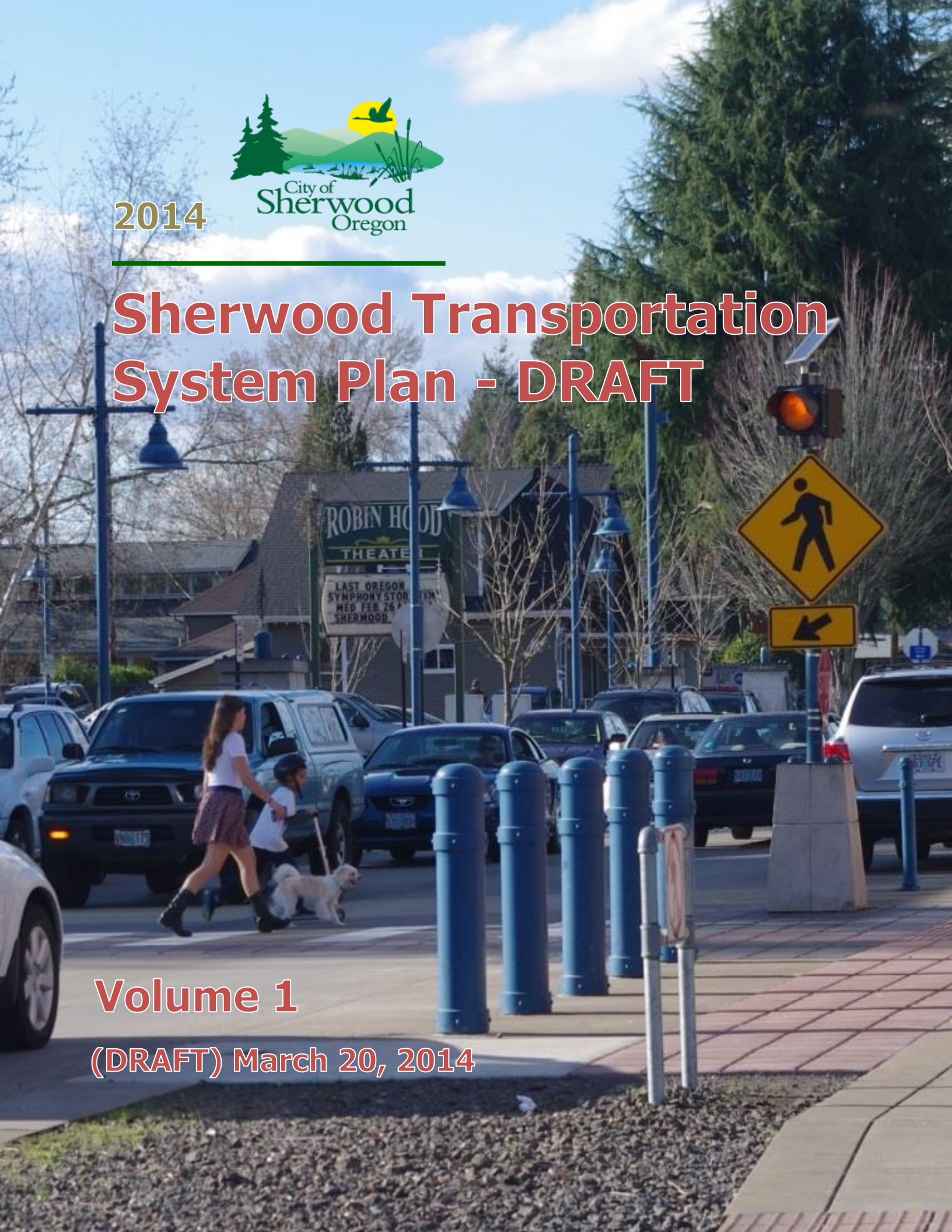

2014

City of Sherwood Oregon

Sherwood Transportation System Plan - DRAFT

Volume 1

(DRAFT) March 20, 2014

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- *Citizen Advisory Team*
- *Technical Advisory Team*

A special acknowledgement goes out to all the Sherwood residents, business owners, and visitors who attended community meetings or submitted comments. Your input helped make this Plan possible.

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The contents of this document do not necessarily reflect views or policies of the State of Oregon.

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Tables

Acronyms

CAC: Community Advisory Committee

CAP: Capacity Allocation Program

MSTIP: Major Streets Transportation Improvement Program

ODOT: Oregon Department of Transportation

RTFP: Regional Transportation Functional Plan

RTP: Regional Transportation Plan

SOV: Single Occupant Vehicle

TAC: Technical Advisory Committee

TDM: Transportation Demand Management

TGM: Transportation Growth and Management

TIA: Traffic Impact Analysis

TSM: Transportation System Management

TSMO: Transportation System Management and Operations

TSP: Transportation System Plan

TVFR: Tualatin Valley Fire and Rescue

UGB: Urban Growth Boundary

V/C: Volume-to Capacity

VHD: Vehicle-Hours of Delay

VMT: Vehicle-Miles Travelled

How to use this Document

The Transportation System Plan (TSP) serves the following general purposes:

- Identifies general vision and strategies
- Identifies future improvements
- Provides an overview of standards.

Project List

The prioritized project list identifies improvements that the City is anticipated to pursue through year 2035 given the projected revenue. The inclusion of projects does not commit the City to funding or constructing these projects. Rather, the list is a guide for determining how the City of Sherwood is generally assumed to allocate its funding towards transportation investments. New development, the likelihood for atypical funding opportunities, and the potential for unforeseen circumstances, may shift identified transportation improvement priority.

