increases the delay for east-west traffic.
Safety	Does not specifically address a documented safety concern, but has safety benefits for bicycles and pedestrians.	Traffic signals can increase the occurrence of rear end collisions.

R12 Harvard Avenue at Lookingglass Road

At this intersection, the northbound left-turn is stop-controlled while all other movements are free or yielding. By 2040, the increase in traffic volumes on Harvard Avenue is expected to cause the northbound left-turn to exceed the City's LOS standard of D with a v/c of 0.20 and a LOS F. This movement has low traffic volumes, but will have to wait for over a minute to make a turn across Harvard Avenue traffic. The proposed concept should be considered as development to the west and south of this intersection occur.

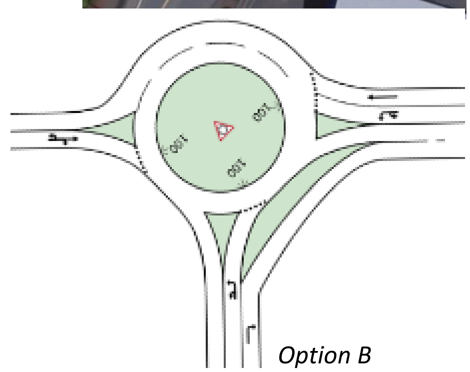
Concept R12 – Option A: Install a traffic signal
This concept would install a traffic signal to address the northbound left-turn operations. Preliminary signal warrants are not met at this location and it is unlikely that future traffic demand may warrant a signal.



Cost Opinion (Option A): $570,000

Concept R12 – Option B: Install a roundabout with a westbound bypass lane
This concept would install a roundabout with a westbound through bypass lane at Harvard Avenue and Lookingglass Road. This configuration would keep traffic moving and provide opportunity for all movements to move freely.

Cost Opinion (Option B): $1.4 million



Option B

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	N/A
Title VI and Environmental Justice	Option A protected pedestrian crossings benefits Title VI and Environmental Justice populations	N/A
Vehicle Miles Traveled (VMT)	N/A	Unlikely to decrease VMT.
Bicycle Level of Traffic Stress (BLTS)	No change	No change, remains BLTS 4 on Harvard Ave
Qualitative pedestrian/ transit assessment	Pedestrian: May improve from 'poor' to 'good' at intersection Transit: No change	Pedestrian: N/A Transit: No change
Bicycle/Pedestrian facilities and network	Option A provides a protected crossing of Harvard Ave for pedestrians.	N/A
Vehicular transportation facilities and network	Options A and B decrease the queuing and the delay for northbound left-turn movement	Option A disrupts the flow of traffic on Harvard Ave and increases the delay for east-west traffic.
Transit system	N/A	N/A
Rail and freight networks	Options A and B decrease the queuing and the delay for northbound left-turn movement	Option A disrupts the flow of traffic on Harvard Ave and increases the delay for east-west traffic.
Safety	- Option A would have a greater safety benefit for bicycles and pedestrians. - Option B reduces the number of vehicular conflict points.	Option A: Traffic signals can increase the occurrence of rear end collisions.

R13 Harvard Avenue Bridge to Charter Oaks Drive and Charter Oaks and Troost Street Improvements

This concept would construct a new bridge to carry Harvard Avenue across the South Umpqua River, forming a new connection with Charter Oaks Drive. With this new bridge connection, improvements to Charter Oaks Drive and Troost Street would formalize this route as an alternative to Stewart Parkway for north-south travel between Garden Valley Boulevard and Harvard Avenue in west Roseburg.

Cost Opinion: $29 million

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	This concept would span the South Umpqua River, likely having impacts on sensitive lands and lands within the 100-year floodplain.

Area of Interest	Benefits	Impacts
Title VI and Environmental Justice	Improved vehicle, bicycle, and pedestrian connectivity benefits Title VI and Environmental Justice populations.	N/A
Vehicle Miles Traveled (VMT)	N/A	Unlikely to decrease VMT.
Bicycle Level of Traffic Stress (BLTS)	BLTS improves from BLTS 3 to BLTS 1 or 2, depending on design.	N/A
Qualitative pedestrian/ transit assessment	Pedestrian: Could be ‘good’ or ‘excellent’ depending on design. Transit: No change	Pedestrian: N/A Transit: No change
Bicycle/Pedestrian facilities and network	Increases river crossing opportunities for cyclists and pedestrians.	Concept may increase vehicle volumes on routes where improvements are made, creating a more uncomfortable environment for cyclists.
Vehicular transportation facilities and network	Provides increased connectivity for vehicle travel.	N/A
Transit system	May provide opportunities for new routing.	N/A
Rail and freight networks	Provides increased connectivity for vehicle travel.	N/A
Safety	N/A	N/A

R14 Stewart Park Drive Bridge Replacement

The City has identified the repair of the Stewart Park Drive Bridge as a need and has been awarded a grant to fund the planned improvements. This project is programmed for completion in 2022. The City sees this as a temporary fix and the bridge would eventually need to be replaced to include enhanced bicycle and pedestrian facilities. This project would replace the existing two-lane structure with a modernized structure that accommodates vehicular, bicycle and pedestrian traffic.

Cost Opinion: $30-35 million

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	Could potential use existing footings.	This concept would span the South Umpqua River, likely having impacts on sensitive lands and lands within the 100-year floodplain.
Title VI and Environmental Justice	Improved vehicle, bicycle, and pedestrian connectivity benefits Title VI and Environmental Justice populations.	N/A
Vehicle Miles Traveled (VMT)	N/A	Unlikely to decrease VMT.

Area of Interest	Benefits	Impacts
Bicycle Level of Traffic Stress (BLTS)	BLTS improves from BLTS 3 to BLTS 1 or 2, depending on design.	N/A
Qualitative pedestrian/ transit assessment	Pedestrian: Could be 'good' or 'excellent' depending on design. Transit: No change	Pedestrian: N/A Transit: No change
Bicycle/Pedestrian facilities and network	Improves river crossing opportunities for cyclists and pedestrians.	N/A
Vehicular transportation facilities and network	Provides enhanced/secure connectivity for vehicle travel.	N/A
Transit system	May provide opportunities for new routing.	N/A
Rail and freight networks	New bridge would not have existing weight restrictions.	N/A
Safety	Improved structure benefits safety and resiliency.	N/A

R15 Edenbower Northbound Receiving Lanes Extension at Stewart Parkway and Edenbower

This concept would extend the northbound receiving lanes at the intersection of Stewart Parkway and Edenbower Boulevard in order to better accommodate vehicles performing the eastbound left turn movements from the dual eastbound left turn lanes on Stewart Parkway. Extending the receiving lanes would facilitate smoother operations and decrease delays at this intersection.

Cost Opinion: $460,000

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	Might have right of way impacts as widening of Edenbower Blvd is necessary to accommodate lane extension.
Title VI and Environmental Justice	N/A	N/A
Vehicle Miles Traveled (VMT)	N/A	Unlikely to decrease VMT.
Bicycle Level of Traffic Stress (BLTS)	No change	No change, will remain at BLTS 3.
Qualitative pedestrian/ transit assessment	Pedestrian: No change Transit: No change	Pedestrian: No change Transit: No change
Bicycle/Pedestrian facilities and network	N/A	N/A

Area of Interest	Benefits	Impacts
Vehicular transportation facilities and network	Could improve lane imbalance and queuing for travelers on Stewart Pkwy making the dual eastbound left-turn onto Edenbower Blvd.	N/A
Transit system	N/A	N/A
Rail and freight networks	Could improve lane imbalance and queuing for travelers on Stewart Pkwy making the dual eastbound left-turn onto Edenbower Blvd.	N/A
Safety	Would facilitate improved vehicle movement and reduce vehicle backups at the intersection.	N/A

R16 Roadway Connections and Extensions

This concept proposes new street connections and extensions to provide improved connectivity citywide. Nine options are summarized below.

Concept R16 – Option A: NW Hill extension

This concept would extend NW Hill between Stewart Parkway and Mulholland Drive to provide a parallel route to Garden Valley Boulevard.

Cost Opinion (Option A): $10 million

Concept R16 – Option B: Rifle Range Street connection

This concept would construct a new bridge to carry Rifle Range Street over Deer Creek in order to connect Rifle Range between Douglas Avenue and Oakbriar Avenue.

Cost Opinion (Option B): $3.2 million

Concept R16 – Option C: Fulton Street Connection

This concept would construct a new bridge to carry Fulton Street over Deer Creek in order to connect Fulton between Douglas Avenue and the current south end of Fulton.

Cost Opinion (Option C): $4.7 million

Concept R16 – Option D: Full Connection between Sunset Street and Parker Road

This concept would construct a new full street connection between the current north end of Sunset Street and the current south end of Parker Road.

Cost Opinion (Option D): $3.0 million

Concept R16 – Option E: Commercial Avenue extension

This concept would extend Commercial Avenue between Fulton Street and Rifle Range Street to provide a parallel route to Diamond Lake Boulevard.

Cost Opinion (Option E): $3.1 million

Concept R16 – Option F: Klamath Avenue extension
This concept would extend Klamath Avenue between Fulton Street and Rifle Range Street to provide a parallel route to Diamond Lake Boulevard.

Cost Opinion (Option F): $2.7 million

Concept R16 – Option G: Medical Park Drive extension
This concept would extend Medical Park Drive between Garden Valley Boulevard and the current south end of Medical Park Drive to provide a parallel route to Stewart Parkway.

Cost Opinion (Option G): $5.0 million

Concept R16 – Option H: Forest Glen Lane extension
This concept would improve and extend Forest Glen Lane between N Bank Road and Weyerhaeuser Drive to provide a parallel route to Stephens Street.

Cost Opinion (Option H): $7.4 million

Concept R16 – Option I: Edenbower Boulevard extension
This concept would and extend Edenbower Boulevard between Stephens Street and Hughes Street to provide a parallel route to Newton Creek Road.

Cost Opinion (Option I): $6.5 million

Area of Interest	Benefits	Impacts
Natural and historic resources conflicts	N/A	Roadway alignments yet to be determined. ROW impacts likely.
Title VI and Environmental Justice	Could improve multi-modal access to transportation disadvantaged communities.	N/A
Vehicle Miles Traveled (VMT)	N/A	Unlikely to decrease VMT.
Bicycle Level of Traffic Stress (BLTS)	New roads would meet City standards and likely result in BLTS 2 rating, at a minimum.	N/A
Qualitative pedestrian/ transit assessment	Pedestrian: New roads would meet City standards and result in 'good' rating, at a minimum. Transit: No change	Pedestrian: N/A Transit: No change
Bicycle/Pedestrian facilities and network	May increase pedestrian and bike connectivity.	Concept may increase vehicle volumes on extended routes, creating a more uncomfortable environment for cyclists.

Area of Interest	Benefits	Impacts
Vehicular transportation facilities and network	Provides increased connectivity for vehicle travel.	N/A
Transit system	May provide opportunities for new routing.	N/A
Rail and freight networks	Provides increased connectivity for vehicle travel.	N/A
Safety	N/A	N/A

Goals and Objectives Evaluation

In addition to evaluating the potential benefits and impacts, each concept was qualitatively evaluated against the goals and objectives established at the beginning of the Roseburg TSP Update. The evaluation criteria are summarized in Table 7 and the results of the evaluation for each concept follow in Table 8.

TABLE 7. EVALUATION CRITERIA

Criteria	Goal Description	Rating	
Mobility	**Enhance mobility for users of all transportation modes** ▪ *Transit*: Increase the number of destinations that can be reached by transit and/or reduce transit journey times. ▪ *Bicycle and Pedestrian*: Improve bicycle and pedestrian circulation within and between neighborhoods and commercial centers and/or reduce bicycle and pedestrian travel times. ▪ *Roadway*: Maintain or improve existing facilities to current design standards and/or address gaps in the street network that prevent reasonably direct travel. ▪ *Emergency Services*: Maintain or improve emergency vehicle response times.	+	Enhances the mobility of users of one or more of the modes shown in the Goal Description (at left) and does not reduce the mobility of users of other modes
		/	Significantly enhances the mobility of users of one or more of the modes at the expense of that of another mode; the reduction in the mobility of this other mode must only be to a degree deemed acceptable
		-	Reduces the mobility of users of one or more of the modes to a degree deemed unacceptable
		N/A	Project has no effect on mobility for any mode
Cost	**Prioritize projects that are most cost-effective at meeting the City's transportation goals**	+	Project is cost effective given potential alternatives
		/	Project is more cost effective than some alternatives
		-	Project is not cost effective
		N/A	Project's cost effectiveness is difficult to determine or has not yet been evaluated
Safety	**Increase safety and security for users of all transportation modes**	+	Fully addresses a known safety/security issue or has high potential to greatly increase safety for users of one or more modes
		/	Addresses a known safety/security issue of moderate concern or the proposed project will provide moderate transportation safety benefits
		-	Reduces safety/security for users of one or more modes

Criteria	Goal Description	Rating	
		N/A	Project has no effect on safety/security for users of all modes
Land Use	**Coordinate land use and transportation decision making**	+	Project complements and supports surrounding existing and planned development
		-	Project adversely impacts surrounding existing and planned development
		N/A	Project has no impact on surrounding existing and planned development
Environmental Effects	**Reduce negative environmental impacts associated with use of the transportation system (e.g., air and water pollution, disruption of natural resources, and noise)**	+	Has high potential to greatly reduce negative environmental impacts
		/	Has potential to provide moderate environmental benefits
		-	Has high potential to increase negative environmental impacts
		N/A	Project has no effect on environmental impacts related to use of the transportation system
Effect on Transportation Disadvantaged Populations	**Increase the mobility and accessibility afforded to transportation disadvantaged users and minimize negative externalities that disproportionately affect transportation disadvantaged populations (e.g., youth, older adults, persons with limited English proficiency or with disabilities, and no-vehicle households)**	+	Nature and/or location of project creates high potential for significant enhancement of mobility for transportation disadvantaged populations
		/	Nature and/or location of project creates potential for moderate enhancement of mobility for transportation disadvantaged populations
		-	Nature and/or location of project creates high potential for a reduction of mobility for transportation disadvantaged populations and/or negative externalities that negatively impact these populations
		N/A	Project has no impact on transportation disadvantaged populations
Economic Vitality	**Maintain or improve access to local businesses and places or employment and facilitate regional movement of people, goods, and services**		
		+	Has high potential to greatly enhance access to local businesses and places of employment and/or mobility of freight regionally
		/	Has potential to enhance access to local businesses and places of employment and/or mobility of freight regionally
		-	Has high potential to reduce access to local businesses and places of employment and/or mobility of freight regionally
		N/A	Project has no effect on access to local businesses and places of employment and/or mobility of freight regionally

Criteria	Goal Description	Rating	
Promotes a Balanced System Among Modes	**Prioritize a multimodal transportation system that meets the diverse needs of many different users and uses**	+	Fully addresses a known gap in the City's street, transit, or bicycle and pedestrian network or significantly improves connections between two or more modes
		/	Mitigates the impacts associated with an identified gap in the City's street, transit, or bicycle and pedestrian network or moderately improves connections between two or more modes
		-	Creates obstacles to increased connectivity of the City's street, transit, or bicycle and pedestrian network or diminishes connections between two or more modes
		N/A	

TABLE 8. EVALUATION OF POTENTIAL CONCEPTS

Concept	Mobility	Cost	Safety	Land Use	Environmental Effects	Title VI/ Environmental Justice	Economic Vitality	Balanced System
BICYCLE & PEDESTRIAN								
BP1: Roseburg Streets								
Bicycle Route wayfinding and pavement marking	+	+	/	+	/	+	+	/
BP2: Douglas Avenue								
Bike facilities and sidewalks	+	/	+	N/A	/	+	/	/
BP3: Garden Valley Boulevard								
Widened shared use sidewalks	/	/	/	N/A	/	+	+	/
BP4: Stephens Street								
Bike lanes	/	/	/	N/A	/	/	/	/
BP5: West Harvard Avenue								
Widened shared use sidewalk	+	/	/	N/A	/	+	/	/
BP6: Downtown Roseburg								
S Umpqua River multi-use path sharrow connections	+	+	/	N/A	/	+	/	/
BP7: South Umpqua River								
Multi-Use path and Portland Ave crossing	+	N/A	/	+	+	+	+	+
BP8: Fulton Street								
Sidewalks and bicycle facilities	+	/	/	+	+	+	+	+
BP9: Ramp Road								
Sidewalks	/	/	N/A	/	+	/	/	+
BP10: Pine Street								
Sidewalks	/	-	/	N/A	N/A	/	N/A	/
BP11: Main Street								
Sidewalks and bicycle facilities	/	+	/	N/A	/	+	/	/
BP12: Mosher Avenue								
Bicycle facilities and railroad crossing improvements	/	+	/	N/A	/	/	/	/
BP13: Burke Street/Roberts Avenue								
Sharrows	/	+	/	N/A	/	/	/	/
BP14: Jackson Street								
Sharrows	/	+	/	N/A	/	/	/	/

TABLE 8. EVALUATION OF POTENTIAL CONCEPTS

Concept	Mobility	Cost	Safety	Land Use	Environmental Effects	Title VI/ Environmental Justice	Economic Vitality	Balanced System
BP15: Stewart Parkway								
Multi-use Path	/	-	N/A	N/A	+	/	N/A	+
BP16: Trail Wayfinding and Connections on Existing Infrastructure								
Trail wayfinding and connections	+	+	/	N/A	/	+	+	+
BP17: Garden Valley Boulevard and Stephens Street								
Transit stops	/	/	/	-	N/A	/	/	/
BP18: Calkins Avenue								
Sharrows	+	+	/	+	/	/	/	/
BP19: Garden Valley Boulevard								
Midblock Crossing	+	/	/	N/A	N/A	/	/	/
BP20: Diamond Lake Boulevard, Garden Valley Boulevard, and Harvard Avenue								
Further study	N/A	+	+	N/A	N/A	/	N/A	N/A
BP21: Citywide								
New multi-use paths	+	/	+	+	/	+	+	+
BP22: Garden Valley Boulevard/VA Campus								
New multi-use path or 2-way cycle track connection	+	/	+	+	/	+	+	+
TRANSIT								
T1: Purchase of Additional Buses	N/A	N/A	N/A	N/A	+	N/A	N/A	+
T2: New Transit Center	+	N/A	+	+	/	+	+	+
T3: New Maintenance Facility	N/A	N/A	N/A	-	/	N/A	N/A	-
T4: Stop Amenities	N/A	N/A	+	+	/	+	/	+
T5: Increased Frequencies	+	N/A	N/A	N/A	+	+	+	+
T6: New Routes	+	N/A	N/A	N/A	+	+	+	+
T7: Transit ITS	/	N/A	N/A	N/A	/	/	/	/
T8: Additional Dial-a-Ride Service and Increased Integration with Fixed Route	+	N/A	N/A	N/A	/	+	/	/
ROADWAY								
R1: Stewart Pkwy at Aviation Dr/ Mulholland Dr								

TABLE 8. EVALUATION OF POTENTIAL CONCEPTS

Concept	Mobility	Cost	Safety	Land Use	Environmental Effects	Title VI/ Environmental Justice	Economic Vitality	Balanced System
A: Dedicated southeast right-turn lane	/	/	/	+	-	-	+	-
B: Dedicated southeast right-turn lane and flashing yellow left-turn arrows	/	+	+	+	-	-	+	-
C: *Dedicated southeast right-turn lane and realign intersection*	/	/	+	/	-	-	+	-
R2: Garden Valley Blvd at Stewart Pkwy								
Dual eastbound and westbound left-turn lanes	/	/	+	+	-	-	+	-
R3: Stewart Pkwy at Valley View Dr								
Prohibit eastbound left-turns out of Valley View Dr and - Provide for southbound U-turn south on Stewart Pkwy, or - Add signage to direct drivers to Kline St	/	+	+	+	/	N/A	N/A	/
R4: Stewart Pkwy at Stephens St								
A: Dual northbound left-turn	/	+	-	+	-	-	+	-
B: Dedicated westbound and southbound right-turn lanes	/	+	-	+	-	-	+	-
R5: Garden Valley Blvd at Stephens St								
Dual eastbound left-turn lanes, dedicated southbound and northbound right-turn lanes	+	/	/	-	-	-	+	-
R6: Harvard Ave at W Broccoli St								
A: Traffic signal (monitor intersection; preliminary signal warrants are not met)	+	+	/	+	/	+	+	/
B: Single Lane Roundabout	/	/	/	-	-	+	+	/
R7: Harvard Ave at Centennial Dr								
Restripe southbound right-turn lane to a shared southbound left/right-turn lane (to provide a second southbound left-turn lane)	+	+	/	+	/	N/A	/	/
R8: Washington Ave at Spruce St								
A: Signalize (monitor intersection; preliminary signal warrants are not met)	+	/	/	N/A	/	+	/	/
B: Access management (prohibit northbound traffic or prohibit eastbound left-turn at Spruce/Oak)	/	+	/	N/A	/	N/A	N/A	/

TABLE 8. EVALUATION OF POTENTIAL CONCEPTS

Concept	Mobility	Cost	Safety	Land Use	Environmental Effects	Title VI/ Environmental Justice	Economic Vitality	Balanced System
R9: Stephens St at Washington Ave								
Extend pedestrian timing to 30 seconds to get pedestrians across northbound and southbound through lanes	/	+	+	+	N/A	+	/	+
R10: Stephens St at Winchester St								
A: Realign to T-Intersection	+	/	/	+	-	/	/	/
B: Signalize, realign and provide dual WBR	+	/	/	+	-	+	/	+
R11: Fulton St or Lake St at Diamond Lake Blvd								
Signalize (monitor intersection; preliminary signal warrants are not met): Improve opportunities for protected crossing of Diamond Lake Blvd	/	/	/	+	/	+	/	+
R12: Harvard Ave at Lookingglass Rd								
A: Traffic signal (monitor intersection; preliminary signal warrants are not met)	/	/	/	+	-	+	/	+
B: Single Lane Roundabout with bypass lane	+	/	/	+	-	+	/	+
R13: Harvard Ave, Charter Oaks Dr, Troost St								
New bridge connection and street improvements	+	/	/	/	-	+	/	+
R14: Stewart Park Drive Bridge								
Bridge repair								
R15: Stewart Pkwy and Edenbower Blvd								
Extension of northbound receiving lanes	/	+	/	/	-	/	/	/

TECHNICAL MEMORANDUM #5: APPENDIX A

DATE: July 1, 2019

TO: City of Roseburg, Oregon Department of Transportation, Region 3

FROM: Angela Rogge, PE, Shelly Alexander, PE David Evans and Associates, Inc.

SUBJECT: Roseburg Transportation System Plan Update (TSP)
Task 7.3 Concept Transportation System Operational Analysis

This appendix to *Technical Memorandum #5: Develop Multimodal System Project Concepts* identifies the intersection locations and concepts that require further traffic operations analysis. The content of this document focuses solely on identifying potential concepts requiring additional traffic analysis with emphasis on locations exceeding, or expected to exceed, the applicable City or ODOT mobility targets. **Note: The development of draft concepts is an iterative process. The project IDs in this appendix may not match the IDs in the final *Technical Memorandum #5.* This appendix notes where project IDs have changed, or if a concept was dropped from consideration for the TSP.**

Identification of Deficiencies

The project team identified the intersections requiring additional operational analysis with input from three main sources:

- Study area analysis (Technical Memoranda #3 and #4)
- Stakeholders (via committee meetings and public open house)
- Previous Plans (such as the 2006 TSP and Capital Improvement Plan)

Development of Concepts

The concepts listed in this appendix are focused on addressing the vehicular operational deficiencies. *Technical Memorandum #5: Develop Multimodal System Project Concepts* will include a variety of concepts to improve vehicular and multimodal connectivity, enhance public safety, efficiently manage the existing system and reduce vehicular demand.

There are 13 locations identified for operational analysis, as shown in Figure 1. Table 1 briefly summarizes the operational deficiencies, potential concepts, and resulting operations, which is followed by a more detailed narrative. The analysis worksheets are also attached and provide specific information on the assumed geometric configurations, traffic control, and peak hour turning movement volumes[1].

[1] Source: 2040 Baseline PM Peak Hour turning movement volumes *(Technical Memorandum 4)*

Figure 1
Roadway Operational Concepts

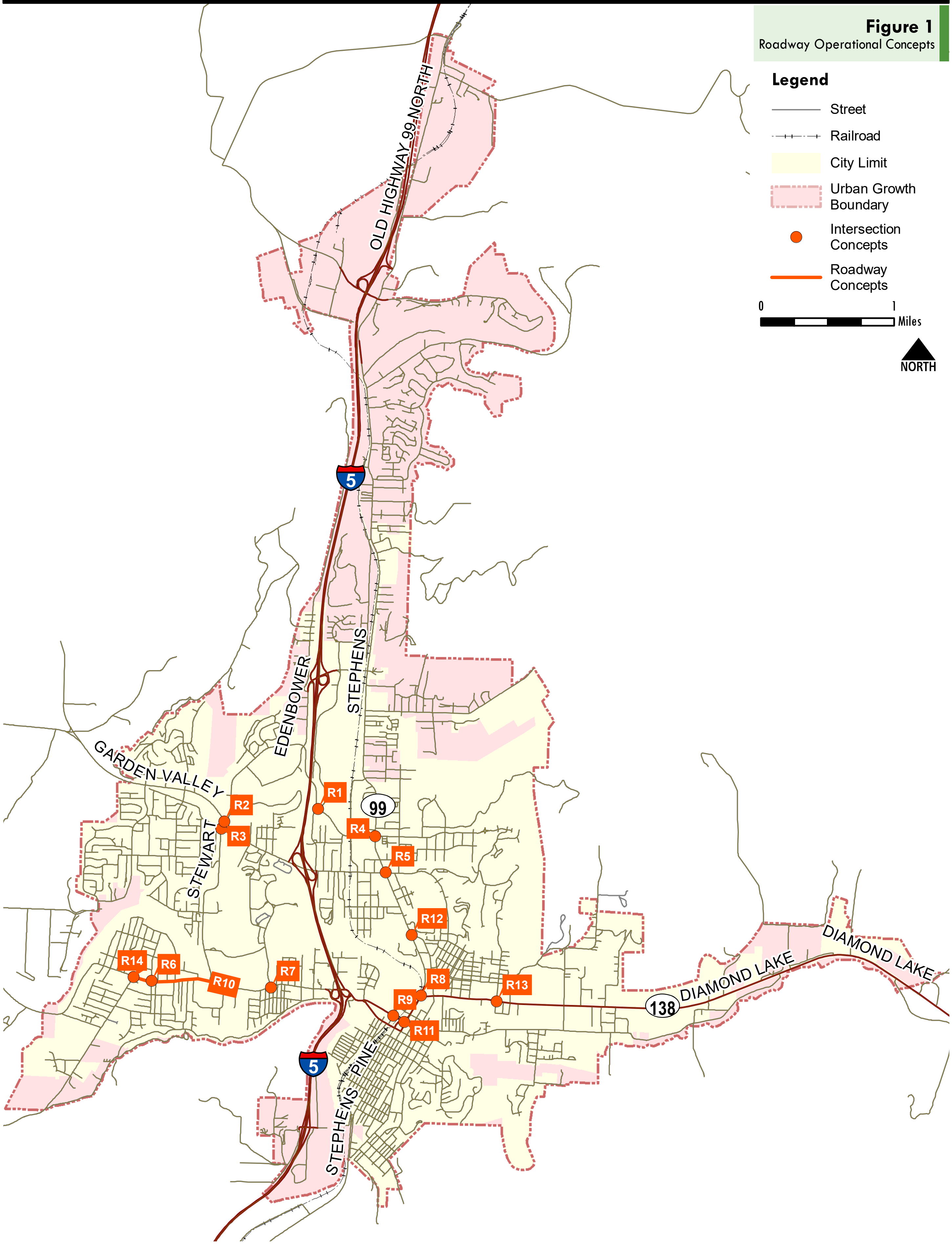


TABLE 1. TRANSPORTATION OPERATIONAL CONCEPTS

ID	Location	Identified Deficiency	Potential Concept	Critical Movement[1]	V/C, LOS[2] Existing	V/C, LOS[2] Future No Build	V/C, LOS[2] Future Mitigated
R1	Stewart Pkwy at Aviation Dr/ Mulholland Dr	• 2040 Operations • Critical crash rate	Option A: Dedicated southeast right-turn lane Option B: Dedicated southeast right-turn lane and flashing yellow left-turn arrows	Overall	0.43, A	**0.86, C**	Option A: 0.75, B Option B: 0.80, B
R2	Garden Valley Blvd at Stewart Pkwy	• 2040 Operations • Critical crash rate	Dual eastbound and westbound left-turn lanes (remove permitted phasing)	Overall	0.74, C	**1.09, E**	**0.94, D[3]**
R3	Stewart Pkwy at Valley View Dr	• 2040 Operations • Crash rate and critical crash rate	Prohibit eastbound left-turns out of Valley View Dr and - Provide for southbound U-turn south on Stewart Pkwy, or - Add signage to direct drivers to Kline St	EB L	0.46, E	**1.27, F**	*EB R[1]*: 0.27, C
R4	Stewart Pkwy at Stephens St	2040 Operations	Option A: Dual northbound left-turn Option B: Dedicated westbound and southbound right-turn lanes	Overall	0.62, C	**0.91, D**	Option A: 0.80, D Option B: 0.82, D
R5	Garden Valley Blvd at Stephens St	2040 Operations	Cycle length to 120 sec, dual eastbound left-turn lanes, dedicated southbound and northbound right-turn lanes	Overall	0.79, D	**1.10, F**	0.84, D
R6	Harvard Ave at W Broccoli St	2040 Operations	Option A: Traffic signal (monitor intersection; preliminary signal warrants are not met) Option B: Single Lane Roundabout	SB LTR	0.31, C	**1.18, F**	Option A: *Overall[1]* - 0.43, B **Option B: *East Leg[1]* - 1.05, F**
R7	Harvard Ave at Centennial Dr	• 2040 Operations • Side street "event" queuing	Restripe southbound right-turn lane to a shared southbound left/right-turn lane *(to provide a second southbound left-turn lane)*	Overall	0.57, A	**0.93, D**	0.78, C

TABLE 1. TRANSPORTATION OPERATIONAL CONCEPTS

ID	Location	Identified Deficiency	Potential Concept	Critical Movement[1]		V/C, LOS[2] Existing	Future No Build	Future Mitigated
R8*	Diamond Lake Blvd at Stephens St	2040 Operations	Dual southbound left-turn lanes *Note: This was removed from consideration of the TSP as it requires significant structural and environmental impacts	Overall		0.55, C	**0.99, D**	0.82, C
R9 *R8 in TM5*	Washington Ave at Spruce St	Existing and 2040 Operations	Option A: Signalize (monitor intersection; preliminary signal warrants are not met) Option B: Access management (prohibit northbound traffic or prohibit eastbound left-turn at Spruce/Oak)	NB L/T WB L/T		0.90, F --, A	**1.30, F** **--, A**	Option A: *Overall*[1] - 0.72, B Option B: *SBTR*[1] - 0.27, C
R10*	Harvard Ave: Stewart Pkwy to Lookingglass Rd	Multimodal connectivity	Three lane cross-section of Harvard Ave from Stewart Pkwy (#42) to Lookingglass Rd (#40) to allow for bicycle lanes on Harvard Ave, including Broccoli St (#41) *Note: This option does not meet mobility targets and was dropped from consideration of the TSP	#40	NB L	0.06, D	**0.20, F**	**0.23, F**
				#41	SB LTR	0.31, C	**1.18, F**	**1.63, F**
				#42	Overall	0.64, C	0.81, C	**1.11, E**
R11 *R9 in TM5*	Stephens St at Washington Ave	• Pedestrian timing • Safety	Extend pedestrian timing to 30 seconds to get pedestrians across northbound and southbound through lanes.	Overall		0.63, B	0.79, B	0.79, B
R12* *R10 in TM5*	Stephens St at Winchester St	• Safety • Queuing	Option A: Directional signage to Downtown Roseburg and formalized turn lanes on Stephens side streets Option B: Realign to T-Intersection Option C: Signalize, realign and provide dual WBR Option D: Jug handle SBL to EBT and signalize *Note: Options A and D not preferred, were dropped from consideration of the TSP	SB L		0.66, C	0.75, C	Option A: *SBL*[1] - 0.75, C **Option B: *SBL*[1] - 1.47, F** Option C: *Overall*[1] - 0.82, B Option D: *Overall*[1] - 0.82, C
R13; *R11 in TM5*	Fulton St at Diamond Lake Blvd	• Safety • Multimodal connectivity	Signalize (monitor intersection; preliminary signal warrants are not met): Improve opportunities for protected crossing of Diamond Lake Blvd	SB LTR EB L		0.16, C 0.03, A	0.35, E 0.04, A	*Overall*[1]: 0.47, A

TABLE 1. TRANSPORTATION OPERATIONAL CONCEPTS

ID	Location	Identified Deficiency	Potential Concept	Critical Movement[1]	V/C, LOS[2]		
					Existing	Future No Build	Future Mitigated
R14; *R12 in TM5*	Harvard Ave at Lookingglass Rd	• 2040 Operations	Option A: Traffic signal (monitor intersection; preliminary signal warrants are not met) Option B: Single Lane Roundabout with bypass lane	NB L	0.06, D	**0.20, F**	Option A: *Overall*[1] – 0.65, B Option B: *East Leg*[1] - 0.49, A

Shaded cells exceed applicable mobility targets; Acronyms: EB = eastbound; WB = westbound; NB = northbound; and SB = southbound. L = left; T = through; and R = right.

1. Results are reported for the worst operating movements that must stop or yield the right of travel to other traffic flows. For signalized intersections, the overall operations are reported.
2. The v/c ratios and LOS are based on the results of the macrosimulation analysis using Synchro, which does not account for the influence of adjacent intersection operations.
3. This intersection is still expected to exceed the City's v/c mobility target

R1: Stewart Parkway at Aviation Drive/Mulholland Drive

The intersection of Stewart Parkway at Aviation Drive/Mullholland Drive serves as access to several businesses and the Roseburg Airport. Mulholland Drive also provides access to the Garden Valley Boulevard interchange to I-5. Although congestion is not currently a concern, the intersection is expected to operate at a v/c of 0.86 and LOS C by 2040, which exceeds the City's dual standard of v/c no worse than 0.85 and LOS D or better. The eastbound traffic on Stewart Parkway is approaching capacity.

The crash history at this intersection revealed a pattern of left-turning related collisions and a higher than average crash rate when compared to other similar study area intersections. The majority of the crashes occurred when vehicles traveling southeast on Stewart Parkway attempted to turn left onto Aviation Drive, failing to yield the right-of-way to oncoming traffic. Two options were developed at this intersection to address the operational and safety concerns.[2]

Concept R1 – Option A: Dedicated southeast right-turn lane

Option A would add a dedicated southeast right-turn lane from Stewart Parkway to Mulholland Drive to serve the high volume of right-turning vehicles. This option addresses the operational deficiency, but does not address the safety concern.

Concept R1 – Option B: Dedicated southeast right-turn lane and flashing yellow left-turn arrows

Option B includes the same improvements as Option A, but installs protected-permitted flashing left-turn arrows on all approaches to provide some protection to left-turning vehicles, specifically to those turning off Stewart Parkway.

R2: Garden Valley Boulevard at Stewart Pkwy

Garden Valley Boulevard at Stewart Parkway is one of the busiest intersections in Roseburg. A significant amount of the residents on the west side travel through this intersection during their daily commute as it is one of only two east-west routes connecting to the commercial center, I-5 and downtown.

Recent improvements to the intersection have alleviated some of the operational concerns, however this intersection is expected to operate at a v/c of 1.09 and LOS E by 2040, which exceeds the City's dual standard of v/c no worse than 0.85 and LOS D or better. Traffic turning off Garden Valley Boulevard will continue to experience delays without additional turn lanes.

The crash history at this intersection revealed a pattern of rear end related collisions and a higher than average crash rate when compared to other similar study area intersections.

Concept R2 – Dual eastbound and westbound left-turn lanes (remove permitted phasing)

To help mitigate the anticipated operational concerns, this intersection would require creating parallel or alternative routes for the eastbound and westbound movements. Future local road connections, functional classification changes and demand management measures will be outlined in *Technical Memorandum 5: Develop Multimodal System Project Concepts.* The concept proposes also adding eastbound and westbound dual left-turns from Garden Valley Boulevard to Stewart Parkway. The

[2] A third option could consider realigning the intersection to address sight distance concerns, however this would not require operational analysis so it is not listed in this memorandum.

resulting operations would still exceed the City's mobility target, however, the level of capacity improvements to mitigate the intersection are not considered desirable for the Roseburg community. Continuing to construct additional capacity creates large intersections that generate an unwelcome environment for pedestrians.

R3: Stewart Parkway at Valley View Drive

The stop-controlled T-intersection of Stewart Parkway at Valley View Drive experiences side street delays while vehicles wait for a gap in traffic to turn on to Stewart Parkway. The eastbound left-turn is expected to operate at a v/c of 1.27 and LOS F by 2040, exceeding the City's dual v/c and LOS standard. This intersection was noted during the existing conditions analysis as approaching capacity.

The crash history at this intersection suggests a pattern of turning-related collisions. This intersection is closely spaced to the intersection of Stewart Parkway with Garden Valley Boulevard and is likely impacted by queuing upstream. This intersection exceeded the critical crash rate and the statewide 90th percentile crash rate and would benefit from turn restrictions.

Concept R3 – Prohibit eastbound left-turns off of Valley View Drive

To improve safety and reduce delay at the intersection, this concept proposes restricting the eastbound left-turns from Valley View Drive to Stewart Parkway; all other movements would still be permitted. In order to provide access to Garden Valley, signage could direct drivers to use the Kline Street access to Garden Valley Boulevard. Allowing for a U-turn further south on Stewart Pkwy could be an option as well, although it may require a policy or enforcement strategy for the City.

R4: Stewart Parkway at Stephens Street

The intersection of Stewart Parkway at Stephens Street is a signalized intersection that provides an important connection into and out of downtown Roseburg. Although the intersection currently operates within the City's mobility targets, by 2040 it is expected to operate at a v/c of 0.91 and LOS D, which exceeds the City's dual standard of v/c no worse than 0.85 and LOS D or better. The northbound left-turn lane is approaching the available capacity. Two options were developed to mitigate to the City's mobility targets and the benefit-cost of both options is evaluated in *Technical Memorandum #5*.

Concept R4 – Option A: Dual northbound left-turn lanes

Option A would add dual northbound left-turn lanes from Stephens Street to Stewart Parkway. The resulting operations would be a v/c of 0.80 and LOS D.

Concept R4 – Option B: Dedicated westbound and southbound right-turn lanes

Option B improve operations by creating dedicated westbound and southbound right-turn lanes. The resulting operations would be a v/c of 0.82 and LOS D.

R5: Garden Valley Boulevard at Stephens Street

Garden Valley Boulevard at Stephens Street is a signalized intersection providing an important connection from downtown to the commercial businesses on Garden Valley Boulevard. The intersection is currently approaching the City's mobility target and is expected to exceed it by 2040 with a v/c of 1.10 and LOS F. The intersection could be mitigated back to the City's target with some substantial capacity improvements.

Concept R5 – Dual eastbound left-turn lanes, dedicated southbound and northbound right-turn lanes

To help mitigate the anticipated operational concerns, this intersection would require additional capacity on three of the four legs. The concept proposes adding dual eastbound left-turns on Garden Valley Boulevard and dedicated southbound and northbound right-turn on Stephens Street. The resulting operations would be a v/c of 0.84 and LOS D. This intersection would benefit from creating parallel or alternative routes. Future local road connections, functional classification changes and demand management measures will be outlined in *Technical Memorandum 5: Develop Multimodal System Project Concepts.*

Should this project be considered for implementation, the dual eastbound left turns could warrant access management actions for the property in the southwest quadrant. Access management could mean closing the access on Garden Valley Boulevard or restricting it to right-in/right-out.

R6 Harvard Avenue at W Broccoli Street

This two-way stop-controlled intersection serves as access to residences, churches and an Elementary school. Although this intersection currently operates well within applicable mobility targets, the anticipated growth in southwest Roseburg is expected to increase traffic on Harvard Avenue, which will make it more difficult to make turns from Broccoli Street. This intersection should continue to be monitored and may require different intersection control in the future. Two options were analyzed.

Concept R6 – Option A: Traffic Signal

Option A would install a four-phase traffic signal with permitted lefts. This would allow the side street volumes an opportunity to turn onto Harvard Avenue and also provide a protected crossing of Harvard Avenue for pedestrians. Although ODOT's preliminary signal warrants were not met, future conditions may warrant signalization.

Concept R6 – Option B: Roundabout

Option B provides an alternative to signalization by installing a roundabout. Operational results of a roundabout indicate a roundabout is not ideal for this location. The high volumes could create a bottleneck at this location.

Concept R6 – Option C: All Way Stop Control – Excluded from final TM5; not a preferred option

Option C provides an alternative to higher cost improvements by installing a four-way stop controlled intersection. The LOS and V/C would operate within City mobility targets under this option. All-way stop control on a 5-lane cross-section would be uncharacteristic for Roseburg. High-visibility pavement markings and potential curb-bulb outs on Harvard could be warranted to enhance the pedestrian crossing. The City does not believe this intersection warrants any improvements at this time as daily traffic volumes at this intersection are low.

Concept R6 – Option D: Turn Restrictions – Excluded from final TM5; not a preferred option

Option D provides an alternative to higher cost improvements by making Broccoli Street right-out only (left-in would still be allowed). The LOS and V/C would operate within City mobility targets under this option, however traffic would be redirected to side streets. The City does not believe this intersection warrants any improvements at this time as daily traffic volumes at this intersection are low.

R7 Harvard Avenue at Centennial Drive/Stewart Park Drive

The intersection of Harvard Avenue at Centennial Drive/Stewart Park Drive serves as an access to several community features: Schools, Stewart Park, athletic fields and the trail system. The intersection currently operates within the City's mobility targets, with occasional queuing on the side street experienced during community events. The operations are expected to worsen as increased traffic on Harvard Avenue demands more of the traffic signal's available green time. The proposed concept would provide additional capacity for the traffic leaving Centennial Drive/Stewart Park Drive and traveling east.

Concept R7 – Restripe southbound right-turn lane to a shared southbound left/right-turn lane

The proposed concept would utilize the existing right-of-way and restripe the north leg of the intersection to allow for dual southbound left-turns. Centennial Drive/Stewart Park would be striped as a southbound left and southbound left/right-turn lane.

R8 Diamond Lake Boulevard at Stephens Street

This signalized intersection was recently improved as part of the OR 138 Solutions Project and does not currently experience congestion. However, forecasted growth along Diamond Lake Boulevard is expected to strain the capacity of the southbound left-turn lane and the overall operations are projected to exceed ODOT's v/c standard of 0.90 with a v/c of 0.99 by 2040.