The project list includes conceptual street alignments at a system planning-level. Before construction of any of the projects can begin, more detailed surveys will need to be undertaken to identify hydrological, topographical, or other geological constraints that could hinder the alignment of the planned streets.

Transportation Standards

The standards documented in the TSP are for guiding new improvements to the transportation system and for identifying deficiencies in the current system. These apply city facilities; facilities owned by other jurisdictions will have their own standards to follow.

Street Cross-Sections: New streets shall meet the design requirements in Sherwood's *Engineering Design and Standard Details Manual*[1] per the functional class in the TSP. In constrained situations, a design exception may be allowed through a variance procedure.

Access Spacing: New street connections shall meet the access spacing standards in the TSP. In constrained situations, a design exception may be allowed through a variance procedure. Generally, existing facilities are not required to be modified to meet these standards. However, if a site redevelops, or a street is upgraded, access to the site may be subject to redesign to achieve or work towards achieving access spacing standards.

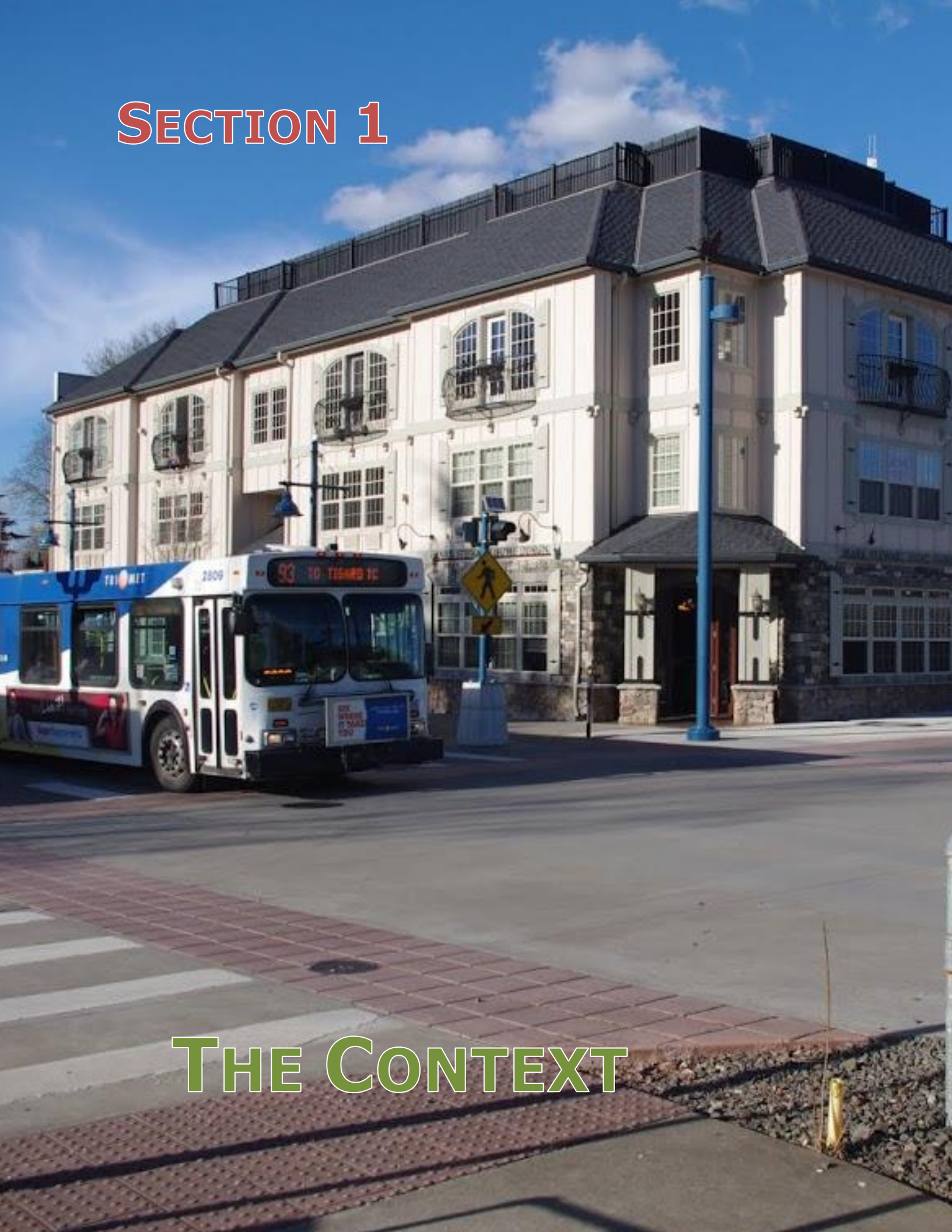
Traffic Calming: After determining the need for traffic calming along a facility, the appropriate technique shall be determined using engineering judgment by the Sherwood Public Works department. A toolbox of potential traffic calming techniques and their typical application is provided in Volume 2 of the TSP.

Local Connectivity: Figure 16 indicates the general location where new local streets could potentially be installed, and is not a comprehensive map of all potential future local connections. Connections shown on the figure do not necessarily topographic, environmental or manmade constraints. All future local connections must go through city review—whether or not the connection is shown on the figure—to determine the appropriate location.

Mobility Targets: For all Traffic Impact Analysis (TIA) studies conducted in Sherwood, the TIA shall evaluate its impact on the transportation system using the mobility targets in the TSP. Additional requirements are provided in the City's Development Code.