Concept R8 – Dual southbound left-turn lanes – Excluded from final TM5; not a preferred option

This concept would provide dual southbound left-turn lanes from Stephens Street to Diamond Lake Boulevard (OR 138) to serve the future demand. This would result in a v/c of 0.82 and LOS C.

R9 Washington Avenue at Spruce Street

R8 in Technical Memorandum #5

This two-way stop controlled intersection has seen modernization improvements in recent years and has become an attractive route for drivers wanting to avoid the Stephens Street/Oak Street couplet. The northbound movements are expected to operate at a v/c of 1.30 and LOS F[3], which exceeds the City's dual v/c and LOS standard and ODOT's mobility target of v/c of 0.90. This intersection should continue to be monitored and may require different intersection control or access management in the future.

Concept R9 – Option A: Traffic Signal

This option would install a traffic signal to provide opportunities for the side street volumes to cross Washington Avenue. Although ODOT's preliminary signal warrants were not met, future conditions may warrant signalization. Signalization here may be difficult to implement due to proximity to RR crossing.

Concept R9 – Option B: Access management

This option would attempt to combat the cut-through drivers attempting to avoid the traffic signals in the Stephens Street/Oak Street couplet by eliminating the ability to make northbound movements from Spruce across or onto Washington Avenue. This would be done by creating a curb extension or bulb-out to prevent the movements and adding "No outlet" signage at the intersection of Oak Avenue and Spruce Street. Another variation of this option may be to prohibit vehicles from turning left from

[3] The operations reflect seasonally adjusted PM Peak hour traffic volumes.

Oak Street onto Spruce Street, which would dramatically reduce the number of northbound vehicles at the Washington Avenue intersection.

R10 Harvard Ave: Stewart Parkway to Lookingglass Road

During a public open house for the TSP, community members suggested reducing the vehicular cross-section of Harvard Avenue from five-lanes to three-lanes in order to provide bicycle lanes. There is ample right-of-way to make this change, however it would have implications to the vehicular operations. An iterative process evaluated the feasibility of reducing Harvard Avenue to three lanes between Stewart Parkway and Lookingglass Road.

Concept R10 – Restripe Harvard Avenue as three lanes from Stewart Parkway to Lookingglass Road in order to provide bicycle lanes on Harvard Avenue – Excluded from final TM5; not a preferred option

The analysis reviewed the feasibility of this concept by reducing the number of travel lanes on Harvard Avenue, which impacted three study area intersections: Harvard Avenue at Lookingglass Road, Broccoli Street and Stewart Parkway. It was determined it was not operationally feasible to reduce through capacity at Stewart Parkway, but could be possible with intersection control changes at Lookingglass Road and Broccoli Street.

In order to meet operational targets in 2040 with a three-lane cross-section of Harvard Avenue, Lookingglass would need to be a roundabout with two circulatory lanes on the north side to accommodate the anticipated westbound traffic. Broccoli Street would need to be signalized, similar to concept R6.

If Lookingglass is to be a roundabout under this option, Broccoli should not be signalized. A signal this close would push large pulses of traffic into the roundabout which could create approach/roundabout failure and long queues. Roundabouts work based under random flow or outside the direct influence area of a signal. It would be best to limit Broccoli to right-out under this case and reroute similar to what is suggested under R6-D. In this option, the roundabout could be used as an indirect left turn (U-turn) for SBL traffic from Broccoli.

Ultimately, this option is not expected to meet mobility targets in the future and is not recommended for further consideration in the TSP.

R11 Stephens Street at Washington Avenue

R9 in Technical Memorandum #5

The current configuration of the signalized intersection of Stephens Street at Washington Avenue requires pedestrians traveling east-west cross multiple lanes of traffic to get to an island, and then cross more lanes. The operations of this intersection currently meet ODOT mobility targets and are expected to do so by 2040. The concept proposed at this intersection is intended to improve the pedestrian experience.

Concept R11 – Extend pedestrian timing for pedestrians traveling east-west

This concept extends the pedestrian time to 30 seconds. This timing adjustment can be made without impacting the vehicular operations.

R12 Stephens Street at Winchester Street

R12 in Technical Memorandum #5

The intersection of Stephens Street at Winchester Street is a non-standard stop-controlled intersection in which all movements are free or yielding with the exception of the northbound right-turn. The intersection serves a high number of southbound left-turning vehicles in the PM peak hour as drivers often use Winchester Street as an alternate route to Stephens Street to travel downtown and to Diamond Lake Boulevard. Driver behavior has not changed since the improvements of the OR 138 Solutions Project.

Although the traffic operations currently meet and are expected to meet mobility targets by 2040, the configuration is not friendly to pedestrians and there is a trend in the crash history that indicates a high number of rear end collisions for northbound vehicles where Winchester Street connects to Stephens Street. Four concepts were developed.

Concept R12 – Option A: Directional signage to Downtown Roseburg and formalized turn lanes on Stephens Street between Winchester and Diamond Lake Boulevard – Excluded from final TM5; not a preferred option

The intent of this concept is to reduce the southbound left-turn lane demand. This option would install directional wayfinding signage to direct vehicles traveling southbound on Stephens Street to continue south instead of turning onto Winchester Street. Additionally, formally striping southbound left-turn lanes in the median lane on Stephens Street to the side streets might entice vehicles to use alternative routes to Winchester Street.

Concept R12 – Option B: Realign intersection to a T-intersection

This option realigns the Winchester Street approach to Stephens Street and utilizes STOP-control for the sidestreet. The realignment would improve visibility of bicyclists and pedestrians, and more clearly define routes and crossing for bicyclists and pedestrians. The realignment would also improve sight distance for northbound drivers along Winchester Street as they turn to join northbound Stephens Street vehicles, however the stopped movement of these vehicles would cause the intersection to exceed applicable mobility targets unless travel patterns change.

Concept R12 – Option C: Signalize, realign and provide dual WBR

This option would realign the Winchester Street approach to Stephens Street and signalize the intersection. Traffic volumes would benefit from dual westbound right turn lanes to serve the previously free-flow movement. The realignment would improve sight distance for northbound drivers along Winchester Street as they merge with northbound Stephens Street vehicles, improve visibility of bicyclists and pedestrians, and more clearly define routes and crossing for bicyclists and pedestrians. Preliminary signal warrants are met at this intersection.

Concept R12 – Option D: Jug handle SBL to EBT and signalize – Excluded from final TM5; not a preferred option

This option would address the queuing concern for southbound left-turning vehicles as well as provide better definition of bicycle and pedestrian facilities in the area. To accomplish this, the southbound left movement would access a jug handle (think at-grade cloverleaf ramp style), via a southbound right-turn, to approach the signal. The signal would provide the gap in northbound traffic to cross to

Winchester Street. The signal would also provide a more clearly define route and crossing locations for bicycles and pedestrians. Preliminary signal warrants are met at this intersection.

R13 Fulton Street at Diamond Lake Boulevard

R11 in Technical Memorandum #5

At this intersection, Diamond Lake Boulevard is a five-lane cross-section with a posted speed of 45 mph. Fulton Street is a two-lane road where traffic must cross Diamond Lake Boulevard at a two-way stop controlled intersection. Conversations with the City and stakeholders indicated future opportunities for redevelopment near this intersection and a need for safe pedestrian crossings of Diamond Lake Blvd.

Concept R13 – Install a traffic signal[4]

This concept would install a traffic signal at Fulton Street (or Lake) at Diamond Lake Boulevard to provide a protected pedestrian crossing of Diamond Lake Blvd and anticipate future development. Although the preliminary signal warrants are not met at this location, future traffic demand may warrant a change in traffic control.

R14 Harvard Avenue at Lookingglass Road

R12 in Technical Memorandum #5

At this intersection, the northbound left-turn is stop-controlled while all other movements are free or yielding. By 2040, the increase in traffic volumes on Harvard Avenue is expected to cause the northbound left-turn to exceed the City's LOS standard of D with a v/c of 0.20 and a LOS F. This movement has low traffic volumes, but will have to wait for over a minute to make a turn across Harvard Avenue traffic. The proposed concept should be considered as development to the west and south of this intersection occur.

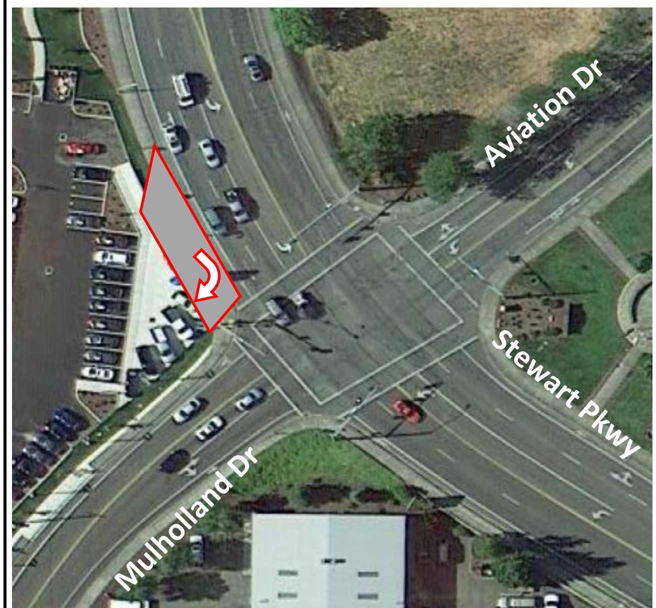
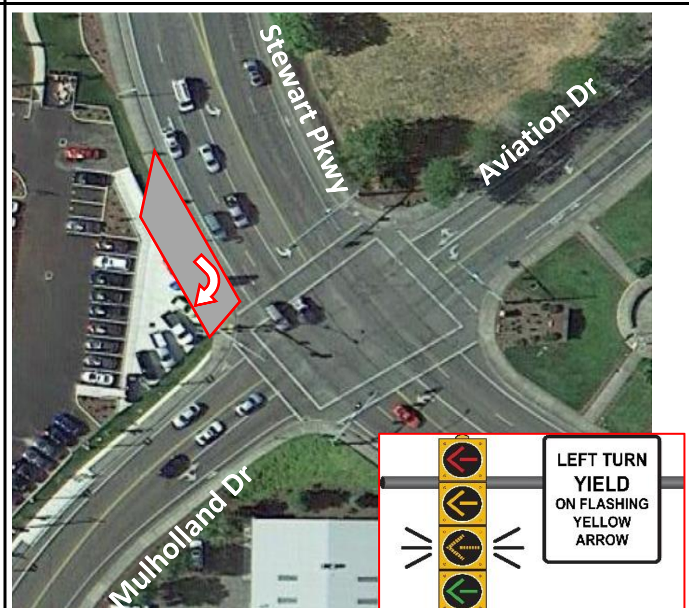
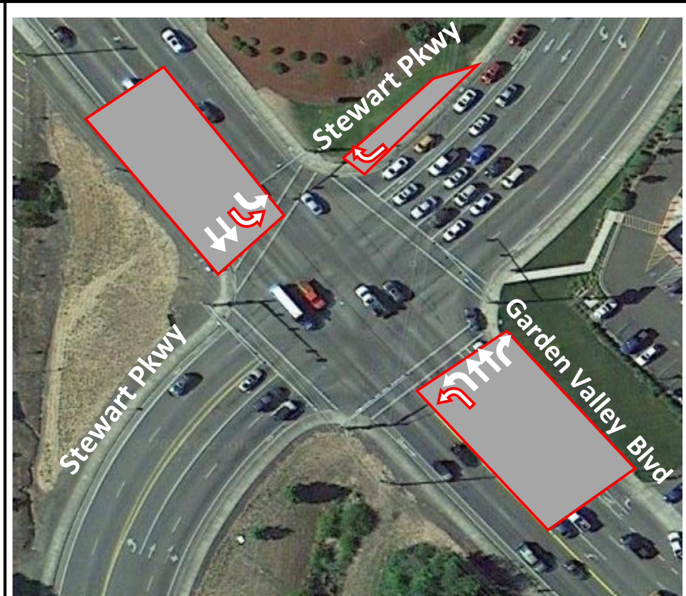
Concept R14 – Option A: Install a traffic signal

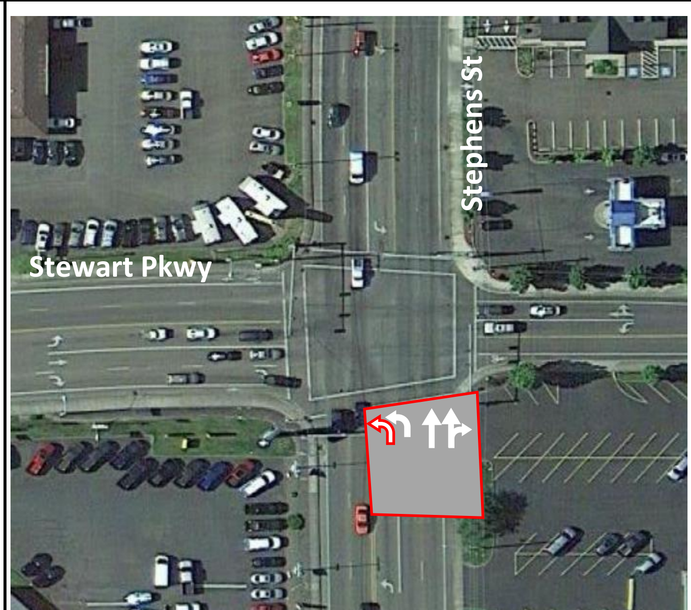
This concept would install a traffic signal to address the northbound left-turn operations. Preliminary signal warrants are not met at this location and it is unlikely that future traffic demand may warrant a signal.

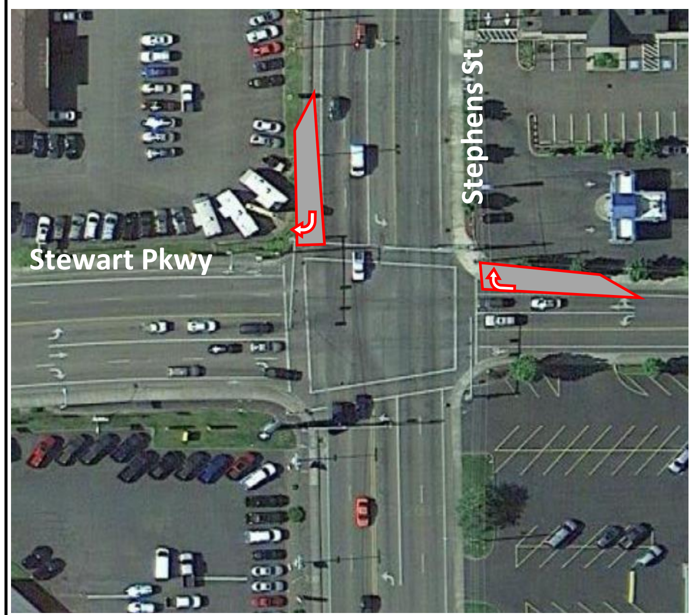
Concept R14 – Option B: Install a roundabout with a westbound bypass lane

This concept would install a roundabout with a westbound through bypass lane at Harvard Avenue and Lookingglass Road. This configuration would keep traffic moving and provide opportunity for all movements to move freely.

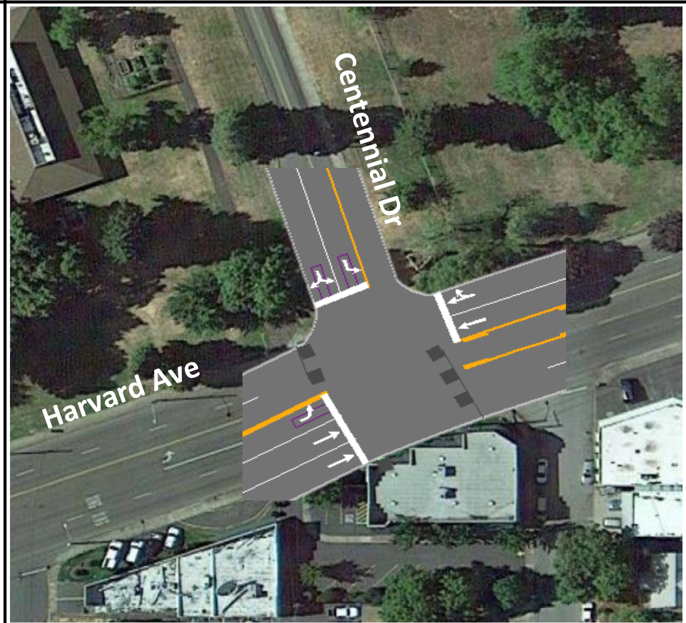
[4] A roundabout could also be evaluated here although a signal is preferred for the purpose of pedestrian crossings.

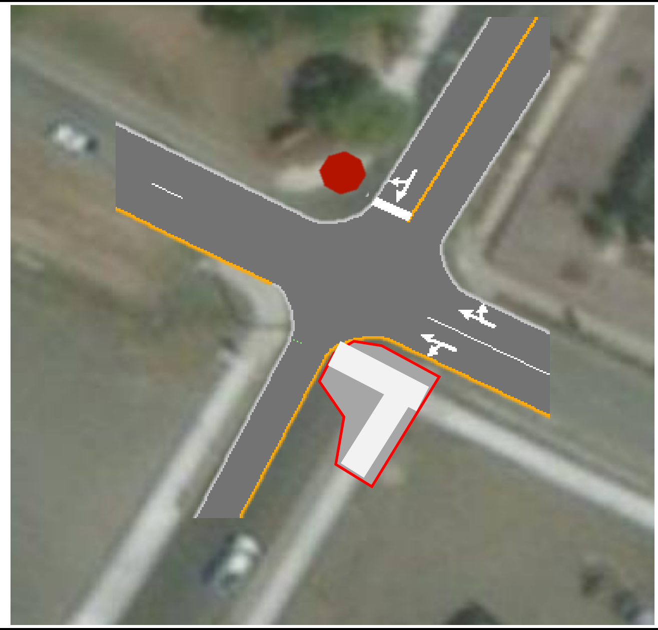
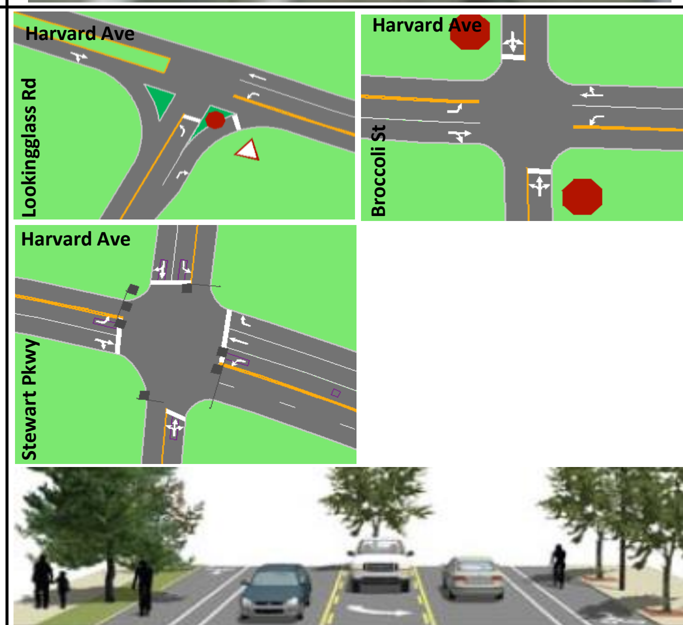
ID	Location	Potential Roadway Concept	Concept sketch
R1-A	Stewart Pkwy at Aviation Dr/ Mulholland Dr	Option A: Dedicated southeast right-turn lane	
R1-B		Option B: Dedicated southeast right-turn lane and flashing yellow left-turn arrows	
R2	Garden Valley Blvd at Stewart Pkwy	Dual eastbound and westbound left-turn lanes (remove permitted phasing)	

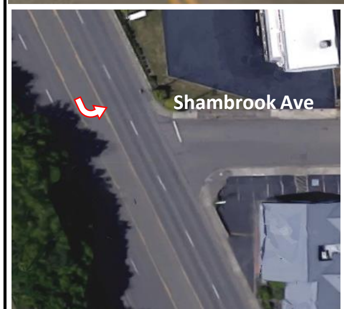
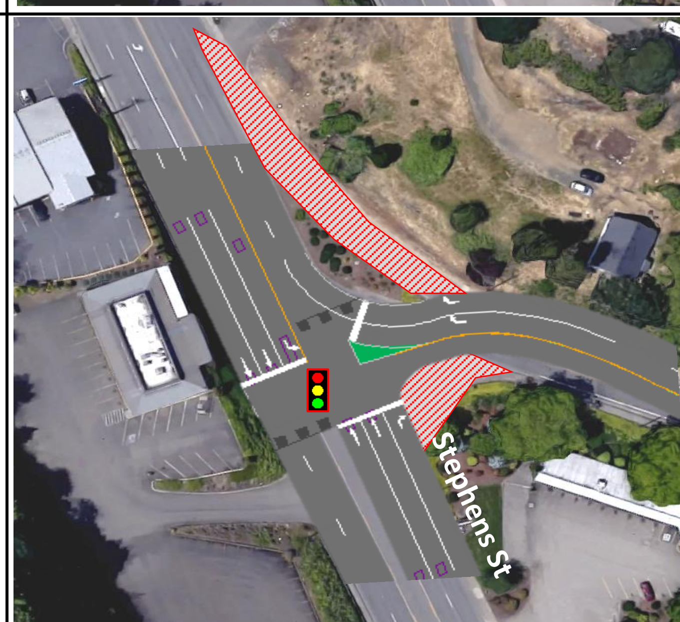
ID	Location	Potential Roadway Concept	Concept sketch
R3	Stewart Pkwy at Valley View Dr	Prohibit eastbound left-turns out of Valley View Dr and - Provide for southbound U-turn south on Stewart Pkwy, or - Add signage to direct drivers to Kline St	
	Stewart Pkwy at Valley View Dr	Prohibit eastbound left-turns out of Valley View Dr and - Provide for southbound U-turn south on Stewart Pkwy, or - Add signage to direct drivers to Kline St	
R4-A	Stewart Pkwy at Stephens St	Dual northbound left-turn	

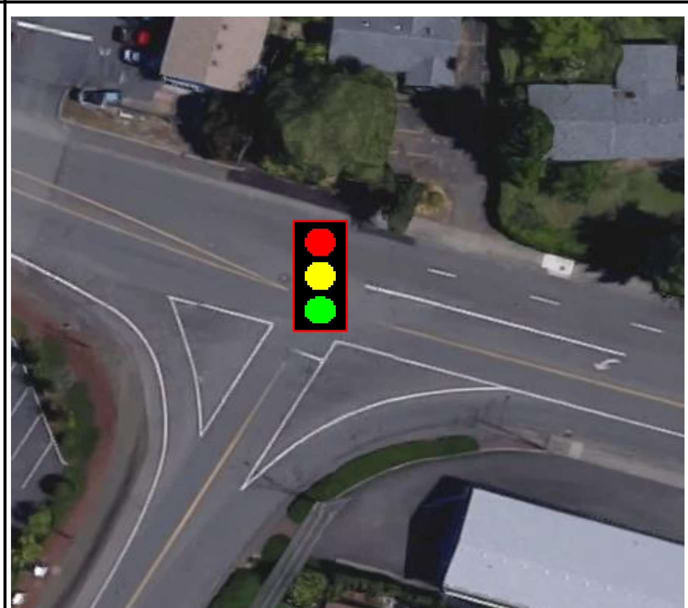
ID	Location	Potential Roadway Concept	Concept sketch
R4-B	Stewart Pkwy at Stephens St	Dedicated westbound and southbound right-turn lanes	
R5	Garden Valley Blvd at Stephens St	Cycle length to 120 sec, dual eastbound left-turn lanes, dedicated southbound and northbound right-turn lanes	
R6-A	Harvard Ave at W Broccoli St	Traffic signal (monitor intersection; preliminary signal warrants are not met)	

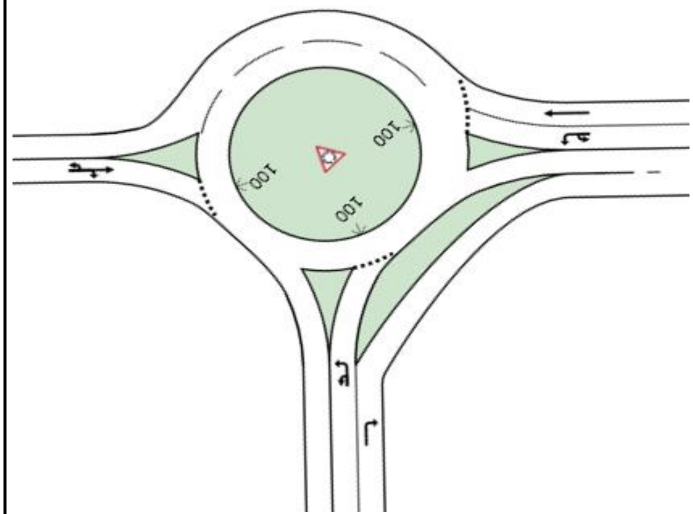
ID	Location	Potential Roadway Concept	Concept sketch
R6-B	Harvard Ave at W Broccoli St	Single Lane Roundabout with right-turn bypass lanes	
R6-D	Harvard Ave at W Broccoli St	Turn restrictions	

ID	Location	Potential Roadway Concept	Concept sketch
R7	Harvard Ave at Centennial Dr	Restripe southbound right-turn lane to a shared southbound left/right-turn lane (to provide a second southbound left-turn lane)	
R8	Diamond Lake Blvd at Stephens St	Dual southbound left-turn lanes	
R9-A	Washington Ave at Spruce St	Signalize (monitor intersection; preliminary signal warrants are not met)	

ID	Location	Potential Roadway Concept	Concept sketch
R9-B	Washington Ave at Spruce St	Access management (prohibit northbound traffic or prohibit eastbound left-turn at Spruce/Oak)	
R10	Harvard Ave: Stewart Pkwy to Lookingglass Rd	Three lane cross-section of Harvard Ave from Stewart Pkwy (#42) to Lookingglass Rd (#40) to allow for bicycle lanes on Harvard Ave, including Broccoli St (#41)	
R11	Stephens St at Washington Ave	Extend pedestrian timing to 30 seconds to get pedestrians across northbound and southbound through lanes.	

ID	Location	Potential Roadway Concept	Concept sketch
R12-A		Option A: Directional signage to Downtown Roseburg and formalized turn lanes on Stephens side streets	  
R12-B	Stephens St at Winchester St	Realign to T-Intersection	
R12-C		Signalize, realign and provide dual WBR	

ID	Location	Potential Roadway Concept	Concept sketch
R12-D	Stephens St at Winchester St	Jug handle SBL to EBT and signalize	
R13	Fulton St at Diamond Lake Blvd	Signalize (monitor intersection; preliminary signal warrants are not met): Improve opportunities for protected crossing of Diamond Lake Blvd	
R14-A	Harvard Ave at Lookingglass Rd	Traffic signal (monitor intersection; preliminary signal warrants are not met)	

ID	Location	Potential Roadway Concept	Concept sketch
R14-B	Harvard Ave at Lookingglass Rd	Single Lane Roundabout with bypass lane	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	820	365	95	620	35	335	35	75	55	75	50
Future Volume (vph)	45	820	365	95	620	35	335	35	75	55	75	50
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.90		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1568	3292	1488	1646	3197		1646	1549		1662	1646	
Flt Permitted	0.28	1.00	1.00	0.17	1.00		0.67	1.00		0.68	1.00	
Satd. Flow (perm)	469	3292	1488	301	3197		1161	1549		1190	1646	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	49	891	397	103	674	38	364	38	82	60	82	54
RTOR Reduction (vph)	0	0	258	0	4	0	0	49	0	0	28	0
Lane Group Flow (vph)	49	891	139	103	708	0	364	71	0	60	108	0
Heavy Vehicles (%)	6%	1%	0%	1%	3%	6%	1%	0%	2%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6			8			4		
Actuated Green, G (s)	24.3	21.8	21.8	26.7	23.0		25.9	25.9		25.9	25.9	
Effective Green, g (s)	24.3	22.8	22.8	26.7	24.0		26.4	26.4		26.4	26.4	
Actuated g/C Ratio	0.37	0.35	0.35	0.41	0.37		0.41	0.41		0.41	0.41	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	217	1156	522	200	1182		472	630		484	669	
v/s Ratio Prot	0.01	c0.27		c0.03	0.22			0.05			0.07	
v/s Ratio Perm	0.08		0.09	0.18			c0.31			0.05		
v/c Ratio	0.23	0.77	0.27	0.52	0.60		0.77	0.11		0.12	0.16	
Uniform Delay, d1	13.4	18.7	15.1	13.3	16.6		16.6	12.0		12.0	12.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	3.1	0.2	1.7	0.7		7.3	0.1		0.1	0.1	
Delay (s)	13.8	21.8	15.3	15.0	17.2		24.0	12.0		12.1	12.3	
Level of Service	B	C	B	B	B		C	B		B	B	
Approach Delay (s)		19.6			17.0			21.0			12.2	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	18.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	64.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	820	365	95	620	35	335	35	75	55	75	50
Future Volume (vph)	45	820	365	95	620	35	335	35	75	55	75	50
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.90		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1568	3292	1488	1646	3197		1646	1549		1662	1646	
Flt Permitted	0.28	1.00	1.00	0.18	1.00		0.47	1.00		0.68	1.00	
Satd. Flow (perm)	456	3292	1488	318	3197		814	1549		1190	1646	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	49	891	397	103	674	38	364	38	82	60	82	54
RTOR Reduction (vph)	0	0	261	0	4	0	0	57	0	0	33	0
Lane Group Flow (vph)	49	891	136	103	708	0	364	63	0	60	103	0
Heavy Vehicles (%)	6%	1%	0%	1%	3%	6%	1%	0%	2%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6			8			4		
Actuated Green, G (s)	23.4	20.8	20.8	25.4	21.8		25.7	18.6		12.6	10.0	
Effective Green, g (s)	23.4	21.8	21.8	25.4	22.8		26.2	19.1		13.6	10.5	
Actuated g/C Ratio	0.37	0.34	0.34	0.40	0.36		0.41	0.30		0.21	0.17	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5		3.0	2.5		3.0	2.5	
Lane Grp Cap (vph)	213	1128	510	202	1146		488	465		277	271	
v/s Ratio Prot	0.01	c0.27		c0.03	0.22		c0.14	0.04		0.01	0.06	
v/s Ratio Perm	0.08		0.09	0.17			c0.17			0.04		
v/c Ratio	0.23	0.79	0.27	0.51	0.62		0.75	0.13		0.22	0.38	
Uniform Delay, d1	13.4	18.8	15.1	13.5	16.8		14.3	16.2		20.4	23.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	3.6	0.2	1.5	0.9		6.1	0.1		0.4	0.7	
Delay (s)	13.8	22.5	15.3	15.0	17.7		20.5	16.3		20.8	24.3	
Level of Service	B	C	B	B	B		C	B		C	C	
Approach Delay (s)		20.0			17.3			19.4			23.2	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	19.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	63.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	395	790	130	360	900	335	175	345	245	375	570	585
Future Volume (vph)	395	790	130	360	900	335	175	345	245	375	570	585
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0	5.0	4.0	4.0	4.0	4.0	4.0	5.0
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3193	3146		3225	3260	1473	1646	3325	1488	3193	3325	1473
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3193	3146		3225	3260	1473	1646	3325	1488	3193	3325	1473
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	403	806	133	367	918	342	179	352	250	383	582	597
RTOR Reduction (vph)	0	10	0	0	0	64	0	0	186	0	0	44
Lane Group Flow (vph)	403	929	0	367	918	278	179	352	64	383	582	553
Heavy Vehicles (%)	1%	4%	0%	0%	2%	1%	1%	0%	0%	1%	0%	1%
Turn Type	Prot	NA		Prot	NA	pt+ov	Prot	NA	Perm	Prot	NA	pt+ov
Protected Phases	5	2		1	6	6 7	3	8		7	4	4 5
Permitted Phases									8			
Actuated Green, G (s)	18.0	40.1		16.8	38.4	60.2	16.2	30.5	30.5	16.8	31.1	54.1
Effective Green, g (s)	19.0	41.1		17.3	39.4	60.2	16.7	31.5	31.5	17.3	32.1	54.1
Actuated g/C Ratio	0.15	0.33		0.14	0.32	0.49	0.14	0.26	0.26	0.14	0.26	0.44
Clearance Time (s)	5.0	5.0		4.5	5.0		4.5	5.0	5.0	4.5	5.0	
Vehicle Extension (s)	2.5	4.2		2.5	4.2		2.5	2.5	2.5	2.5	2.5	
Lane Grp Cap (vph)	492	1049		452	1042	719	223	850	380	448	866	646
v/s Ratio Prot	0.13	c0.30		0.11	0.28	0.19	0.11	0.11		c0.12	0.18	c0.38
v/s Ratio Perm									0.04			
v/c Ratio	0.82	0.89		0.81	0.88	0.39	0.80	0.41	0.17	0.85	0.67	0.86
Uniform Delay, d1	50.4	38.8		51.4	39.7	19.9	51.7	38.2	35.7	51.7	40.8	31.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.0	9.4		10.4	9.2	0.5	18.0	0.2	0.2	14.5	1.9	10.7
Delay (s)	60.4	48.3		61.8	48.9	20.4	69.7	38.4	35.8	66.2	42.7	41.8
Level of Service	E	D		E	D	C	E	D	D	E	D	D
Approach Delay (s)		51.9			45.8			44.7			48.1	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	47.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	123.2	Sum of lost time (s)	19.0
Intersection Capacity Utilization	87.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Intersection						
Int Delay, s/veh	1.3					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	115	60	635	725	335
Future Vol, veh/h	0	115	60	635	725	335
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	250	0	350	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	1	0	0	2	0	1
Mvmt Flow	0	125	65	690	788	364

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1445	576	1152	0	-	0
Stage 1	970	-	-	-	-	-
Stage 2	475	-	-	-	-	-
Critical Hdwy	6.82	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.82	-	-	-	-	-
Critical Hdwy Stg 2	5.82	-	-	-	-	-
Follow-up Hdwy	3.51	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	124	466	614	-	-	-
Stage 1	331	-	-	-	-	-
Stage 2	595	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	111	466	614	-	-	-
Mov Cap-2 Maneuver	111	-	-	-	-	-
Stage 1	296	-	-	-	-	-
Stage 2	595	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.5	1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	614	-	-	466	-	-
HCM Lane V/C Ratio	0.106	-	-	0.268	-	-
HCM Control Delay (s)	11.6	-	0	15.5	-	-
HCM Lane LOS	B	-	A	C	-	-
HCM 95th %tile Q(veh)	0.4	-	-	1.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	165	460	65	140	80	340	1000	50	45	845	120
Future Volume (vph)	250	165	460	65	140	80	340	1000	50	45	845	120
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1630	1716	1458	1630	1622		3162	3237		1630	3199	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1630	1716	1458	1630	1622		3162	3237		1630	3199	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	250	165	460	65	140	80	340	1000	50	45	845	120
RTOR Reduction (vph)	0	0	180	0	18	0	0	3	0	0	9	0
Lane Group Flow (vph)	250	165	280	65	202	0	340	1047	0	45	956	0
Turn Type	Prot	NA	Prot	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	3	8	8	7	4		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	19.7	32.6	32.6	5.3	19.2		14.4	47.6		4.5	37.7	
Effective Green, g (s)	19.7	33.6	33.6	5.3	19.2		14.4	47.6		4.5	37.7	
Actuated g/C Ratio	0.18	0.31	0.31	0.05	0.18		0.13	0.44		0.04	0.35	
Clearance Time (s)	4.0	5.0	5.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5		2.5	4.3		2.5	4.3	
Lane Grp Cap (vph)	300	538	457	80	291		425	1440		68	1127	
v/s Ratio Prot	c0.15	0.10	0.19	0.04	c0.12		c0.11	0.32		0.03	c0.30	
v/s Ratio Perm												
v/c Ratio	0.83	0.31	0.61	0.81	0.69		0.80	0.73		0.66	0.85	
Uniform Delay, d1	42.1	27.9	31.2	50.4	41.1		44.9	24.4		50.5	32.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	17.4	0.2	2.1	43.6	6.5		10.1	2.1		19.6	6.5	
Delay (s)	59.5	28.1	33.3	93.9	47.6		55.0	26.4		70.1	38.5	
Level of Service	E	C	C	F	D		D	C		E	D	
Approach Delay (s)		39.8			58.2			33.4			39.9	
Approach LOS		D			E			C			D	

Intersection Summary			
HCM 2000 Control Delay	38.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	107.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	81.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	165	460	65	140	80	340	1000	50	45	845	120
Future Volume (vph)	250	165	460	65	140	80	340	1000	50	45	845	120
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1630	1716	1458	1630	1716	1458	1630	3237		1630	3260	1458
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1630	1716	1458	1630	1716	1458	1630	3237		1630	3260	1458
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	250	165	460	65	140	80	340	1000	50	45	845	120
RTOR Reduction (vph)	0	0	331	0	0	68	0	3	0	0	0	84
Lane Group Flow (vph)	250	165	129	65	140	12	340	1047	0	45	845	36
Turn Type	Prot	NA	Prot	Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	3	8	8	7	4		1	6		5	2	
Permitted Phases						4						2
Actuated Green, G (s)	19.1	26.6	26.6	7.2	15.7	15.7	25.5	51.8		6.3	32.6	32.6
Effective Green, g (s)	19.1	27.6	27.6	7.2	15.7	15.7	25.5	51.8		6.3	32.6	32.6
Actuated g/C Ratio	0.18	0.25	0.25	0.07	0.14	0.14	0.23	0.48		0.06	0.30	0.30
Clearance Time (s)	4.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	4.3		2.5	4.3	4.3
Lane Grp Cap (vph)	285	434	369	107	247	210	381	1539		94	975	436
v/s Ratio Prot	c0.15	0.10	0.09	0.04	c0.08		c0.21	0.32		0.03	c0.26	
v/s Ratio Perm						0.01						0.02
v/c Ratio	0.88	0.38	0.35	0.61	0.57	0.05	0.89	0.68		0.48	0.87	0.08
Uniform Delay, d1	43.8	33.6	33.3	49.5	43.4	40.2	40.4	22.1		49.7	36.1	27.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	24.6	0.4	0.4	8.0	2.4	0.1	22.1	1.4		2.8	8.6	0.1
Delay (s)	68.3	34.0	33.7	57.4	45.8	40.3	62.5	23.6		52.5	44.7	27.5
Level of Service	E	C	C	E	D	D	E	C		D	D	C
Approach Delay (s)		43.6			46.9			33.1			43.0	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	39.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	108.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	82.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	270	305	490	190	190	90	425	1045	135	70	945	195
Future Volume (vph)	270	305	490	190	190	90	425	1045	135	70	945	195
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.5	4.0	4.0	4.5
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00		0.97	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3193	1750	1444	1646	1654		3193	3292	1458	1662	3292	1473
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3193	1750	1444	1646	1654		3193	3292	1458	1662	3292	1473
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	276	311	500	194	194	92	434	1066	138	71	964	199
RTOR Reduction (vph)	0	0	40	0	14	0	0	0	75	0	0	126
Lane Group Flow (vph)	276	311	460	194	272	0	434	1066	63	71	964	73
Heavy Vehicles (%)	1%	0%	3%	1%	1%	0%	1%	1%	2%	0%	1%	1%
Turn Type	Prot	NA	pt+ov	Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	8	8 1	7	4		1	6		5	2	
Permitted Phases									6			2
Actuated Green, G (s)	12.8	25.3	47.5	16.4	28.9		17.7	54.4	54.4	5.9	42.6	42.6
Effective Green, g (s)	13.3	25.8	48.0	16.9	29.4		18.2	54.9	54.4	6.4	43.1	42.6
Actuated g/C Ratio	0.11	0.22	0.40	0.14	0.24		0.15	0.46	0.45	0.05	0.36	0.36
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.5	3.0		2.5	2.5		2.5	4.6	4.6	2.5	4.6	4.6
Lane Grp Cap (vph)	353	376	577	231	405		484	1506	660	88	1182	522
v/s Ratio Prot	0.09	0.18	c0.32	c0.12	c0.16		c0.14	0.32		0.04	c0.29	
v/s Ratio Perm									0.04			0.05
v/c Ratio	0.78	0.83	0.80	0.84	0.67		0.90	0.71	0.10	0.81	0.82	0.14
Uniform Delay, d1	51.9	45.0	31.7	50.2	40.9		50.0	26.1	18.7	56.2	34.8	26.3
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.4	13.8	7.5	22.3	3.9		18.9	2.8	0.3	38.9	6.3	0.6
Delay (s)	62.3	58.8	39.2	72.5	44.9		68.8	29.0	19.0	95.1	41.1	26.8
Level of Service	E	E	D	E	D		E	C	B	F	D	C
Approach Delay (s)		50.7			56.0			38.7			41.9	
Approach LOS		D			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	44.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	465	10	150	850	65	5	1	75	50	10	30
Future Volume (vph)	15	465	10	150	850	65	5	1	75	50	10	30
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	0.99			0.87			0.95	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.97	
Satd. Flow (prot)	1630	3249		1630	3225			1496			1594	
Flt Permitted	0.18	1.00		0.42	1.00			0.99			0.84	
Satd. Flow (perm)	316	3249		713	3225			1486			1383	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	505	11	163	924	71	5	1	82	54	11	33
RTOR Reduction (vph)	0	3	0	0	10	0	0	43	0	0	17	0
Lane Group Flow (vph)	16	513	0	163	985	0	0	45	0	0	81	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	21.7	21.7		21.7	21.7			28.5			28.5	
Effective Green, g (s)	21.7	21.7		21.7	21.7			28.5			28.5	
Actuated g/C Ratio	0.37	0.37		0.37	0.37			0.48			0.48	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	115	1190		261	1182			715			665	
v/s Ratio Prot		0.16			c0.31							
v/s Ratio Perm	0.05			0.23				0.03			c0.06	
v/c Ratio	0.14	0.43		0.62	0.83			0.06			0.12	
Uniform Delay, d1	12.5	14.1		15.4	17.1			8.2			8.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.6	0.3		4.6	5.2			0.2			0.4	
Delay (s)	13.1	14.4		20.0	22.3			8.4			8.8	
Level of Service	B	B		C	C			A			A	
Approach Delay (s)		14.3			22.0			8.4			8.8	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	18.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	59.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Oregon Department of Transportation

Transportation Development Branch

Transportation Planning Analysis Unit

Preliminary Traffic Signal Warrant Analysis[1]

Major Street:	Harvard Ave	**Minor Street:**	Broccoli St
Project:	Roseburg TSP	**City/County:**	Roseburg City
Year:	2040	**Alternative:**	0

Preliminary Signal Warrant Volumes

Number of Approach lanes		ADT on major street approaching from both directions		ADT on minor street, highest approaching volume	
Major Street	Minor Street	Percent of standard warrants		Percent of standard warrants	
		100	70	100	70
Case A: Minimum Vehicular Traffic					
1	1	8850	6200	2650	1850
2 or more	1	10600	7400	2650	1850
2 or more	2 or more	10600	7400	3550	2500
1	2 or more	8850	6200	3550	2500
Case B: Interruption of Continuous Traffic					
1	1	13300	9300	1350	950
2 or more	1	15900	11100	1350	950
2 or more	2 or more	15900	11100	1750	1250
1	2 or more	13300	9300	1750	1250
X	100 percent of standard warrants				
	70 percent of standard warrants[2]				

Preliminary Signal Warrant Calculation

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2 or more	10600	15550	N
	Minor	1	2650	600	
Case B	Major	2 or more	15900	15550	N
	Minor	1	1350	600	

Analyst and Date:	Reviewer and Date:

[1] Meeting preliminary signal warrants does **not** guarantee that a signal will be installed. When preliminary signal warrants are met, project analysts need to coordinate with Region Traffic to initiate the traffic signal engineering investigation as outlined in the Traffic Manual. Before a signal can be installed, the engineering investigation must be conducted or reviewed by the Region Traffic Manager who will forward signal recommendations to headquarters. Traffic signal warrants must be met and the State Traffic Engineer's approval obtained before a traffic signal can be installed on a state highway.