Truck Routes: If an improvement is proposed along a truck route shown on Figure 17, it must comply with the special design standards for truck routes set by the facility owner. Reductions to vehicle-carrying capacity are not often allowed along truck routes.

[1] *Engineering Design and Standard Details Manual,* July 1, 2009.



Section 1

The Context

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The Context

The City of Sherwood lies in southwest Washington County, only fourteen miles from downtown Portland. The lush landscape led to the establishment of the farming community in the late 1800's, and agriculture and manufacturing have dominated the economy of Sherwood until recent decades.

Sherwood is now roughly four square miles, and home to approximately 18,575 residents.[2] The city has a downtown grid (Old Town) where the town was originally platted around the Portland and Willamette Valley Railway. Beyond the historic downtown, the city has commercial retail areas, manufacturing and industrial parks, as well as suburban neighborhoods mixed with green space, recreational trails, and is adjacent to the Tualatin River National Wildlife Refuge.

The City of Sherwood has grown rapidly since 1990, as shown in Figure 1, from a population of 3,093 to 18,194 in 2010.[3] The population is younger and wealthier on average than typical residents of Washington County or Oregon. The average household size is 2.8 persons compared to 2.5 statewide, and 20% of Sherwood residents are under 10 years old compared to less than 14% for Washington County and 13% statewide. The prevalence of young families translates to specific transportation needs to serve children who are likely to walk or bike to get around.

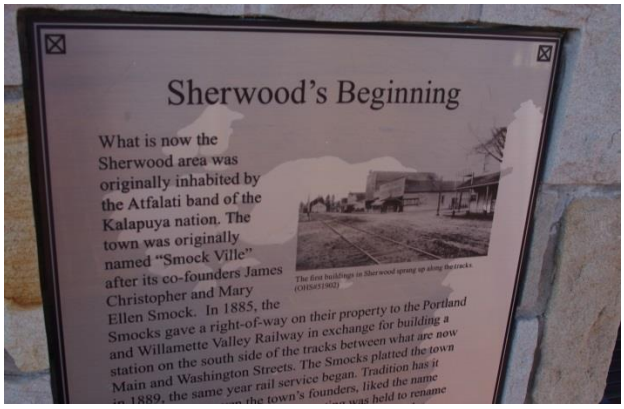
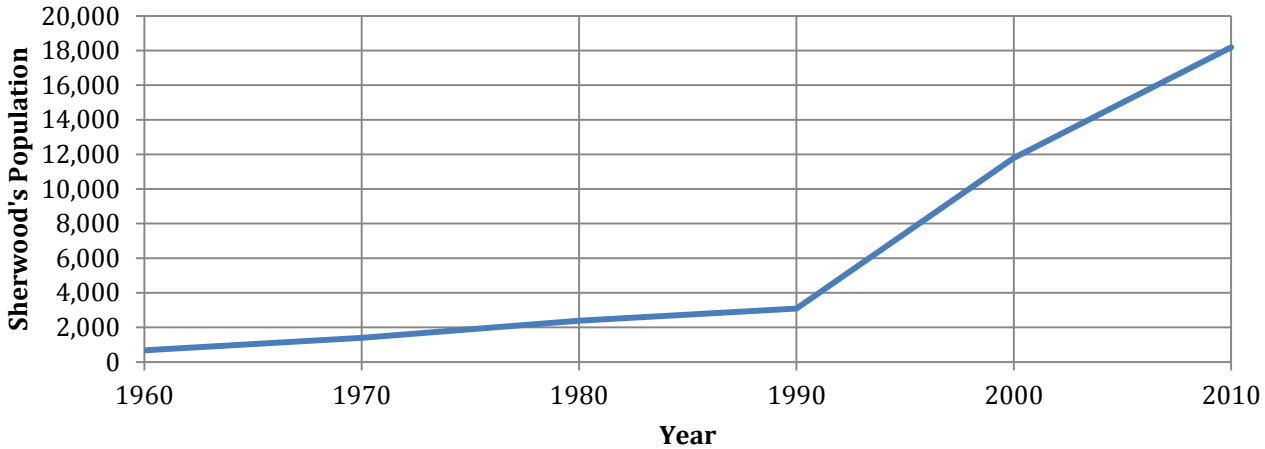


Figure 1: Historical Population Growth in Sherwood



[2] 2013 Portland State Population Research Center population projection.

[3] United States Census Bureau.

While the growth in population has been accommodated through increases in housing, it has created a housing and jobs imbalance in the community. Currently, with the higher than average income levels, 70% of employed residents commute outside of the city for work to seek higher wage jobs. To help remedy this, a concept plan for a 300 acre "employment land" area to the east of the city (Tonquin Employment Area) has been adopted to guide development. In addition, there are 70 acres of smaller, vacant parcels throughout the city that are available for non-residential development. These planned areas may have capacity needs for moving freight, or multimodal needs for accessing smaller sites in town.

The Challenge

Sherwood, like many jurisdictions, faces the challenge of accommodating population and employment growth while maintaining acceptable service levels on its transportation network. With major regional facilities (e.g., OR 99W, Tualatin-Sherwood Road) dividing the city, trying to meet acceptable levels of service for motor vehicles is likely to come at a cost to other modes—therefore, achieving a balanced, multi-modal transportation system through a series of system improvements is difficult. Furthermore, the city must balance its investments to ensure that the existing and future transportation system adequately serves all members of the community and is well maintained.