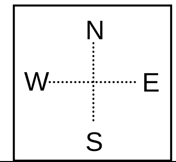
[2] Used due to 85th percentile speed in excess of 40 mph or isolated community with population of less than 10,000.

Single Lane Roundabout Input Sheet

General Information	
Analyst:	Angela Rogge
Agency:	DEA
Date:	9/17/2018
East leg:	Harvard
Project:	Roseburg TSP

Passenger Car Equivalents			Rec
bicycle	E_b	1	1
medium	E_m	1.5	1.5
heavy	E_h	2	2
South leg	Broccoli		
Year:	20yrs > build		

Roundabout Input			
3 or 4 legs			4
Portion of an hour:			0.25
Peak hr	4	30	PM



Pedestrian crossings per le	Approaches N	E	S	W
#	9	3	1	1

Hour Volumes vph		Approaches N	E	S	W
Exits	N	0	65	1	15
	E	50	0	75	465
	S	10	150	0	10
	W	30	850	5	0

Changes here do not go to Input tab.

Flow Rate v_i		Approaches N	E	S	W
Exits	N	0	71	1	16
	E	54	0	82	505
	S	11	163	0	11
	W	33	924	5	0

Peak Hour Factor PHF		Approaches N	E	S	W
Exits	N	0.92	0.92	0.92	0.92
	E	0.92	0.92	0.92	0.92
	S	0.92	0.92	0.92	0.92
	W	0.92	0.92	0.92	0.92

Vehicle Factor f_{hv}		Approaches N	E	S	W
Exits	N	1.000	1.000	1.000	1.000
	E	0.990	1.000	0.968	0.997
	S	1.000	0.997	1.000	1.000
	W	1.000	0.994	0.714	1.000

# of Bicycles vph		Approaches N	E	S	W
Exits	N	0	0	2	0
	E	0	0	0	1
	S	3	0	0	0
	W	0	4	0	0

Proportion of Bicycle P_b		Approaches N	E	S	W
Exits	N	0.000	0.000	2.000	0.000
	E	0.000	0.000	0.000	0.002
	S	0.300	0.000	0.000	0.000
	W	0.000	0.005	0.000	0.000

# of Medium Trucks vph		Approaches N	E	S	W
Exits	N	0	0	0	0
	E	1	0	5	3
	S	0	1	0	0
	W	0	11	4	0

Proportion of Medium P_m		Approaches N	E	S	W
Exits	N	0.000	0.000	0.000	0.000
	E	0.020	0.000	0.067	0.006
	S	0.000	0.007	0.000	0.000
	W	0.000	0.013	0.800	0.000

# of Heavy Trucks vph		Approaches N	E	S	W
Exits	N	0	0	0	0
	E	0	0	0	0
	S	0	0	0	0
	W	0	0	0	0

Proportion of Heavy P_h		Approaches N	E	S	W
Exits	N	0.000	0.000	0.000	0.000
	E	0.000	0.000	0.000	0.000
	S	0.000	0.000	0.000	0.000
	W	0.000	0.000	0.000	0.000

Adjusted Flow Rate v_i		Approaches N	E	S	W
Exits	N	0	71	1	16
	E	55	0	85	507
	S	11	163	0	11
	W	33	930	7	0
Entry Flow Rate (pc/h)		99	1164	93	534
Conflict Flow (pc/h)		1100	24	578	229

Exits w/o right vol pcl		Weighted Entry Vehicle Factors			
N	17	0.994	0.994	0.947	0.997
E	562				
S	174	Weighted Conflict Vehicle Factors			
W	937	0.992	0.913	0.996	0.995

Output		Approaches N	E	S	W
Conflict flow (veh/h)	v_c	1091	22	576	228
Entry flow (veh/h)	v_i	98	1157	88	532
Entry capacity (veh/h)	c_i	374	1097	600	896
Pedestrian impedance	f_{ped}	1	1	1	1
Leg v/c ratio	x_i	0.26	1.05	0.15	0.59
Control delay (sec/veh)	d_i	14.3	60.5	7.8	12.6
LOS	n/a	B	F	A	B
HCM 95th% Queue (veh)	Q_m	1	24	1	4

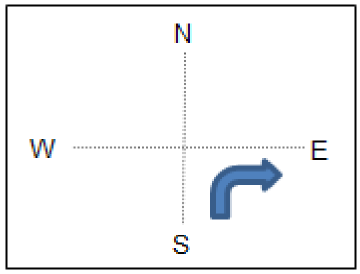
Int cntrl delay (sec/veh)	d_{int}	41.95
Intersection LOS	n/a	E

Bypass Lane Merge Point Analysis

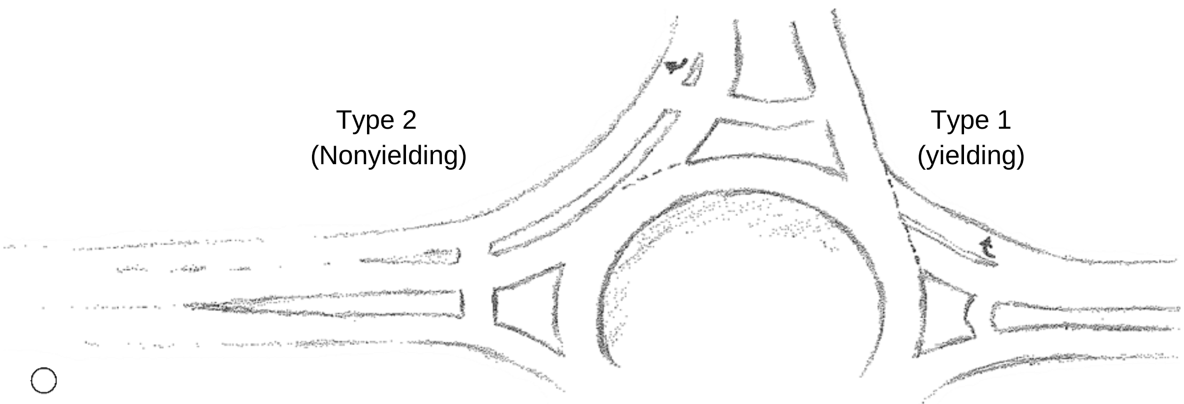
Only two selections are necessary (cell E13 and yield selection button).

Entry on the Single Lane Roundabout Calculator:

Hour Volumes vph		Approaches N	E	S	W
Exits	N	0	65	1	15
	E	50	0	75	465
	S	10	150	0	10
	W	30	850	5	0



A heavy right turn volume approaches at the East leg.
The heavy right turn volume then exits on the North leg.



Type 2 Nonyielding Bypass lane

If there is room for a new lane, then bypass LOS is A and capacity is expected to be high (higher than yielding bypass values shown below) and the analysis is complete for this bypass lane.

Considerations for a Type 2 nonyielding bypass lane:

- A median refuge should ensure a pedestrian only crosses one lane at a time
- Bypass travel path geometrically slows traffic
- Is there a heavy left turn volume down this leg to create a demand to quickly merge?

Type 1 Yielding Bypass lane

Items to keep in mind if constrained to a Type 1 nonyielding bypass lane:

- Angle that driver has to look over the shoulder to merge, then forward to yield to pedestrians
- All traffic volume is now in one lane, consider what gaps exist for pedestrian
- Safety of heavy right movement merging into all movements exiting roundabout

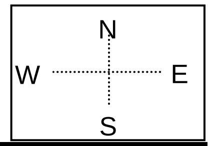
		1111	pc/h
Capacity	c	1111	veh/h
Entry Flow Rates	v	71	veh/h
Volume to Capacity ratio	v/c	0.06	
Delay		3.7	s/veh
LOS		A	
HCM Queue		0	veh

The roundabout analysis with the East approach to the North leg bypass volume removed is to the right. Please print and electronically save this information for your records.

Single Lane Roundabout Input Sheet

General Information		Passenger Car Equivalents			Rec
Analyst:	Angela Rogge	bicycle	E_b	1	1
Agency:	DEA	medium	E_m	1.5	1.5
Date:	9/17/2018	heavy	E_h	2	2
East leg:	Harvard	South leg:	Broccoli		
Project:	Roseburg TSP		Year:	20yrs > build	

Roundabout Input			
3 or 4 legs			4
Portion of an hour:			0.25
Peak hr	4	30	PM



Pedestrian crossings per l	N	E	S	W
#	9	3	1	1

ONE BYPASS

Hour Volumes vph		Approaches N	E	S	W
Exits	N	0	0	1	15
	E	50	0	75	465
	S	10	150	0	10
	W	30	850	5	0

Flow Rate v_i		Approaches N	E	S	W
Exits	N	0	0	1	16
	E	54	0	82	505
	S	11	163	0	11
	W	33	924	5	0

Peak Hour Factor PHF		Approaches N	E	S	W
Exits	N	0.92	0.00	0.92	0.92
	E	0.92	0.92	0.92	0.92
	S	0.92	0.92	0.92	0.92
	W	0.92	0.92	0.92	0.92

Vehicle Factor f_{hv}		Approaches N	E	S	W
Exits	N	1.000	1.000	1.000	1.000
	E	0.990	1.000	0.968	0.997
	S	1.000	0.997	1.000	1.000
	W	1.000	0.994	0.714	1.000

# of Bicycles vph		Approaches N	E	S	W
Exits	N	0	0	2	0
	E	0	0	0	1
	S	3	0	0	0
	W	0	4	0	0

Proportion of Bicycle P_b		Approaches N	E	S	W
Exits	N	0.000	0.000	2.000	0.000
	E	0.000	0.000	0.000	0.002
	S	0.300	0.000	0.000	0.000
	W	0.000	0.005	0.000	0.000

# of Medium Trucks vph		Approaches N	E	S	W
Exits	N	0	0	0	0
	E	1	0	5	3
	S	0	1	0	0
	W	0	11	4	0

Proportion of Medium P_m		Approaches N	E	S	W
Exits	N	0.000	0.000	0.000	0.000
	E	0.020	0.000	0.067	0.006
	S	0.000	0.007	0.000	0.000
	W	0.000	0.013	0.800	0.000

# of Heavy Trucks vph		Approaches N	E	S	W
Exits	N	0	0	0	0
	E	0	0	0	0
	S	0	0	0	0
	W	0	0	0	0

Proportion of Heavy P_h		Approaches N	E	S	W
Exits	N	0.000	0.000	0.000	0.000
	E	0.000	0.000	0.000	0.000
	S	0.000	0.000	0.000	0.000
	W	0.000	0.000	0.000	0.000

Adjusted Flow Rate v_i		Approaches N	E	S	W
Exits	N	0	0	1	16
	E	55	0	85	507
	S	11	163	0	11
	W	33	930	7	0
Entry Flow Rate (pc/h)		99	1093	93	534
Conflict Flow (pc/h)		1100	24	578	229
Bypass Delay		0.0	41.8	0.0	0.0
Weighted Entry Veh Factor		0.994	0.994	0.947	0.997
1st Bypass Entry Flov		0	71	0	0
Weighted Conflict Factors		0.992	0.913	0.996	0.995

Output		Approaches N	E	S	W
Conflict flow (veh/h)	v_c	1091	22	576	228
Entry flow (veh/h)	v_i	98	1086	88	532
Entry capacity (veh/h)	c_i	374	1097	600	896
Pedestrian impedance	f_{ped}	1	1	1	1
Leg v/c ratio	x_i	0.26	0.99	0.15	0.59
Control delay (sec/veh)	d_i	14.3	44.3	7.8	12.6
LOS	n/a	B	E	A	B
HCM 95th% Queue (veh)	Q_m	1	20	1	4

Int cntrl delay (sec/veh)	d_{int}	32.02
Intersection LOS	n/a	D

Intersection	
Intersection Delay, s/veh	12.1
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	320	5	65	510	55	2	1	45	45	5	25
Future Vol, veh/h	10	320	5	65	510	55	2	1	45	45	5	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	1	0	2	3	0	0	0	0	2	0	0
Mvmt Flow	11	348	5	71	554	60	2	1	49	49	5	27
Number of Lanes	1	2	0	1	2	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	3	3
HCM Control Delay	11.1	12.9	9.7	11
HCM LOS	B	B	A	B

Lane	NBLn1	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1
Vol Left, %	4%	100%	0%	0%	100%	0%	0%	60%
Vol Thru, %	2%	0%	100%	96%	0%	100%	76%	7%
Vol Right, %	94%	0%	0%	4%	0%	0%	24%	33%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	48	10	213	112	65	340	225	75
LT Vol	2	10	0	0	65	0	0	45
Through Vol	1	0	213	107	0	340	170	5
RT Vol	45	0	0	5	0	0	55	25
Lane Flow Rate	52	11	232	121	71	370	245	82
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.091	0.019	0.37	0.192	0.117	0.561	0.356	0.157
Departure Headway (Hd)	6.301	6.24	5.752	5.703	5.951	5.463	5.239	6.947
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	568	574	626	630	606	665	690	517
Service Time	4.043	3.97	3.482	3.433	3.651	3.163	2.939	4.687
HCM Lane V/C Ratio	0.092	0.019	0.371	0.192	0.117	0.556	0.355	0.159
HCM Control Delay	9.7	9.1	11.8	9.8	9.4	14.9	10.8	11
HCM Lane LOS	A	A	B	A	A	B	B	B
HCM 95th-tile Q	0.3	0.1	1.7	0.7	0.4	3.5	1.6	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	25	1100	1270	85	445	95
Future Volume (vph)	25	1100	1270	85	445	95
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.5	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	0.95		0.97	
Frt	1.00	1.00	0.99		0.97	
Flt Protected	0.95	1.00	1.00		0.96	
Satd. Flow (prot)	1662	3260	3233		3107	
Flt Permitted	0.95	1.00	1.00		0.96	
Satd. Flow (perm)	1662	3260	3233		3107	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	1196	1380	92	484	103
RTOR Reduction (vph)	0	0	3	0	15	0
Lane Group Flow (vph)	27	1196	1469	0	572	0
Heavy Vehicles (%)	0%	2%	2%	0%	2%	3%
Turn Type	Prot	NA	NA		Prot	
Protected Phases	5	2	6		4	
Permitted Phases						
Actuated Green, G (s)	1.8	55.9	50.6		21.3	
Effective Green, g (s)	1.8	56.4	51.1		21.8	
Actuated g/C Ratio	0.02	0.61	0.55		0.23	
Clearance Time (s)	3.5	4.5	4.5		4.5	
Vehicle Extension (s)	1.0	2.0	2.0		1.0	
Lane Grp Cap (vph)	32	1977	1776		728	
v/s Ratio Prot	0.02	c0.37	c0.45		c0.18	
v/s Ratio Perm						
v/c Ratio	0.84	0.60	0.83		0.79	
Uniform Delay, d1	45.5	11.4	17.3		33.4	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	93.1	0.4	3.1		5.2	
Delay (s)	138.5	11.7	20.4		38.6	
Level of Service	F	B	C		D	
Approach Delay (s)		14.5	20.4		38.6	
Approach LOS		B	C		D	

Intersection Summary			
HCM 2000 Control Delay	21.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	93.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	675	0	760	530	490	620
Future Volume (vph)	675	0	760	530	490	620
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5		4.0	4.5	6.0	5.0
Lane Util. Factor	*0.70		0.95	1.00	0.97	0.95
Frt	1.00		1.00	0.85	1.00	1.00
Flt Protected	0.95		1.00	1.00	0.95	1.00
Satd. Flow (prot)	2260		3292	1458	3162	3292
Flt Permitted	0.95		1.00	1.00	0.95	1.00
Satd. Flow (perm)	2260		3292	1458	3162	3292
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	711	0	800	558	516	653
RTOR Reduction (vph)	0	0	0	15	0	0
Lane Group Flow (vph)	711	0	800	543	516	653
Heavy Vehicles (%)	3%	8%	1%	2%	2%	1%
Turn Type	Prot	Perm	NA	pm+ov	Prot	NA
Protected Phases	8		2	8	1	6
Permitted Phases		8		2		6
Actuated Green, G (s)	40.6		33.7	74.3	30.2	69.9
Effective Green, g (s)	40.6		34.7	74.3	30.2	69.9
Actuated g/C Ratio	0.34		0.29	0.62	0.25	0.58
Clearance Time (s)	4.5		5.0	4.5	6.0	5.0
Vehicle Extension (s)	1.0		4.2	1.0	2.5	4.2
Lane Grp Cap (vph)	764		951	957	795	1917
v/s Ratio Prot	c0.31		c0.24	0.19	c0.16	0.20
v/s Ratio Perm				0.18		
v/c Ratio	0.93		0.84	0.57	0.65	0.34
Uniform Delay, d1	38.3		40.1	13.4	40.2	13.0
Progression Factor	1.00		0.52	0.33	1.00	1.00
Incremental Delay, d2	17.6		4.5	0.3	4.1	0.2
Delay (s)	56.0		25.3	4.7	44.2	13.2
Level of Service	E		C	A	D	B
Approach Delay (s)	56.0		16.8			26.9
Approach LOS	E		B			C

Intersection Summary			
HCM 2000 Control Delay	29.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	20	1500	5	65	115	0	0	5	90
Future Volume (vph)	0	0	0	20	1500	5	65	115	0	0	5	90
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)					4.5			4.5			4.5	
Lane Util. Factor					0.95			1.00			1.00	
Frt					1.00			1.00			0.87	
Flt Protected					1.00			0.98			1.00	
Satd. Flow (prot)					3256			1690			1512	
Flt Permitted					1.00			0.85			1.00	
Satd. Flow (perm)					3256			1462			1512	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	20	1500	5	65	115	0	0	5	90
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	19	0
Lane Group Flow (vph)	0	0	0	0	1525	0	0	180	0	0	76	0
Heavy Vehicles (%)	0%	2%	0%	2%	2%	2%	3%	1%	2%	2%	0%	1%
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8			2					
Actuated Green, G (s)					30.2			11.5			11.5	
Effective Green, g (s)					30.2			11.5			11.5	
Actuated g/C Ratio					0.60			0.23			0.23	
Clearance Time (s)					4.5			4.5			4.5	
Vehicle Extension (s)					3.0			3.0			3.0	
Lane Grp Cap (vph)					1939			331			342	
v/s Ratio Prot											0.05	
v/s Ratio Perm					0.47			c0.12				
v/c Ratio					0.79			0.54			0.22	
Uniform Delay, d1					7.8			17.3			16.0	
Progression Factor					1.00			1.00			1.00	
Incremental Delay, d2					2.2			1.8			0.3	
Delay (s)					10.0			19.1			16.3	
Level of Service					A			B			B	
Approach Delay (s)		0.0			10.0			19.1			16.3	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	11.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	50.7	Sum of lost time (s)	9.0
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Oregon Department of Transportation

Transportation Development Branch

Transportation Planning Analysis Unit

Preliminary Traffic Signal Warrant Analysis[1]

Major Street:	Washington Ave	**Minor Street:**	Spruce St
Project:	Roseburg TSP	**City/County:**	Roseburg City
Year:	2040	**Alternative:**	0

Preliminary Signal Warrant Volumes

Number of Approach lanes		ADT on major street approaching from both directions		ADT on minor street, highest approaching volume	
Major Street	Minor Street	Percent of standard warrants 100	70	Percent of standard warrants 100	70
Case A: Minimum Vehicular Traffic					
1	1	8850	6200	2650	1850
2 or more	1	10600	7400	2650	1850
2 or more	2 or more	10600	7400	3550	2500
1	2 or more	8850	6200	3550	2500
Case B: Interruption of Continuous Traffic					
1	1	13300	9300	1350	950
2 or more	1	15900	11100	1350	950
2 or more	2 or more	15900	11100	1750	1250
1	2 or more	13300	9300	1750	1250
X	100 percent of standard warrants				
	70 percent of standard warrants[2]				

Preliminary Signal Warrant Calculation

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2 or more	10600	15250	N
	Minor	1	2650	1800	
Case B	Major	2 or more	15900	15250	N
	Minor	1	1350	1800	
Analyst and Date:			Reviewer and Date:		

[1] Meeting preliminary signal warrants does **not** guarantee that a signal will be installed. When preliminary signal warrants are met, project analysts need to coordinate with Region Traffic to initiate the traffic signal engineering investigation as outlined in the Traffic Manual. Before a signal can be installed, the engineering investigation must be conducted or reviewed by the Region Traffic Manager who will forward signal recommendations to headquarters. Traffic signal warrants must be met and the State Traffic Engineer's approval obtained before a traffic signal can be installed on a state highway.

[2] Used due to 85th percentile speed in excess of 40 mph or isolated community with population of less than 10,000.

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	20	1500	5	0	0	0	0	5	90
Future Vol, veh/h	0	0	0	20	1500	5	0	0	0	0	5	90
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	-	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	2	0	2	2	2	3	1	2	2	0	1
Mvmt Flow	0	0	0	20	1500	5	0	0	0	0	5	90

Major/Minor	Major2			Minor2		
Conflicting Flow All	0	0	0	-	1543	753
Stage 1	-	-	-	-	1543	-
Stage 2	-	-	-	-	0	-
Critical Hdwy	4.14	-	-	-	6.5	6.92
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.22	-	-	-	4	3.31
Pot Cap-1 Maneuver	-	-	-	0	116	354
Stage 1	-	-	-	0	178	-
Stage 2	-	-	-	0	-	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	0	354
Mov Cap-2 Maneuver	-	-	-	-	0	-
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-

Approach	WB	SB
HCM Control Delay, s		18.9
HCM LOS		C

Minor Lane/Major Mvmt	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	354
HCM Lane V/C Ratio	-	-	-	0.268
HCM Control Delay (s)	-	-	-	18.9
HCM Lane LOS	-	-	-	C
HCM 95th %tile Q(veh)	-	-	-	1.1

Intersection	
Int Delay, s/veh	6.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	215	10	505	380	10	275
Future Vol, veh/h	215	10	505	380	10	275
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Free	-	None	-	Yield
Storage Length	-	-	225	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	1	33	3	1	40	3
Mvmt Flow	231	11	543	409	11	296

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	231	0	1726	231
Stage 1	-	-	-	-	231	-
Stage 2	-	-	-	-	1495	-
Critical Hdwy	-	-	4.13	-	6.8	6.23
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	-	-	2.227	-	3.86	3.327
Pot Cap-1 Maneuver	-	0	1331	-	79	806
Stage 1	-	0	-	-	726	-
Stage 2	-	0	-	-	168	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	1331	-	47	806
Mov Cap-2 Maneuver	-	-	-	-	47	-
Stage 1	-	-	-	-	430	-
Stage 2	-	-	-	-	168	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.5	15.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	WBL	WBT
Capacity (veh/h)	47	806	-	1331	-
HCM Lane V/C Ratio	0.229	0.367	-	0.408	-
HCM Control Delay (s)	103	12	-	9.6	-
HCM Lane LOS	F	B	-	A	-
HCM 95th %tile Q(veh)	0.8	1.7	-	2	-

Intersection	
Int Delay, s/veh	25.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	465	10	150	850	65	5	1	75	50	10	30
Future Vol, veh/h	15	465	10	150	850	65	5	1	75	50	10	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	2	3	0	0	0	0	2	0	0
Mvmt Flow	16	505	11	163	924	71	5	1	82	54	11	33

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	995	0	0	516	0	0	1851	1864	511	1870	1834	960
Stage 1	-	-	-	-	-	-	543	543	-	1286	1286	-
Stage 2	-	-	-	-	-	-	1308	1321	-	584	548	-
Critical Hdwy	4.1	-	-	4.12	-	-	7.1	6.5	6.2	7.12	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.12	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.12	5.5	-
Follow-up Hdwy	2.2	-	-	2.218	-	-	3.5	4	3.3	3.518	4	3.3
Pot Cap-1 Maneuver	703	-	-	1050	-	-	58	74	567	55	77	314
Stage 1	-	-	-	-	-	-	528	523	-	202	237	-
Stage 2	-	-	-	-	-	-	198	228	-	498	520	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	703	-	-	1050	-	-	39	61	567	~ 40	64	314
Mov Cap-2 Maneuver	-	-	-	-	-	-	39	61	-	~ 40	64	-
Stage 1	-	-	-	-	-	-	516	511	-	197	200	-
Stage 2	-	-	-	-	-	-	142	193	-	416	508	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	1.3	22.5	$ 460.1
HCM LOS			C	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	293	703	-	-	1050	-	-	60
HCM Lane V/C Ratio	0.3	0.023	-	-	0.155	-	-	1.63
HCM Control Delay (s)	22.5	10.2	-	-	9.1	-	-	$ 460.1
HCM Lane LOS	C	B	-	-	A	-	-	F
HCM 95th %tile Q(veh)	1.2	0.1	-	-	0.5	-	-	8.9

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	285	550	1	1	965	490	5	5	5	285	1	435
Future Volume (vph)	285	550	1	1	965	490	5	5	5	285	1	435
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.95		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98		0.95	1.00	
Satd. Flow (prot)	1630	1715		1662	1716	1488		1644		1646	1459	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.59		0.75	1.00	
Satd. Flow (perm)	1630	1715		1662	1716	1488		985		1296	1459	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	300	579	1	1	1016	516	5	5	5	300	1	458
RTOR Reduction (vph)	0	0	0	0	0	151	0	4	0	0	219	0
Lane Group Flow (vph)	300	580	0	1	1016	365	0	11	0	300	240	0
Heavy Vehicles (%)	2%	2%	0%	0%	2%	0%	0%	0%	0%	1%	0%	2%
Turn Type	Prot	NA		Prot	NA	Prot	Perm	NA		Perm	NA	
Protected Phases	1	6		5	2	2		4			4	
Permitted Phases							4			4		
Actuated Green, G (s)	20.0	90.2		1.0	71.2	71.2		28.0		28.0	28.0	
Effective Green, g (s)	20.0	91.7		1.0	72.7	72.7		28.5		28.5	28.5	
Actuated g/C Ratio	0.15	0.69		0.01	0.55	0.55		0.21		0.21	0.21	
Clearance Time (s)	4.0	5.5		4.0	5.5	5.5		4.5		4.5	4.5	
Vehicle Extension (s)	3.0	4.5		3.0	4.5	4.5		3.5		3.5	3.5	
Lane Grp Cap (vph)	244	1180		12	936	812		210		277	312	
v/s Ratio Prot	c0.18	0.34		0.00	c0.59	0.25					0.16	
v/s Ratio Perm								0.01		c0.23		
v/c Ratio	1.23	0.49		0.08	1.09	0.45		0.05		1.08	0.77	
Uniform Delay, d1	56.6	9.8		65.6	30.2	18.2		41.6		52.3	49.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	133.8	0.6		3.0	55.4	0.7		0.1		78.0	11.5	
Delay (s)	190.4	10.3		68.6	85.7	18.9		41.7		130.3	60.8	
Level of Service	F	B		E	F	B		D		F	E	
Approach Delay (s)		71.7			63.2			41.7			88.3	
Approach LOS		E			E			D			F	

Intersection Summary			
HCM 2000 Control Delay	71.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	133.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	111.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	59.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	765	800	5	530	1170
Future Vol, veh/h	0	765	800	5	530	1170
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	832	870	5	576	1272

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	438	0	0	875	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	4.14	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	0	~ 567	-	-	767	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	~ 567	-	-	767	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	239.6	0	7
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	567	767	-
HCM Lane V/C Ratio	-	-	1.467	0.751	-
HCM Control Delay (s)	-	-	239.6	22.4	-
HCM Lane LOS	-	-	F	C	-
HCM 95th %tile Q(veh)	-	-	40.7	7	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Oregon Department of Transportation

Transportation Development Branch

Transportation Planning Analysis Unit

Preliminary Traffic Signal Warrant Analysis[1]

Major Street:	Stephens St	**Minor Street:**	Winchester
Project:	Roseburg TSP	**City/County:**	Roseburg City
Year:	2040	**Alternative:**	0

Preliminary Signal Warrant Volumes

Number of Approach lanes		ADT on major street approaching from both directions		ADT on minor street, highest approaching volume	
Major Street	Minor Street	Percent of standard warrants 100	70	Percent of standard warrants 100	70
Case A: Minimum Vehicular Traffic					
1	1	8850	6200	2650	1850
2 or more	1	10600	7400	2650	1850
2 or more	2 or more	10600	7400	3550	2500
1	2 or more	8850	6200	3550	2500
Case B: Interruption of Continuous Traffic					
1	1	13300	9300	1350	950
2 or more	1	15900	11100	1350	950
2 or more	2 or more	15900	11100	1750	1250
1	2 or more	13300	9300	1750	1250
X	100 percent of standard warrants				
	70 percent of standard warrants[2]				

Preliminary Signal Warrant Calculation

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2 or more	10600	25000	Y
	Minor	1	2650	3114	
Case B	Major	2 or more	15900	25000	Y
	Minor	1	1350	3114	

Analyst and Date:	Reviewer and Date:

[1] Meeting preliminary signal warrants does **not** guarantee that a signal will be installed. When preliminary signal warrants are met, project analysts need to coordinate with Region Traffic to initiate the traffic signal engineering investigation as outlined in the Traffic Manual. Before a signal can be installed, the engineering investigation must be conducted or reviewed by the Region Traffic Manager who will forward signal recommendations to headquarters. Traffic signal warrants must be met and the State Traffic Engineer's approval obtained before a traffic signal can be installed on a state highway.

[2] Used due to 85th percentile speed in excess of 40 mph or isolated community with population of less than 10,000.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	765	800	5	530	1170
Future Volume (vph)	0	765	800	5	530	1170
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5	4.0	4.0	4.0	4.0
Lane Util. Factor		0.88	0.95	1.00	1.00	0.95
Frt		0.85	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		2567	3260	1458	1630	3260
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		2567	3260	1458	1630	3260
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	832	870	5	576	1272
RTOR Reduction (vph)	0	24	0	3	0	0
Lane Group Flow (vph)	0	808	870	2	576	1272
Turn Type		pt+ov	NA	Perm	Prot	NA
Protected Phases		3 1	2		1	6
Permitted Phases				2		
Actuated Green, G (s)		43.0	25.4	25.4	32.7	62.6
Effective Green, g (s)		43.0	25.9	25.9	33.2	63.1
Actuated g/C Ratio		0.56	0.33	0.33	0.43	0.82
Clearance Time (s)			4.5	4.5	4.5	4.5
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		1426	1090	487	699	2657
v/s Ratio Prot		c0.31	c0.27		c0.35	0.39
v/s Ratio Perm				0.00		
v/c Ratio		0.57	0.80	0.00	0.82	0.48
Uniform Delay, d1		11.2	23.4	17.2	19.5	2.2
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.5	4.2	0.0	7.8	0.1
Delay (s)		11.7	27.5	17.2	27.3	2.3
Level of Service		B	C	B	C	A
Approach Delay (s)	11.7		27.5			10.1
Approach LOS	B		C			B

Intersection Summary			
HCM 2000 Control Delay	14.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	77.4	Sum of lost time (s)	13.0
Intersection Capacity Utilization	62.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑						↑↱			↑↑↑	
Traffic Volume (vph)	0	530	0	0	0	0	0	800	5	0	1700	0
Future Volume (vph)	0	530	0	0	0	0	0	800	5	0	1700	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5						4.5			4.5	
Lane Util. Factor		1.00						0.95			0.91	
Frt		1.00						1.00			1.00	
Flt Protected		1.00						1.00			1.00	
Satd. Flow (prot)		1716						3257			4684	
Flt Permitted		1.00						1.00			1.00	
Satd. Flow (perm)		1716						3257			4684	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	576	0	0	0	0	0	870	5	0	1848	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	576	0	0	0	0	0	874	0	0	1848	0
Turn Type		NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases												
Actuated Green, G (s)		32.0						40.8			40.8	
Effective Green, g (s)		32.0						40.8			40.8	
Actuated g/C Ratio		0.39						0.50			0.50	
Clearance Time (s)		4.5						4.5			4.5	
Vehicle Extension (s)		3.0						3.0			3.0	
Lane Grp Cap (vph)		671						1624			2336	
v/s Ratio Prot		c0.34						0.27			c0.39	
v/s Ratio Perm												
v/c Ratio		0.86						0.54			0.79	
Uniform Delay, d1		22.8						14.0			17.0	
Progression Factor		1.00						1.00			1.00	
Incremental Delay, d2		10.6						0.3			1.9	
Delay (s)		33.4						14.4			18.9	
Level of Service		C						B			B	
Approach Delay (s)		33.4			0.0			14.4			18.9	
Approach LOS		C			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	81.8	Sum of lost time (s)	9.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	1065	5	5	825	10	5	1	1	20	1	35
Future Volume (vph)	30	1065	5	5	825	10	5	1	1	20	1	35
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.98			0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.98	
Satd. Flow (prot)	1662	3196		1662	3193			1657			1531	
Flt Permitted	0.31	1.00		0.22	1.00			0.82			0.89	
Satd. Flow (perm)	541	3196		381	3193			1400			1389	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	31	1109	5	5	859	10	5	1	1	21	1	36
RTOR Reduction (vph)	0	0	0	0	1	0	0	1	0	0	29	0
Lane Group Flow (vph)	31	1114	0	5	868	0	0	6	0	0	29	0
Heavy Vehicles (%)	0%	4%	0%	0%	4%	0%	0%	0%	0%	8%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	22.0	22.0		22.0	22.0			6.7			6.7	
Effective Green, g (s)	22.5	22.5		22.5	22.5			7.2			7.2	
Actuated g/C Ratio	0.60	0.60		0.60	0.60			0.19			0.19	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	322	1907		227	1905			267			265	
v/s Ratio Prot		c0.35			0.27							
v/s Ratio Perm	0.06			0.01				0.00			c0.02	
v/c Ratio	0.10	0.58		0.02	0.46			0.02			0.11	
Uniform Delay, d1	3.3	4.7		3.1	4.2			12.4			12.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	0.5		0.0	0.2			0.0			0.2	
Delay (s)	3.4	5.2		3.1	4.4			12.4			12.8	
Level of Service	A	A		A	A			B			B	
Approach Delay (s)		5.1			4.4			12.4			12.8	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	5.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	37.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Oregon Department of Transportation

Transportation Development Branch

Transportation Planning Analysis Unit

Preliminary Traffic Signal Warrant Analysis[1]

Major Street:	Diamond Lake Blvd	**Minor Street:**	Fulton
Project:	Roseburg TSP	**City/County:**	Roseburg City
Year:	2040	**Alternative:**	0

Preliminary Signal Warrant Volumes

Number of Approach lanes		ADT on major street approaching from both directions		ADT on minor street, highest approaching volume	
Major Street	Minor Street	Percent of standard warrants 100	70	Percent of standard warrants 100	70
Case A: Minimum Vehicular Traffic					
1	1	8850	6200	2650	1850
2 or more	1	10600	7400	2650	1850
2 or more	2 or more	10600	7400	3550	2500
1	2 or more	8850	6200	3550	2500
Case B: Interruption of Continuous Traffic					
1	1	13300	9300	1350	950
2 or more	1	15900	11100	1350	950
2 or more	2 or more	15900	11100	1750	1250
1	2 or more	13300	9300	1750	1250

X	100 percent of standard warrants
	70 percent of standard warrants[2]

Preliminary Signal Warrant Calculation

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2 or more	10600	19300	N
	Minor	1	2650	210	
Case B	Major	2 or more	15900	19300	N
	Minor	1	1350	210	

Analyst and Date:	Reviewer and Date:

[1] Meeting preliminary signal warrants does **not** guarantee that a signal will be installed. When preliminary signal warrants are met, project analysts need to coordinate with Region Traffic to initiate the traffic signal engineering investigation as outlined in the Traffic Manual. Before a signal can be installed, the engineering investigation must be conducted or reviewed by the Region Traffic Manager who will forward signal recommendations to headquarters. Traffic signal warrants must be met and the State Traffic Engineer's approval obtained before a traffic signal can be installed on a state highway.

[2] Used due to 85th percentile speed in excess of 40 mph or isolated community with population of less than 10,000.

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	215	10	505	380	10	275
Future Volume (vph)	215	10	505	380	10	275
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0		4.0	4.0	4.0	4.5
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	1705		1630	1716	1630	1458
Flt Permitted	1.00		0.40	1.00	0.95	1.00
Satd. Flow (perm)	1705		689	1716	1630	1458
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	234	11	549	413	11	299
RTOR Reduction (vph)	1	0	0	0	0	114
Lane Group Flow (vph)	244	0	549	413	11	185
Turn Type	NA		pm+pt	NA	Prot	pt+ov
Protected Phases	6		5	2	4	4 5
Permitted Phases			2			
Actuated Green, G (s)	25.4		52.9	52.9	28.1	55.6
Effective Green, g (s)	25.9		53.4	53.4	28.6	55.6
Actuated g/C Ratio	0.29		0.59	0.59	0.32	0.62
Clearance Time (s)	4.5		4.5	4.5	4.5	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	490		654	1018	517	900
v/s Ratio Prot	0.14		c0.22	0.24	0.01	c0.13
v/s Ratio Perm			c0.28			
v/c Ratio	0.50		0.84	0.41	0.02	0.21
Uniform Delay, d1	26.6		12.4	9.8	21.1	7.5
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	3.6		9.3	1.2	0.1	0.1
Delay (s)	30.2		21.7	11.0	21.2	7.6
Level of Service	C		C	B	C	A
Approach Delay (s)	30.2			17.1	8.1	
Approach LOS	C			B	A	

Intersection Summary			
HCM 2000 Control Delay	17.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	57.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Oregon Department of Transportation

Transportation Development Branch

Transportation Planning Analysis Unit

Preliminary Traffic Signal Warrant Analysis[1]

Major Street:	Harvard Ave	**Minor Street:**	Lookingglass
Project:	Roseburg TSP	**City/County:**	Roseburg City
Year:	2040	**Alternative:**	0

Preliminary Signal Warrant Volumes

Number of Approach lanes		ADT on major street approaching from both directions		ADT on minor street, highest approaching volume	
Major Street	Minor Street	Percent of standard warrants 100	70	Percent of standard warrants 100	70
Case A: Minimum Vehicular Traffic					
1	1	8850	6200	2650	1850
2 or more	1	10600	7400	2650	1850
2 or more	2 or more	10600	7400	3550	2500
1	2 or more	8850	6200	3550	2500
Case B: Interruption of Continuous Traffic					
1	1	13300	9300	1350	950
2 or more	1	15900	11100	1350	950
2 or more	2 or more	15900	11100	1750	1250
1	2 or more	13300	9300	1750	1250
X	100 percent of standard warrants				
	70 percent of standard warrants[2]				

Preliminary Signal Warrant Calculation

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2 or more	10600	11100	N
	Minor	1	2650	300	
Case B	Major	2 or more	15900	11100	N
	Minor	1	1350	300	
Analyst and Date:			Reviewer and Date:		

[1] Meeting preliminary signal warrants does **not** guarantee that a signal will be installed. When preliminary signal warrants are met, project analysts need to coordinate with Region Traffic to initiate the traffic signal engineering investigation as outlined in the Traffic Manual. Before a signal can be installed, the engineering investigation must be conducted or reviewed by the Region Traffic Manager who will forward signal recommendations to headquarters. Traffic signal warrants must be met and the State Traffic Engineer's approval obtained before a traffic signal can be installed on a state highway.

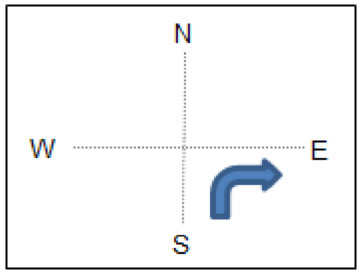
[2] Used due to 85th percentile speed in excess of 40 mph or isolated community with population of less than 10,000.

Bypass Lane Merge Point Analysis

Only two selections are necessary (cell E13 and yield selection button).

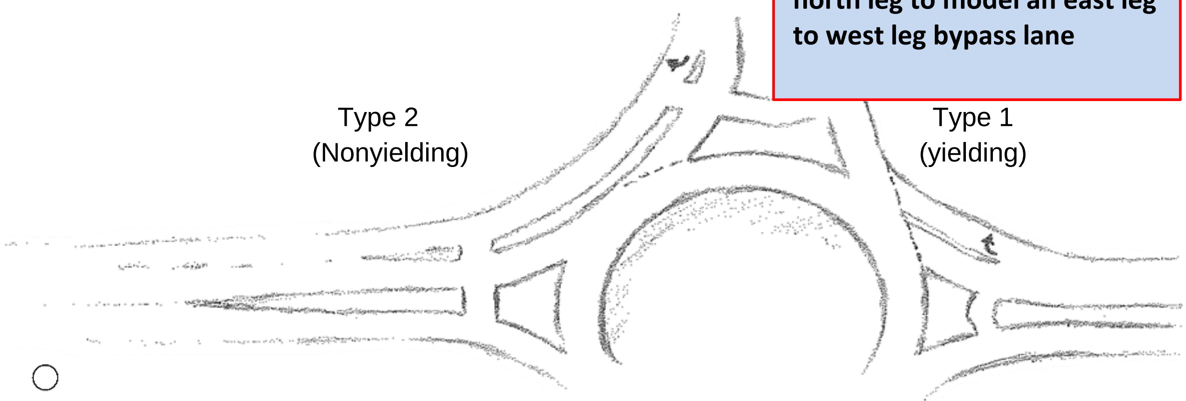
Entry on the Single Lane Roundabout Calculator:

Hour Volumes vph		Approaches N	E	S	W
Exits	N	0	380	10	0
	E	215	0	275	0
	S	10	505	0	0
	W	0	0	0	0



A heavy right turn volume approaches at the East leg.
The heavy right turn volume then exits on the North leg.

Note: Had to manually adjust volumes from west leg to north leg to model an east leg to west leg bypass lane



Type 2 Nonyielding Bypass lane

If there is room for a new lane, then bypass LOS is A and capacity is expected to be high (higher than yielding bypass values shown below) and the analysis is complete for this bypass lane.