The Transportation System Plan

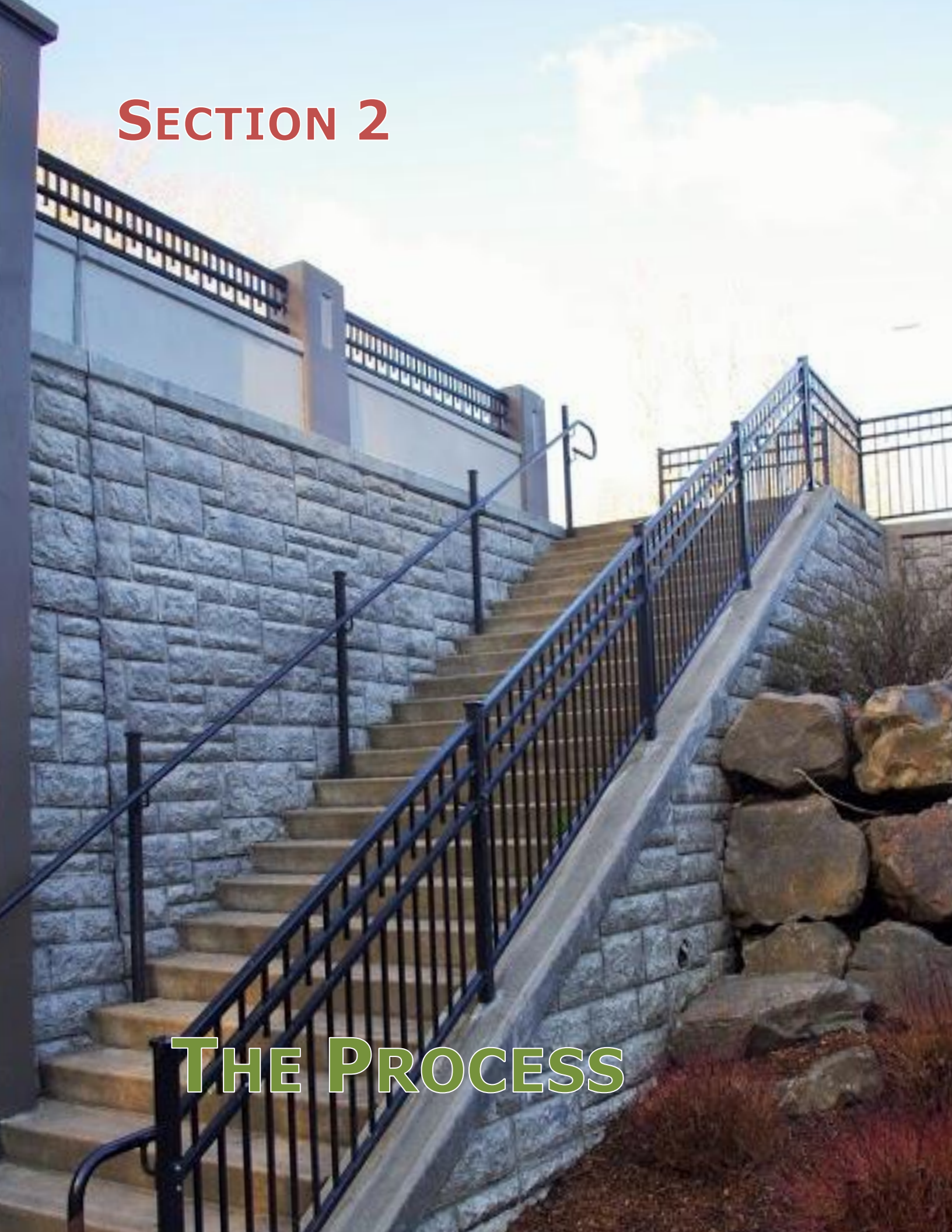
The Transportation System Plan (TSP) is intended to prepare for and accommodate the future growth through year 2035 in the most efficient manner possible. Without the big picture that the TSP provides, maintaining acceptable transportation network performance could not be achieved in an efficient manner. This Plan updates Sherwood's original TSP, which was adopted in the year 2005 for a horizon year of 2020.

What is a TSP?

The TSP provides a long term guide for city transportation investments by incorporating the vision of the community into an equitable and efficient transportation system.

The plan evaluates the current transportation system and outlines policies and projects that are important to protecting and enhancing the quality of life in Sherwood through 2035. The TSP also provides a foundation from which to evaluate and determine what improvements could or should be required as part of private development projects. Plan elements can be implemented by the city, private developers, and state or federal agencies.

A TSP is required by the State of Oregon to help integrate the city's transportation investment plans into the statewide transportation system. The plan balances the needs of walking, bicycling, driving, transit and freight into an equitable and efficient transportation system.



Section 2

The Process

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THE PROCESS

The Sherwood TSP Update was a collaborative process among various public agencies, key stakeholders and the community. Throughout this project, the project team took time to understand multiple points of view, obtain fresh ideas and resources, and encourage participation from the community.

Project staff conducted technical group meetings (referred to as the TAC), hosted citizen advisory group meetings (referred to as the CAC), held meetings with decision makers, and conversed informally with members of the community.