Considerations for a Type 2 nonyielding bypass lane:

- A median refuge should ensure a pedestrian only crosses one lane at a time
- Bypass travel path geometrically slows traffic
- Is there a heavy left turn volume down this leg to create a demand to quickly merge?

Type 1 Yielding Bypass lane

Items to keep in mind if constrained to a Type 1 nonyielding bypass lane:

- Angle that driver has to look over the shoulder to merge, then forward to yield to pedestrians
- All traffic volume is now in one lane, consider what gaps exist for pedestrian
- Safety of heavy right movement merging into all movements exiting roundabout

		1115	pc/h
Capacity	c	1113	veh/h
Entry Flow Rates	v	409	veh/h
Volume to Capacity ratio	v/c	0.37	
Delay		7	s/veh
LOS		A	
HCM Queue		2	veh

The roundabout analysis with the East approach to the North leg bypass volume removed is to the right. Please print and electronically save this information for your records.

General Information		Passenger Car Equivalents			Rec
Analyst:	Angela Rogge	bicycle	E_b	1	1
Agency:	DEA	medium	E_m	1.5	1.5
Date:	9/17/2018	heavy	E_h	2	2
East leg:	Harvard	South leg:	Lookingglass Rd		
Project:	Roseburg TSP		Year:	20yrs > build	

Roundabout Input			
3 or 4 legs			3
Portion of an hour:			0.25
Peak hr	4	30	PM

N / W / E / S

Pedestrian crossings per l	N	E	S	W
#	0	0	0	0

ONE BYPASS

Hour Volumes vph (Exits)	N	E	S	W
N	0	0	10	0
E	215	0	275	0
S	10	505	0	0
W	0	0	0	0

Flow Rate v_i (Exits)	N	E	S	W
N	0	0	11	0
E	231	0	296	0
S	11	543	0	0
W	0	0	0	0

Peak Hour Factor PHF (Exits)	N	E	S	W
N	0.93	0.00	0.93	0.93
E	0.93	0.93	0.93	0.93
S	0.93	0.93	0.93	0.93
W	0.93	0.93	0.93	0.93

Vehicle Factor f_{hv} (Exits)	N	E	S	W
N	1.000	1.000	0.833	1.000
E	0.998	1.000	0.991	1.000
S	0.952	0.993	1.000	1.000
W	1.000	1.000	1.000	1.000

# of Bicycles vph (Exits)	N	E	S	W
N	0	0	0	0
E	0	0	0	0
S	0	0	0	0
W	0	0	0	0

Proportion of Bicycle P_b (Exits)	N	E	S	W
N	0.000	0.000	0.000	0.000
E	0.000	0.000	0.000	0.000
S	0.000	0.000	0.000	0.000
W	0.000	0.000	0.000	0.000

# of Medium Trucks vph (Exits)	N	E	S	W
N	0	0	4	0
E	1	0	5	0
S	1	7	0	0
W	0	0	0	0

Proportion of Medium P_m (Exits)	N	E	S	W
N	0.000	0.000	0.400	0.000
E	0.005	0.000	0.018	0.000
S	0.100	0.014	0.000	0.000
W	0.000	0.000	0.000	0.000

# of Heavy Trucks vph (Exits)	N	E	S	W
N	0	0	0	0
E	0	0	0	0
S	0	0	0	0
W	0	0	0	0

Proportion of Heavy P_h (Exits)	N	E	S	W
N	0.000	0.000	0.000	0.000
E	0.000	0.000	0.000	0.000
S	0.000	0.000	0.000	0.000
W	0.000	0.000	0.000	0.000

Adjusted Flow Rate v_i (Exits)	N	E	S	W
N	0	0	13	0
E	231	0	299	0
S	12	547	0	0
W	0	0	0	0
Entry Flow Rate (pc/h)	243	547	312	0
Conflict Flow (pc/h)	547	13	231	790
Bypass Delay	0.0	8.0	0.0	0.0
Weighted Entry Veh Factor	0.996	0.993	0.984	#DIV/0!
1st Bypass Entry Flov	0	409	0	0
Weighted Conflict Factors	0.993	0.833	0.998	0.994

Output		N	E	S	W
Conflict flow (veh/h)	v_c	543	11	231	785
Entry flow (veh/h)	v_i	242	543	307	#DIV/0!
Entry capacity (veh/h)	c_i	651	1108	883	#DIV/0!
Pedestrian impedance	f_{ped}	1	1	1	1
Leg v/c ratio	x_i	0.37	0.49	0.35	#DIV/0!
Control delay (sec/veh)	d_i	10.6	8.8	8.0	#DIV/0!
LOS	n/a	B	A	A	#DIV/0!
HCM 95th% Queue (veh)	Q_m	2	3	2	#DIV/0!

Int cntrl delay (sec/veh)	d_{int}	8.93
Intersection LOS	n/a	A

Single Lane Roundabout Input Sheet

General Information	
Analyst:	Angela Rogge
Agency:	DEA
Date:	9/17/2018
East leg:	Harvard
Project:	Roseburg TSP

Passenger Car Equivalents			Rec
bicycle	E_b	1	1
medium	E_m	1.5	1.5
heavy	E_h	2	2

South leg	Lookingglass Rd
Year:	20yrs > build

Roundabout Input			
3 or 4 legs			3
Portion of an hour:			0.25
Peak hr	4	30	PM

N
W E
S

Pedestrian crossings per le	Approaches N	E	S	W
#	0	0	0	0

Hour Volumes vph		Approaches N	E	S	W
Exits	N	0	0	0	0
	E	0	0	275	215
	S	0	505	0	10
	W	0	380	10	0

Changes here do not go to Input tab.

Flow Rate v_i		Approaches N	E	S	W
Exits	N	0	0	0	0
	E	0	0	296	231
	S	0	543	0	11
	W	0	409	11	0

Peak Hour Factor PHF		Approaches N	E	S	W
Exits	N	0.93	0.93	0.93	0.93
	E	0.93	0.93	0.93	0.93
	S	0.93	0.93	0.93	0.93
	W	0.93	0.93	0.93	0.93

Vehicle Factor f_{hv}		Approaches N	E	S	W
Exits	N	1.000	1.000	1.000	1.000
	E	1.000	1.000	0.991	0.998
	S	1.000	0.993	1.000	0.952
	W	1.000	0.998	0.833	1.000

# of Bicycles vph		Approaches N	E	S	W
Exits	N	0	0	0	0
	E	0	0	0	0
	S	0	0	0	0
	W	0	0	0	0

Proportion of Bicycle P_b		Approaches N	E	S	W
Exits	N	0.000	0.000	0.000	0.000
	E	0.000	0.000	0.000	0.000
	S	0.000	0.000	0.000	0.000
	W	0.000	0.000	0.000	0.000

# of Medium Trucks vph		Approaches N	E	S	W
Exits	N	0	0	0	0
	E	0	0	5	1
	S	0	7	0	1
	W	0	2	4	0

Proportion of Medium P_m		Approaches N	E	S	W
Exits	N	0.000	0.000	0.000	0.000
	E	0.000	0.000	0.018	0.005
	S	0.000	0.014	0.000	0.100
	W	0.000	0.005	0.400	0.000

# of Heavy Trucks vph		Approaches N	E	S	W
Exits	N	0	0	0	0
	E	0	0	0	0
	S	0	0	0	0
	W	0	0	0	0

Proportion of Heavy P_h		Approaches N	E	S	W
Exits	N	0.000	0.000	0.000	0.000
	E	0.000	0.000	0.000	0.000
	S	0.000	0.000	0.000	0.000
	W	0.000	0.000	0.000	0.000

Adjusted Flow Rate v_i		Approaches N	E	S	W
Exits	N	0	0	0	0
	E	0	0	299	231
	S	0	547	0	12
	W	0	410	13	0
Entry Flow Rate (pc/h)		0	957	312	243
Conflict Flow (pc/h)		970	13	231	547

Exits w/o right vol pch		Weighted Entry Vehicle Factors			
N	0	#DIV/0!	0.995	0.984	0.996
E	231				
S	547	Weighted Conflict Vehicle Factors			
W	423	0.993	0.833	0.998	0.993

Output		Approaches N	E	S	W
Conflict flow (veh/h)	v_c	963	11	231	543
Entry flow (veh/h)	v_i	#DIV/0!	952	307	242
Entry capacity (veh/h)	c_i	#DIV/0!	1110	883	651
Pedestrian impedance	f_{ped}	1	1	1	1
Leg v/c ratio	x_i	#DIV/0!	0.86	0.35	0.37
Control delay (sec/veh)	d_i	#DIV/0!	23.4	8.0	10.6
LOS	n/a	#DIV/0!	C	A	B
HCM 95th% Queue (veh)	Q_m	#DIV/0!	12	2	2

Int cntrl delay (sec/veh)	d_{int}	18.17
Intersection LOS	n/a	C

Technical Memorandum 5 – Appendix B

Relevant Projects - Interchange Area Management Plans (IAMPs)

Within the interchange management areas for I-5 exits 123, 124, 125, 127 and 129, the TSP will acknowledge the concepts identified in previous plans and note suggested revisions where applicable. Table 1 summarizes the projects from the area IAMPs and the suggested revisions by the TSP Update.

TABLE 1. SUGGESTED REVISIONS TO LOCAL IAMPS

IAMP	Identified Deficiency	Project	TSP Recommendation
I-5 Exit 123	Structurally deficient I-5 overcrossing	Tight Diamond similar to the existing configuration. The separation between the NB and SB ramp intersections would be approximately 300 feet. The ramps would be more perpendicular to Portland Ave. than the existing configuration.	No revisions
I-5 Exit 123	Inadequate sight distance, limited width	Portland Ave would be four lanes under I-5, with one through lane and one left-turn lane for each direction. There would be two turn lanes to provide queuing space lost due to the tight intersection spacing.	No revisions
I-5 Exit 123	Inadequate sight distance, current acceleration/deceleration lengths do not meet ODOT design standards	Both acceleration and deceleration lengths on the entrance and exit ramps would be increased to meet current standards.	No revisions
I-5 Exit 123	Substandard access spacing	Realign Frear St with Kendall St to increase the distance between the NB ramp intersection and the Kendall St/Frear St intersection, when a new bridge connecting Portland Ave with Roseburg is constructed.	No revisions

IAMP	Identified Deficiency	Project	TSP Recommendation
I-5 Exit 124	The IAMP for I-5 Exit 124 is not adopted. The TSP recommends general concepts for consideration by the IAMP. Specific concepts cannot be developed until a final interchange configuration is recommended by the IAMP.		• Note: A 2019 project will make several improvements to the intersection of Harvard Ave and the southbound ramps. • Interim: Recommend enhanced pedestrian crossing signage/striping crossing the ramp terminals • IAMP: Interchange configuration recommendation should include accommodations for bicycle and pedestrian facilities across I-5 and support enhanced connections across I-5 on the existing trail system. • IAMP: Consider narrowing vehicular travel lane widths west of I-5 (to Umpqua St) to increase width of bicycle lanes on Harvard Ave
I-5 Exit 125	The IAMP for I-5 Exit 125 is not adopted. The TSP recommends general concepts for consideration by the IAMP. Specific concepts cannot be developed until a final interchange configuration is recommended by the IAMP.		• Interim: Recommend enhanced pedestrian crossing signage/striping crossing the ramp terminals • Interim: To address lane imbalance on Garden Valley Blvd approaching the interchange, consider "Thru Traffic Keep Left" signage • IAMP: Interchange configuration recommendation should include accommodations for bicycle and pedestrian facilities across I-5 • IAMP: Consider narrowing vehicular travel lane widths west of I-5 (within IAMP influence area) to increase width of bicycle lanes on Garden Valley Blvd
I-5 Exit 127	Delays and queues along Edenbower Blvd	Maintain signal coordination	No revisions
I-5 Exit 127	Queues and site distance at Edenbower Blvd at Stewart Pkwy	Provide adequate sight distance	No revisions

IAMP	Identified Deficiency	Project	TSP Recommendation
I-5 Exit 127	Edenbower Blvd at Stephens St queues	Extend left-turn bays	No revisions
I-5 Exit 127	Address long-term traffic operations and safety at NB ramp terminal	Signalize NB ramp terminal	No revisions
I-5 Exit 127	NB ramp terminal north side pedestrian crossing	Improve east-west pedestrian crossing across NB on-ramp by adding a raised island or extending curb and sidewalk	No revisions
I-5 Exit 127	Persistent congestion and queues interfering with travel lanes	Widen Stewart Parkway northwards to add a second EB left-turn lane and widen Edenbower Blvd to add second NB receiving lane.	This project has been constructed. The TSP recommends an additional phase to extend the length of the receiving lanes on Edenbower Blvd.
I-5 Exit 127	Edenbower Blvd at Aviation Dr queues	Extend WB right-turn bay on Edenbower Blvd	No revisions
I-5 Exit 129	Operations at SB ramp terminal	Signalize SB ramp terminal	Recommend removal from IAMP; revised 2040 operations do not warrant a signal.
I-5 Exit 129	Operations at Del Rio Rd/Umpqua College Rd at Stephens St	Add an additional NB left-turn lane and accompanying WB receiving lane, or add a SB through/right turn lane and accompanying WB receiving lane	Recommend removal from IAMP; revised 2040 operations do not warrant additional capacity.
I-5 Exit 129	Operations at SB ramp terminal	Add a WB through lane and accompanying receiving lane	Recommend removal from IAMP; revised 2040 operations do not warrant additional capacity.
I-5 Exit 129	Operations	Add an EB right turn lane	Recommend removal from IAMP; revised 2040 operations do not warrant additional capacity.

LAND USE PLANNING
TRANSPORTATION PLANNING
PROJECT MANAGEMENT

MEMORANDUM

Draft Implementing Ordinances and Code Changes

Roseburg Transportation System Plan Update

DATE	August 9, 2019
TO	Roseburg TSP Project Management Team
FROM	Darci Rudzinski, Shayna Rehberg, & Clinton "CJ" Doxsee, APG
CC	File

INTRODUCTION

This memorandum outlines an approach for amending the City of Roseburg Land Use and Development Regulations ("Code")[1] to ensure that development requirements are consistent with relevant provisions of the Oregon Transportation Planning Rule (OAR 660 Division 12, or "TPR")[2] and reflect the goals and objectives of the Roseburg Transportation System Plan (TSP) update. Code amendments are also intended to address development-related transportation issues that have been raised during the course of the TSP update project. This memorandum proposes regulatory updates based on an evaluation of Code consistency with TPR requirements and Draft TSP recommendations, including sample code language to implement recommended changes. Once reviewed and modified as needed by City staff, the sample code language can be translated into code amendments ready for adoption.[3]

ROSEBURG DEVELOPMENT CODE

OAR 660-012-0045 requires each local government to amend its land use regulations to implement the TSP and to adopt land use regulations consistent with state and federal requirements "to protect transportation facilities, corridors and sites for their identified functions." These requirements are achieved through a variety of measures, including access control standards, robust pedestrian and bicycle circulation and connectivity provisions, standards to protect future road operations of roads, and expanded notice requirements and coordinated review procedures

1 Title 12 of the City of Roseburg Municipal Code
2 Oregon Administrative Rules (OAR) 660-012-0045 and 660-012-0060
3 Policy development is not identified in the project scope of work (draft code changes are identified in Task 8.1). However, it should be noted that, upon adoption, goals and objectives in the updated TSP may effectively become new transportation policy for the City. To that end, it is recommended that the City also review and consider revisions to what may become outdated references to transportation policies in the following Code subsections: Subsections 12.10.010(K)(1)(c), (1)(k), (2)(c), and (2)(k).

for land use applications. Local implementation measures often include processes to apply conditions of approval to development proposals and regulations ensuring that amendments to land use designations, densities, and design standards are consistent with the functions, capacities, and performance standards of facilities identified in the TSP.

Measures in OAR 660-012-0060 address plan and land use regulation amendments to ensure that proposed land uses are consistent with the identified function and capacity of existing and planned transportation facilities. It includes criteria for identifying significant effects of plan or land use regulation amendments on transportation facilities, actions to be taken when a significant effect would occur, identification of planned facilities, and coordination with transportation facility providers. This section also guides local jurisdictions in determining what transportation improvements are "reasonably likely to be provided by the end of the planning period" when considering amendments to local plans and land use regulations.[4]

The consultant team evaluated the City's Code to ensure that development requirements are consistent with these TPR requirements and reflect the recommendations of the updated TSP. Table 1 presents recommendations resulting from this evaluation. Following the table, sample or "model" code language is provided that addresses each recommendation, prefaced by the corresponding recommendation number from the table. New provisions should be considered within the local context and potentially modified to reflect a reasonable requirement for the City of Roseburg. In some cases, suggested text may need to be further refined to better meet community needs and formatted to include correct code numbering, citations, and cross-references. If the City pursues Code amendments, either as part of adopting the updated TSP or as a separate adoption process at a later date, the sample text will need to be appropriately formatted for a legislative amendment to the adopted code (e.g., underline and strikethrough format).

Table 1: City of Roseburg Land Use and Development Regulations (Code) Recommendations

	RECOMMENDATION	CODE SECTION	CITATION
1.	Permit transportation improvements outright that are consistent with the adopted TSP, including modifying the definition of public uses, adding footnotes to zoning district use regulation tables, and adding a new provision to Planned Unit Development use allowances.	DEFINITIONS Section 12.02.090 PUBLIC RESERVE AND RESIDENTIAL OPEN SPACE DISTRICTS Section 12.04.020 RESIDENTIAL DISTRICTS Section 12.04.030	OAR 660-012-0045(1)(a) and (b)

[4] Comprehensive plan, land use code, and zoning amendments are addressed in local Code Sections 12.10.030 (Quasi-judicial Plan Amendment) and 12.10.040 (Zone Change), and 12.12.010 (Partitions and Subdivisions). Section 12.12.010 contains language requiring a traffic impact analysis and conformance with this provision of the TPR. Sections 12.10.030 and 040 addresses amendments to code language and contains specific requirements related to transportation facilities. The Code was found to be in conformance with this section of the TPR.

	RECOMMENDATION	CODE SECTION	CITATION
		COMMERCIAL DISTRICTS Section 12.04.040 AIRPORT DISTRICT Section 12.04.060 INDUSTRIAL DISTRICTS Section 12.04.070	
2.	Ensure that existing access spacing standards and block size standards in the Code are consistent with recommendations in the updated TSP.	PUBLIC IMPROVEMENT REQUIREMENTS Section 12.06.020, Table 3-1 PLATTING AND MAPPING STANDARDS (BLOCKS) Section 12.12.010(L)	OAR 660-012-0045(2)(a)
3.	Ensure that existing mobility standards in the Code are consistent with recommendations in the updated TSP.	TRAFFIC IMPACT STUDY Section 12.06.020(C)	OAR 660-012-0045(2)(b)
4.	Require that transportation agencies be included in pre-application conferences.	PRE-APPLICATION CONFERENCE Section 12.10.010(E)	OAR 660-012-0045(2)(d) and (f)
5.	Augment existing criteria for plan amendments and zone changes to specifically refer to TPR (Section 660-012-0060) criteria.	QUASI-JUDICIAL PLAN AMENDMENT STANDARDS Section 12.10.030(D) ZONE CHANGE CRITERIA Section 12.10.040(C)	OAR 660-012-0045(2)(g) and OAR 660-012-0060
6.	Require commercial uses in the Central Business District (CBD) provide or contribute to providing bicycle parking.	OFF-STREET PARKING Section 12.06.030(H), Table 3-3	OAR 660-012-0045(3)(a)
7.	Add bicycle parking requirements for transit transfer stations and park-and-ride facilities.	OFF-STREET PARKING Section 12.06.030(H), Table 3-3	OAR 660-012-0045(3)(a)
8.	Require “crosswalks” (walkways) through parking areas over a certain size.	SITE DEVELOPMENT INTERNAL WALKWAYS Section 12.06.030(W)(4)	OAR 660-012-0045(3)(b)
9.	Add references to street design standards (cross sections and table) from the updated TSP in Land Division and associated provisions.	LAND DIVISION IMPROVEMENT REQUIREMENTS/STREETS Section 12.12.010(Q) PUBLIC IMPROVEMENT REQUIREMENTS Section 12.06.020(E)	OAR 660-012-0045(3)(b)

	RECOMMENDATION	CODE SECTION	CITATION
10.	Add reference to street design standards (cross sections and table) from TSP and/or Public Works Standards in Planned Unit Development (PUD) provisions.	PUD STANDARDS AND CRITERIA IN RESIDENTIAL DISTRICTS Section 12.12.020(F)	OAR 660-012-0045(3)(b) City interest in preventing substandard streets in PUDs
11.	Add pedestrian and bicycle improvements to list of possible off-site improvements in Section 12.12.010(J).	OFF-SITE IMPROVEMENTS REQUIRED Section 12.12.010(J)	OAR 660-012-0045(3)(c)
12.	Create new transit-supportive development requirements including coordination and provision of transit stop amenities and orientation of building entrances toward transit streets.	SITE IMPROVEMENT REQUIREMENTS Section 12.06.030 (new subsection)	OAR 660-012-0045(4)(a) OAR 660-012-0045(4)(b)
13.	Add targeted preferential parking provisions for carpool/vanpool parking to off-street parking provisions.	PARKING AREA AND DRIVEWAY DESIGN Section 12.06.030(Q) (new subsection)	OAR 660-012-0045(4)(d)
14.	Provide allowances for redevelopment of parking areas for transit uses.	PARKING AREA IMPROVEMENTS Section 12.06.030(S) (new subsection)	OAR 660-012-0045(4)(e)
15.	Maintain options allowing for minimized pavement in street design standards. Ensure that existing street design standards in the Code are consistent with the updated TSP.	PLATTING AND MAPPING STANDARDS – STREETS AND ROADS Section 12.12.010(F), Table 6-1	OAR 660-012-0045(7)
16.	Specify that Oregon Department of Transportation (ODOT) and other road authorities have the authority to submit a land use application without a property owner signature.	DEVELOPMENT APPROVAL PROCEDURES/WHO MAY APPLY Section 12.10.010(D)	Project scope (Task 8.1)
17.	Include a reference in land division code to the connectivity or network plan in the updated TSP.	PLATTING AND MAPPING STANDARDS – STREETS AND ROADS Section 12.12.010(F)(1)(c)	City interest in complete street networks

Proposed Model Code Language

Recommendation #1

Permit transportation improvements outright that are consistent with the adopted TSP by doing the following:

- modify the definition of public uses;
- add footnotes to zoning district use regulation tables; and
- add a new provision to Planned Unit Development use allowances.