The process (shown in Figure 2) was broken into four manageable pieces:

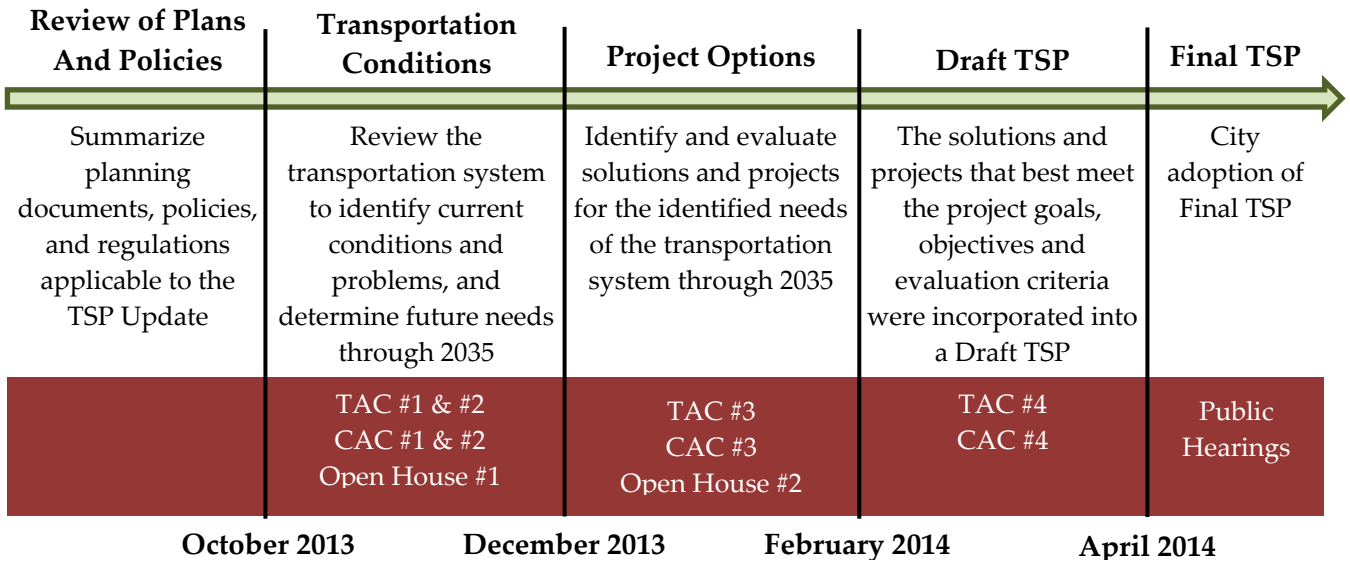
- Plan and Policy Summary Report
- Existing Conditions Technical Report
- Needs, Opportunities, Constraints and Tools Technical Report
- Project Options Technical Report

Each report was posted to the project website (which presented an email address for the public to submit comments and concerns) and presented at an open house, giving residents an opportunity to provide feedback and keep up-to-date with the project.

The project team would then revise the draft reports based on feedback received from the TAC, CAC, decision makers, and public input. The revised documents were reposted to the TSP website. Material from these reports was ultimately used to create the Draft TSP.

Subsequent public hearings with the Planning Commission and City Council on the Draft TSP ultimately led to adoption of the 2014 Sherwood Transportation System Plan.

Figure 2: TSP Update Process



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Section 3

The Vision

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In the past, a typical response to congestion from communities in the region was to expand streets to add additional travel lanes. This practice created significant barriers to walking and biking and detracted from the livability, health, safety, and fiscal wellbeing of the community.

Sherwood's approach to the TSP placed more value on investments in smaller cost-effective solutions for the transportation system rather than larger, more costly ones where practical as transportation funding is limited. As required by statewide planning policies and the Metro Regional Transportation Functional Plan, the approach emphasized a multi-modal network-wide approach to identifying transportation system solutions. As shown in Figure 3, this approach followed a five-step process that considered solutions from top to bottom until a viable solution was identified. This enabled more cost-effective solutions to increase transportation system operation and helped to encourage multiple travel options, increase street connectivity and promote a more sustainable transportation system.

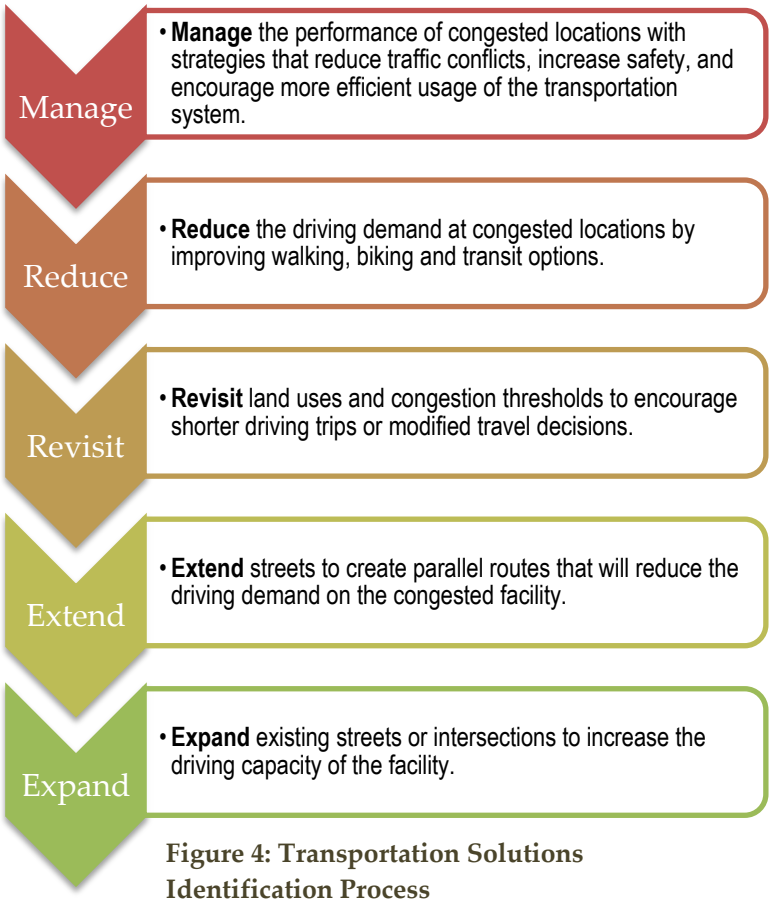


Figure 4: Transportation Solutions Identification Process

How do we reflect Sherwood's Vision in the Plan?

Sherwood's Comprehensive Plan (Chapter 6 Section B) includes eight transportation goals with several strategies to achieve each goal. As shown in Figure 4, these strategies were grouped and condensed into evaluation criteria that project stakeholders felt to be most important to the community to measure how well the transportation solutions addressed Sherwood's goals. The following strategies for each goal were applied as project evaluation criteria:

Goal 1: Provide a supportive transportation network to the land use plan that provides opportunities for transportation choices and the use of alternative modes serving all neighborhoods and businesses

Circulation: Improves mobility through separation of local and through traffic

Goal 2: Develop a transportation system that is consistent with the City's adopted comprehensive land use plan and with the adopted plans of state, local, and regional jurisdictions

Compatibility: Compatible with other jurisdiction's plans and policies (including adjacent cities, counties, Metro, or ODOT)

Agency Standards: Consistent with the standards of the city, region, and state as a whole

Figure 4: Reflecting our Vision in the Plan

Goal 3: Establish a clear and objective set of transportation design and development regulations that addresses all elements of the city transportation system and that promote access to and utilization of a multi-modal transportation system

Land Development Standards: Promotes standardized processes for developers to access and accommodate transportation impacts from development

Goal 4: Develop complementary infrastructure for bicycles and pedestrian facilities to provide a diverse range of transportation choices for city residents

Pedestrian and Bicycle Facilities: Adds bikeway and walkways that fill in system gaps, improve system connectivity, and are accessible to all users

Goal 5: Provide reliable convenient transit service to Sherwood residents and businesses as well as special transit options for the city's elderly and disabled residents

Expands Transit Service: Adds hours, additional routes, stops, or special ride services

Transit Supportive Infrastructure: Improves transit supportive infrastructure and facilities

Goal 6: Provide a convenient and safe transportation network within and between the Sherwood Old Town (Town Center) and Six Corners area that enables mixed use development and provides multi-modal access to area businesses and residents

Design Standards: Develops or refines special standards to facilitate pedestrian and transit friendly development in Old Town and Six Corners

Corridor Connectivity: Improves connectivity through acquisitions and dedications to achieve better street spacing and enhance off-street trail system

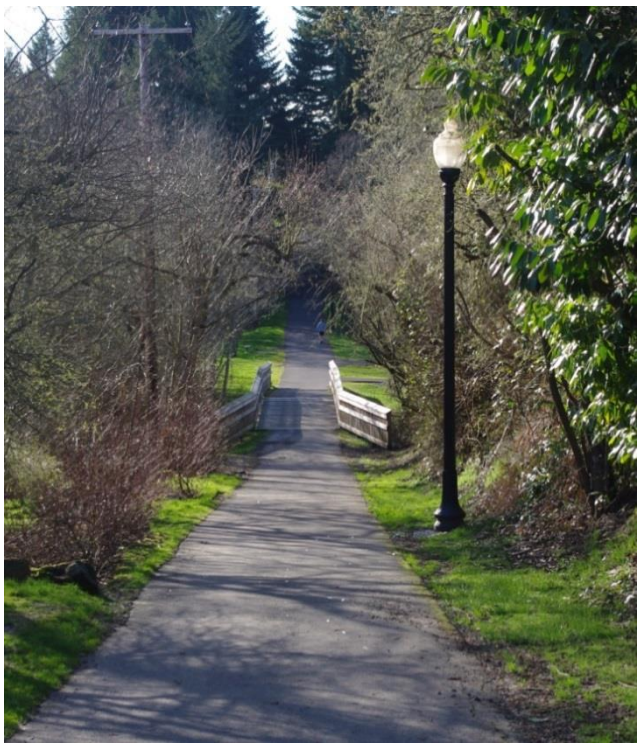
Goal 7: Ensure that efficient and effective freight transportation infrastructure is developed and maintained to support local and regional economic expansion and diversification consistent with City economic plans and policies

Freight Mobility: Invests in infrastructure and services needed to meet current and future demand

Freight Access: Regulates and improves access, including loading and transfer facilities

Goal 8: The Sherwood transportation network will be managed in a manner that ensures the plan is implemented in a timely fashion and is kept up to date with respect to local and regional priorities