Modify the existing definition of "Public and Semi-Public Buildings and Uses" in Section 12.02.090 to include the following in the list of example uses: "transportation improvements that are consistent with the adopted City of Roseburg Transportation System Plan."

Add footnotes to where public and semi-public buildings and uses are listed in the zoning district use regulation tables below, which specify the following: *"Transportation uses that are consistent with the adopted City of Roseburg Transportation System Plan are permitted outright (P)."*

TABLE 2-2: RO AND PR—ALLOWED USES

TABLE 2-4: RESIDENTIAL—ALLOWED USES

TABLE 2-7: COMMERCIAL—ALLOWED USES

TABLE 2-11: AP—ALLOWED USES

TABLE 2-13: INDUSTRIAL—ALLOWED USES

Add a new provision to Planned Unit Development use allowances in Section 12.12.020(F)(2)(c) regarding permitted transportation uses, as follows: "iv. Public and semi-public uses including transportation uses consistent with the City of Roseburg Transportation System Plan."

Recommendation #2

Ensure that existing access spacing standards and block size standards in the Code are consistent with recommendations in the updated TSP. Review the circumstances under which the distances may be reduced and the exceptions process in Section 12.06.020.A.7 to ensure consistency with the recommendations in the draft TSP.[5]

- Existing access spacing standards in Section 12.06.020 (Public Improvement Requirements), Subsection A, Table 3-1

[5] Technical Memorandum #5, Multimodal System Project Concepts, includes new policy to coordinate the City's street and driveway spacing standards for consistency. New policy outlines that new property access points shall meet or exceed these minimum spacing requirements, and where no reasonable alternatives exist or where strict application of the standards would create a safety hazard, the City may allow a variance.

TABLE 3-1: MINIMUM DRIVEWAY SPACING

LAND USE	STREET TYPE		
	ARTERIAL	COLLECTOR	LOCAL
Industrial	500'	200'	150'
Commercial/ Public Land	500'	200'	75'
Multi-family Residential	500'	200'	75'
Single-family Residential and Duplexes	500'	200'	30'

- Provisions in Section 12.06.020.A.7 allow for reductions in the access spacing standards when specific criteria are met or if recommended by the Public Works Director and approved by the Community Development Director.

  7. Distances shown in Table 3-1 may be reduced in the following circumstances:

  i. Access is from a one-way street.

  ii. The driveway is designed and marked "right turn entrance only."

  iii. The driveway is marked "exit only" and is designed to prevent left turns.

  iv. Exceptions to this requirement may be granted by the Community Development Director when recommended by the Public Works Director. Evaluations of exceptions shall consider the posted speed for the street on which access is proposed, constraints due to lot patterns, and effects on the safety and capacity of the adjacent Public Street, bicycle, and pedestrian facilities.

- Existing block size standards in Land Division provisions in Section 12.12.010(L)

  2. Size. For local streets, no blocks shall be more than 500 feet in length between street corner lines unless it is adjacent to an arterial street, or unless the topography or the location of adjoining streets justifies an exception. The recommended minimum length of blocks along a collector street is 1,000 feet. The recommended minimum length of blocks along an arterial street is 1,800 feet.

Recommendation #3

Ensure that existing mobility standards in the Code are consistent with recommendations in the updated TSP.

Existing mobility standards in traffic impact study (TIS) provisions in Section 12.06.020(C)(1):

Volume to Capacity Ratio:

Arterial: 0.85

Collector: 0.90

Local: 0.95

Level of Service Standard:

Signalized intersection: LOS D

Non-signalized intersection: LOS E

Downtown Intersection: 0.95 and LOS E

Recommendation #4

Require that transportation agencies be included in pre-application conferences.

Add the following specification to Section 12.10.010(E), below, in order to allow agencies to coordinate with the applicant and development design earlier in the application process:

"Transportation and other public service and facility providers shall be invited to participate in the pre-application conference if their facilities or services may be affected by the proposed development."

> *E. Pre-application conference. An applicant may request a pre-application conference prior to submitting a request for development approval. The purpose(s) of the conference may include: to acquaint the applicant with the substantive and procedural requirements of this Code, provide for an exchange of information regarding applicable elements of the Comprehensive Plan and development requirements, arrange such technical and design assistance as will aid the applicant, and to identify policies and regulations that create opportunities or pose significant constraints for the proposed development. The requirements of this Section may be waived at the discretion of the Community Development Director.*

Recommendation #5

Augment existing criteria for plan amendments and zone changes to specifically refer to TPR (Section 660-012-0060) criteria.

Add the following language to the Code sections identified below: "Proposals shall be reviewed to determine whether they significantly affect a transportation facility pursuant to Oregon Administrative Rule (OAR) 660-012-0060 (the Transportation Planning Rule or "TPR"). Where the City, in consultation with the applicable roadway authority, finds that a proposed amendment would have a significant effect on a transportation facility, the City shall work with the roadway authority and applicant to modify the request or mitigate the impacts in accordance with the TPR and applicable law."

- Quasi-Judicial Plan Amendment provisions in Section 12.10.030(D)(2)(a):

  D. Application form and content and amendment standards.

1. The Community Development Director shall prescribe forms for applications for quasi-judicial plan amendments which, when completed, shall be sufficient to describe the nature and effect of the proposed amendment.

2. The application shall address the following requirements, which shall be the standard for amendment.

a. That the amendment complies with the Statewide Planning Goals adopted by the Land Conservation and Development Commission…

- Criteria for Zone Changes in Section 12.10.040(C):

C. Criteria for zone change. The Approving Authority may grant a zone change only if the following circumstances are found to exist:

1. The rezoning will conform to the Roseburg Urban Area Comprehensive Plan, including the land use map and written policies.

2. The site is suitable to the proposed zone with respect to the public health, safety, and welfare of the surrounding area.

3. The rezone is consistent with the safety and performance measures of the transportation system.

Recommendation #6

Require commercial uses in the Central Business District (CBD) provide or contribute to providing bicycle parking.

Replace Footnote 2 (below) for Table 3-3 in Section 12.06.030(H) (Off-Street Parking) with the following requirement: "A minimum of two bicycle parking spaces shall be provided for each commercial use in the Central Business District (CBD), subject to the applicability standards of this Section. The applicant shall coordinate with the City to provide the bicycle parking spaces within the public right-of-way or in designated areas on-site for public and employee use, or contribute the equivalent amount to the Central Business District bicycle parking fund. Bicycle parking design and location must be consistent with the Downtown Roseburg Master Plan Design Guidelines and the Bicycle and Pedestrian Plan Support Document. Bicycle racks must be located on the side of the street adjacent to the proposed use, but do not have to be directly adjacent to the proposed use and may be shared between uses on the same block."

[2] Bicycle Parking is not required in the Central Business District (CBD).

Recommendation #7

Add bicycle parking requirements for transit [transfer] stations and park-and-ride facilities.

Add the following requirements for bicycle parking either under the existing "Institutional" category or in a new category called "Other Uses" in Table 3-3 in Section 12.06.030(H):

"xx) Transit transfer stations – Two covered bicycle parking space per bus route that is scheduled to arrive/depart from the station
xx) Park-and-ride lots – Two covered bicycle parking space per 10 vehicle parking spaces"

Recommendation #8

Require "crosswalks" (walkways) through parking areas over a certain size.

Add the following provision to existing internal walkway provisions in Section 12.06.030(W): "Crosswalks shall be provided in parking areas containing more than 100 parking spaces or greater than one (1) acre."

4. Design Standards

f. Crosswalks. Where a walkway crosses a parking area containing more than ten (10) parking spaces, a driveway, or a street, the walkway shall be clearly marked with contrasting paving materials, which may be part of a raised/hump crossing area. Painted or thermo-plastic striping and similar types of non-permanent applications may be approved for crosswalks not exceeding 24 feet in length.

Recommendation #9

Add references to street design standards (cross sections and table) from the updated TSP in Land Division and associated provisions.

- Add a new subsection to Section 12.12.010(Q) (below) that refers to the street design standards in the (Draft) TSP.

  Q. Improvement requirements. Improvements to be installed at the expense of the sub-divider shall be as follows…

  1. Streets. Streets within or partially within the subdivision, and the extension of such streets to a point of conformance with existing streets with which such streets intersect, shall be improved to the following minimum standards:

  a. The street shall be brought to proper grade, including portions outside the roadway where necessary to serve pedestrians, to protect the roadway, or to serve abutting property.

  b. Standard concrete curbs and gutters shall be constructed along the edge of the roadway.

c. Roadway base and concrete or asphaltic concrete surfacing of sufficient width to meet local street design shall be installed to adopted design standards.

d. Sidewalks and walkways shall be constructed to adopted design standards required by ***Subsection 12.06.020(E)*** *and 12.06.030(W).* [emphasis added]

- Augment or replace the phrase "the standards and guidelines established by the Public Works Director" in Section 12.06.020(E) (below) with references to the street design standards in the (Draft) TSP.

  E. Sidewalks, curbs, gutters, storm drainage.

  1. When Construction Required. It shall be a condition of the issuance of a development permit for all property being newly developed, or redeveloped to the extent that structural alteration will increase the size of the total gross floor area on the property, that sidewalks, curbs, gutters, and storm drainage facilities, conforming to the standards and guidelines established by the Public Works Director, shall be installed along the entire street frontage of the property at the sole cost of the permittee prior to the issuance of an occupancy permit, except as provided for in Paragraphs 12.06.020(E)(3) and 12.06.020(E)(4) as outlined below.

Recommendation #10

Add reference to street design standards (cross sections and table) from updated TSP and/or Public Works Standards in Planned Unit Development (PUD) provisions.

Include reference to standards in PUD preliminary development plan approval provisions in Section 12.12.020(F)(8) either in addition to or in place of the last sentence in the subsection regarding appropriate design and approval by the Public Works Director.

8. Traffic Circulation. The location and number of points of access to the site, the interior circulation pattern of streets and pedestrian ways, the separations between pedestrians and moving and parked vehicles, and the arrangement of parking areas in relation to buildings and uses shall be designed to maximize safety and convenience and be compatible with neighboring road systems, buildings, and uses. ***Design of facilities shall be appropriate to the anticipated usage and shall be approved by the Public Works Director.*** [emphasis added]

Recommendation #11

Add "pedestrian and bicycle improvements" to the list of possible off-site improvements in Section 12.12.010(J) (below). (The list starts following "Included may be…")

J. Off-site improvements required. The Approving Authority may determine that the proposed subdivision or partition may result in impacts extending beyond the boundaries of the area to be divided, and in order to provide for the health and welfare of the broader neighborhood area, or

> *the urban area as a whole, may require the developer to construct or participate in the construction of improvements or facilities to alleviate those impacts. Included may be street repair, widening, extension, drainage improvements, measures to facilitate traffic flow, traffic signals, sewer improvements, etc. It is the intent of these requirements to cause development to proceed in an orderly and timely manner, and to avoid overburdening existing facilities and creating hardship for other users of the public facilities that may result if the proposed development proceeded without correcting or participating in correction of deficiencies.*

Recommendation #12

Create new transit-supportive development requirements including coordination with the transit provider, provision of transit stop amenities, and orientation of building entrances toward transit streets.

Add the following language as a new subsection at the end of Section 12.06.030 (Site Improvement Requirements):

> "Development that is proposed adjacent to an existing or planned transit stop, as designated in the City of Roseburg Transportation System Plan or an adopted transit plan, shall provide the following transit access and supportive improvements in coordination with the transit service provider:
>
> > A. Reasonably direct pedestrian connections between the transit stop and primary entrances of the buildings on site. For the purpose of this Section, "reasonably direct" means a route that does not deviate unnecessarily from a straight line or a route that does not involve a significant amount of out-of-direction travel for users.
> >
> > B. The primary entrance of the building closest to the street where the transit stop is located that is oriented to that street.
> >
> > C. A transit passenger landing pad that is ADA-accessible.
> >
> > D. An easement or dedication for a passenger shelter or bench if such an improvement is identified in an adopted plan.
> >
> > E. Lighting at the transit stop.
> >
> > F. Other improvements identified in an adopted plan."

Recommendation #13

Add targeted preferential parking provisions for carpool/vanpool parking to off-street parking provisions.

Include the following language as a new subsection at the end of existing parking area design standards in Section 12.06.030(Q):

"Parking areas that have designated employee parking and more than 20 automobile parking spaces shall provide at least 10% of the employee parking spaces (a minimum of two spaces) as preferential carpool and vanpool parking spaces. Preferential carpool and vanpool parking spaces shall be marked and shall be closer to the employee entrance of the building than other parking spaces, with the exception of ADA-accessible parking spaces."

Recommendation #14

Provide allowances for redevelopment of parking areas for transit uses.

Add the following language as a new subsection at the end of existing parking area improvement provisions in Section 12.06.030(S):

"Parking spaces and parking areas may be used for transit-related uses such as transit stops and park-and-ride or rideshare areas, provided minimum parking space and other off-street parking requirements can still be met."

Recommendation #15

- Maintain options allowing for minimized pavement in street design standards. (For example, existing standards in Table 6-1 (Standard Street Widths) in Section 12.12.010(F) allow for 20 feet of pavement on a local street with no parking.)
- Ensure that existing street design standards in the Code (Table 6-1, below) are consistent with street design standards (cross sections and table) from the updated TSP.
- Clarify Arterial standards by eliminating the "Arterial" table row and listing the applicable standards under "Arterial 3 Lane" and "Arterial 5 Lane" rows.
- Add a standard for "multi-use pathway" to Table 6-1 that is consistent with Section 12.12.010 (I) and the Draft TSP. To support this addition, provide a definition in Section 12.02.090, such as the following: "'Multi-use pathway" means an improvement that supports multiple recreation and transportation opportunities, such as walking, bicycling, and rolling (e.g., wheelchair use, skateboarding, etc.). Multi-use paths conform to adopted City standards, are separated from vehicular traffic, and are located either within the public right-of-way or a public easement."
- Modify footnote [4] to allow bicycles on constrained existing facilities through special shared-lane pavement markings ("sharrows"). The following modified language is recommended: "Collector and arterial streets require bike lanes. For existing collector and

arterial streets where right-of-way is not available, shared-lane pavement markings (e.g., sharrows) may be used to represent a shared roadway. Local streets utilize shared lanes."

- Add a footnote [7], applicable to Arterials, that states: "Design Standards for State Highways are found in the Oregon Highway Design Manual (HDM)."

TABLE 6-1: STANDARD STREET WIDTHS

(Streets in Hillside areas may use Street Standards shown in Subsection 12.04.100(D))

TYPE OF STREET	*MINIMUM RIGHT-OF-WAY WIDTH*		
Arterials [3][4][5]	*70'—120'* [1]		
Collector Streets and All Business Streets Other than Arterials [3][4][5]	*60'—70'* [2]		
Local Streets in Single-Family Density Areas [3]	*60'*		
Circular Ends of Cul-de-Sacs where allowed under Paragraph 12.12.010(F)(7)	*96' Diameter*		
All Streets Not Specifically Provided for Above	*60'*		
STANDARD STREET PAVEMENT WIDTH AND DESIGN FEATURES			
TYPE OF STREET	***PARKING BOTH SIDES***	***PARKING ONE SIDE***	***NO PARKING***
Local [3]	*34-36'*	*26-28'**	*20'**
Collector [3]	*48-50'*	*40-42'*	*32-34'*
Arterial [4][5][6]	*N/A*	*N/A*	
3 lane			*48-50'*
5 lane			*70-74'*

** Where allowed*

[1] The Approving Authority may require a width within the limits shown, based upon adjacent physical conditions, safety of the public and the traffic needs of the community, sidewalk width, and in accordance with other specifications of this Code.

[2] Right-of-way to 70 feet may be required with wider sidewalks; where other design features are included, additional right-of-way may be required.

[3] Pavement width in excess of that shown may be required for other road configurations, such as for turn lanes, etc.

[4] Collector and arterial streets require bike lanes. Local streets utilize shared lanes.

[5] Freight route shall have minimum lane width of 12 feet.

[6] Bus route shall have minimum lane width of 11 feet.

Recommendation #16

Specify that Oregon Department of Transportation (ODOT) and other road authorities have the authority to submit a land use application without a property owner signature.

Add the following language to the list of those who may apply for development approval in Section 12.10.010(D), below: "Public agencies or private entities that have statutory rights of eminent domain for projects they have the authority to construct."

Chapter 12.10 - DEVELOPMENT APPROVAL PROCEDURES

12.10.010 - General provisions.

D. Who may apply. Applications for development approval may be initiated by one or more of the following:

1. The owner of the property which is the subject of the application; or

2. The purchaser of such property who submits a duly executed written contract or copy thereof; or

3. A lessee in possession of such property who submits written consent of the owner to make such application; or

4. Resolution of the City Council.

Any of the above may be represented by an agent who submits written authorization by his/her principal to make such application.

Recommendation #17

Include a reference in land division code to the connectivity or network plan in the updated TSP.

Add a statement to Section 12.12.010(F)(1)(c), below, that: "New streets proposed in Roseburg shall be consistent with the street network plan in the Transportation System Plan."

12.12.010 – Partitions and subdivisions

F. Platting and mapping standards—Streets and roads.

1. General.

c. Transportation System Plan. Any such adopted plan and amendments thereto shall be considered as the correct designation of the transportation, access and safety needs of the Roseburg Urban Area or sub-areas included with respect to the streets designated thereon, for the purpose of ***determining design and location of streets*** *to be required under Paragraphs 12.12.010(F)(a) and (b) above, unless convincing evidence to the contrary is presented to the Approving Authority.* [emphasis added]

TRANSPORTATION FUNDING PROGRAM

The Transportation Funding Program was addressed in Technical Memorandum #4: Future Transportation Operations. The implementation of the program does not require any code changes at this time.

POTENTIAL MANAGEMENT ACTIONS

Management actions, as applied to TSPs, are various project strategies, management measures, and minor improvements that do not require an infrastructure improvement or operational analysis, but may be necessary to address existing and future deficiencies. Potential Management Actions were outlined in Technical Memorandum #5: Multimodal System Project Concepts and include updates to City mobility targets, recommended changes to future Interchange Area Management Plans (IAMPs), and TSM/TDM strategies such as access management, multimodal improvements, and signal coordination and timing.

Other than what is outlined in this memo regarding access spacing standards and mobility targets, implementation of the Potential Management Actions does not require any other code changes at this time. Should ODOT adopt any new plans on its facilities within the Roseburg UGB (e.g. IAMPs, Corridor Studies), the City of Roseburg will adopt the document as a refinement plan to its TSP (City of Roseburg Urban Area Comprehensive Plan amendment).

ADDITIONAL COMPLIANCE REVIEW

In addition to OAR 660 Division 12 Section -0045 and -0060, the Roseburg Development was also reviewed for conformance with the following TPR sections:

- OAR 660-012-0005 – Definitions
- OAR 660-012-0050 – Transportation Project Development
- OAR 660-012-0065 – Transportation Improvements on Rural Lands
- OAR 660-012-0070 – Exceptions for Transportation Improvements on Rural Lands

OAR 660-012-0005 – Definitions. Section OAR -0005 provides a list of definitions applicable to the TPR. The only common definition between the TPR and Roseburg's Code is "Urban Area." The definition for "Urban Area" is consistent between the TPR and the Code. No other definitions from the TPR are defined in the Code. Therefore, the Code is in conformance with the TPR's definitions.

OAR 660-012-0050 – Transportation Project Development. Section -0050 of the TPR references project development and implementation – how a transportation facility or improvement authorized in a TSP is designed and constructed. Project development may or may not require land use decision-making. The TPR directs that during project development, projects authorized in an acknowledged TSP will not be subject to further justification with regard to their need, mode, function, or general location. To this end, the TPR calls for consolidated review of land use decisions and proper noticing requirements for affected transportation facilities and service providers. Section 12.10.010(F) states that "An applicant may apply at one time for all development approvals required by this Code for a single development or use." Therefore, this TPR provision is met.

OAR 660-012-0065 – Transportation Improvements on Rural Lands & OAR 660-012-0070 – Exceptions for Transportation Improvements on Rural Lands. Sections -0065 and -0070 of the TPR identifies transportation facilities, services, and improvements that may be permitted, or permitted through a Rule exception, on rural lands. The updated TSP identifies a limited number of roadway extensions that extend outside of the UGB. They include the Harvard Bridge project and new street connection between Weyerhaeuser Dr. to Forest Glen Ln. For projects that extend outside of the UGB, the TSP recommends the City coordinate with Douglas County for project implementation. The projects identified in the TSP are preliminary and have not identified a need for a Rule exception; a Rule exception would be addressed as project design development advances.