Funding: Leverages local, regional, state, federal, or private funds



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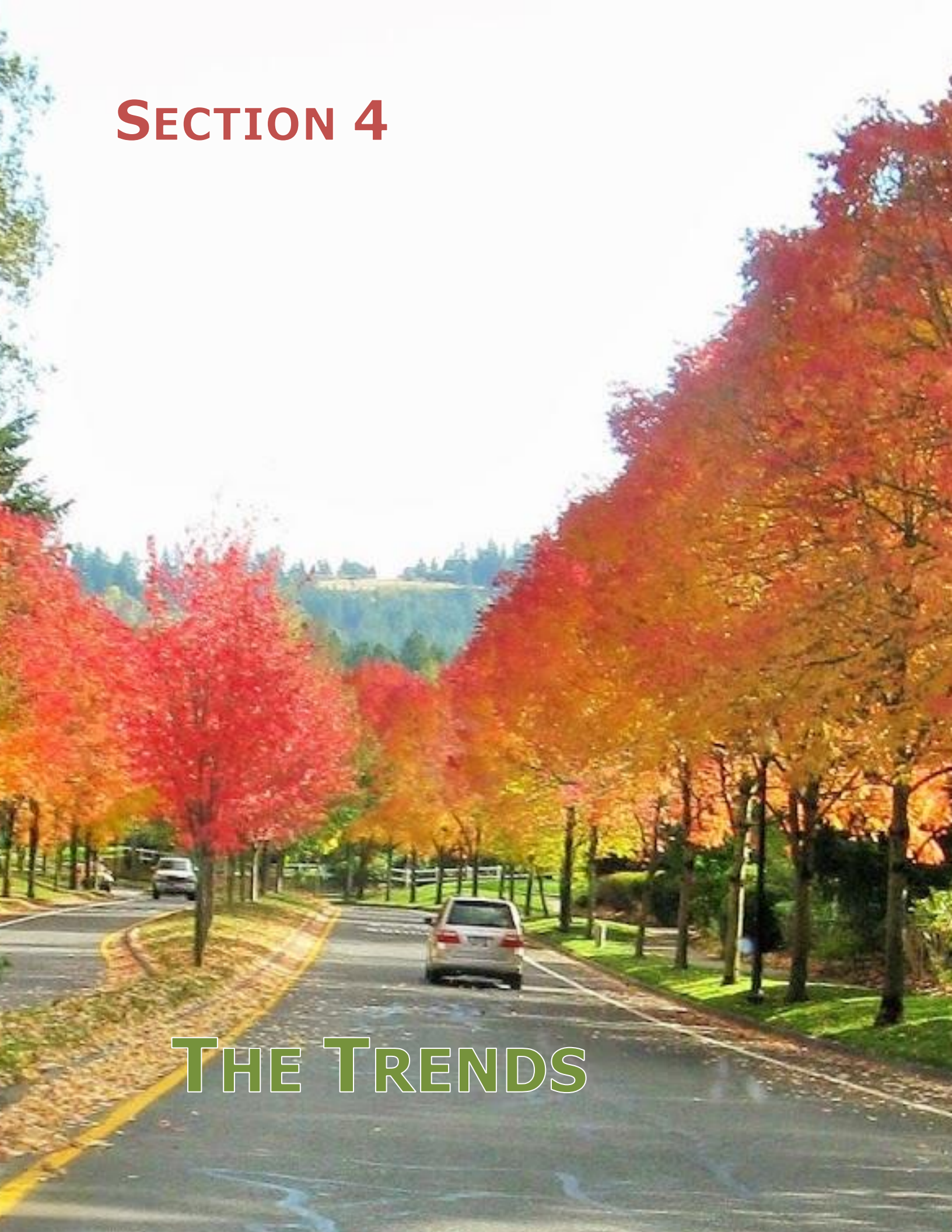
Section 4



The Trends

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THE TRENDS

Before it was determined what investments were needed for Sherwood's transportation system, the current travel conditions were reviewed and future growth and travel trends were forecasted through the year 2035. For this assessment of needs, it was assumed that only the transportation projects with committed funding would be built and that no further investments would be made in order to prioritize and plan projects that re not currently funded. The following sections explain where growth is expected, how the transportation system will perform, and where solutions will be needed.

Snapshot of Sherwood in 2035

Today, the Sherwood area (both land within the existing city limits as well as outlying rural area) is home to 7,500 households and accounts for over 8,800 jobs. Based on Metro's regional growth projections[4] for areas in and around Sherwood, between now and year 2035, employment is expected to increase nearly 5.0 percent a year, slightly outpacing household growth over the same period (4.5 percent). By 2035, based on regional growth forecasts, the Sherwood area (including the urban reserves) is expected to be home to almost 16,000 households and over 19,800 jobs, a 113 and 124 percent increase respectively from 2010.[5] With more people and more jobs in Sherwood, the transportation network will face increased demands.

More People, More Jobs

As shown in Figure 5, much of the population and employment growth is expected to occur around the undeveloped edges of Sherwood.

Employment growth is expected to be highest in the following areas:

- The Tonquin Employment Area, including the area bound by Tualatin-Sherwood Road to the north, Oregon Street to the South, Langer Farms Parkway to the west, and the 124th Avenue alignment to the east
- North of Tualatin-Sherwood Road between OR 99W and Cipole Road
- The urban reserves west of the city
- The areas adjacent to Brookman Road
- The areas adjacent to Tonquin Road
- The area bound by OR 99W, Elwert Road, and Edy Road

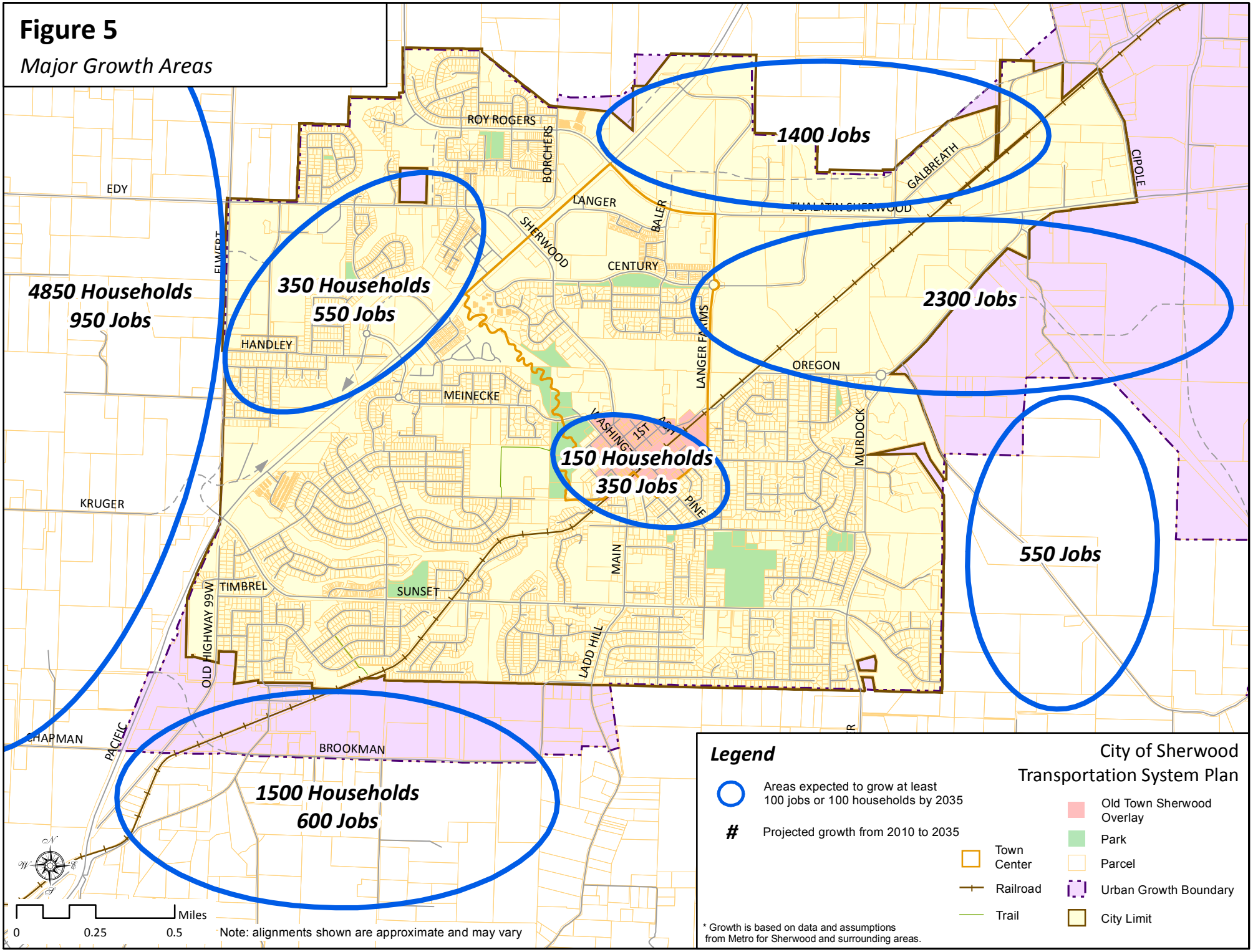
Old Town Sherwood is also expected to see moderate employment growth.

[4] Metro 2035 Gamma land use forecasts.

[5] Analysis is based on Metro Gamma land use forecasts for zones in and around Sherwood.

Figure 5

Major Growth Areas



By the year 2035, household growth is expected to be highest in the following areas:

- The urban reserves west of the city
- The areas adjacent to Brookman Road

Old Town Sherwood and the area bound by OR 99W-Elwert Road-Edy Road are also expected to see moderate household growth.

More Driving

The projected growth in housing and employment is likely to lead to increased activity and person-trips in Sherwood. Even with enhancements to pedestrian and bicycle opportunities and progress towards non-driving trips, there is projected to be an increase of approximately 65% weekday peak hour vehicle trips in the Sherwood area by 2035. Along with this growth, the total vehicle distance travelled in Sherwood is projected to increase, even though the distance travelled per person (average distance) is projected to decrease[6]. This increased overall vehicle travel will place additional strain on Sherwood's streets.

More Congestion

More travel means more congestion. Evening peak hour motor vehicle trips beginning or ending in Sherwood are expected to increase by 63 percent through 2035. Through travel, or trips that do not begin or end in Sherwood, is also expected to increase through 2035 and is generally representative of growth in the region, including surrounding cities such as Tualatin and Newberg. Figure 6 indicates the general amount of traffic projected to use streets in the Sherwood area (based on the width of the color) and the general level of congestion (noted by warmer colors). The following road segments were identified as locations that are projected to be congested during evening peak hour conditions and may require additional capacity improvements or management strategies by the year 2035:

- OR 99W north of SW Tualatin-Sherwood Road
- SW Roy Rogers Road west of OR 99W
- SW Tualatin Sherwood Road east of OR 99W
- SW Edy Road west of OR 99W
- OR 99W south of SW Edy Road
- SW Oregon Street east of SW Murdock Road
- SW Sunset Boulevard between SW Pinehurst Drive and SW Murdock Road
- SW Langer Farms Parkway south of SW Century Drive

[6] The projected increase in vehicle trips (65%) is less than the projected increase in land use (approximately 115% and 125% growth in households and jobs, respectively). As a result, the average distance travelled per person is projected to decrease. Section 9 (The Outcome) includes additional information.

More Walking, Biking, and Transit Use

Old Town and other areas of the Town Center continue to develop in ways that will support multimodal activity. Amenities such as Cannery Square and the Cedar Creek Trail will attract activity and the amount of pedestrian, bicycle, and transit use in the area is expected to grow.

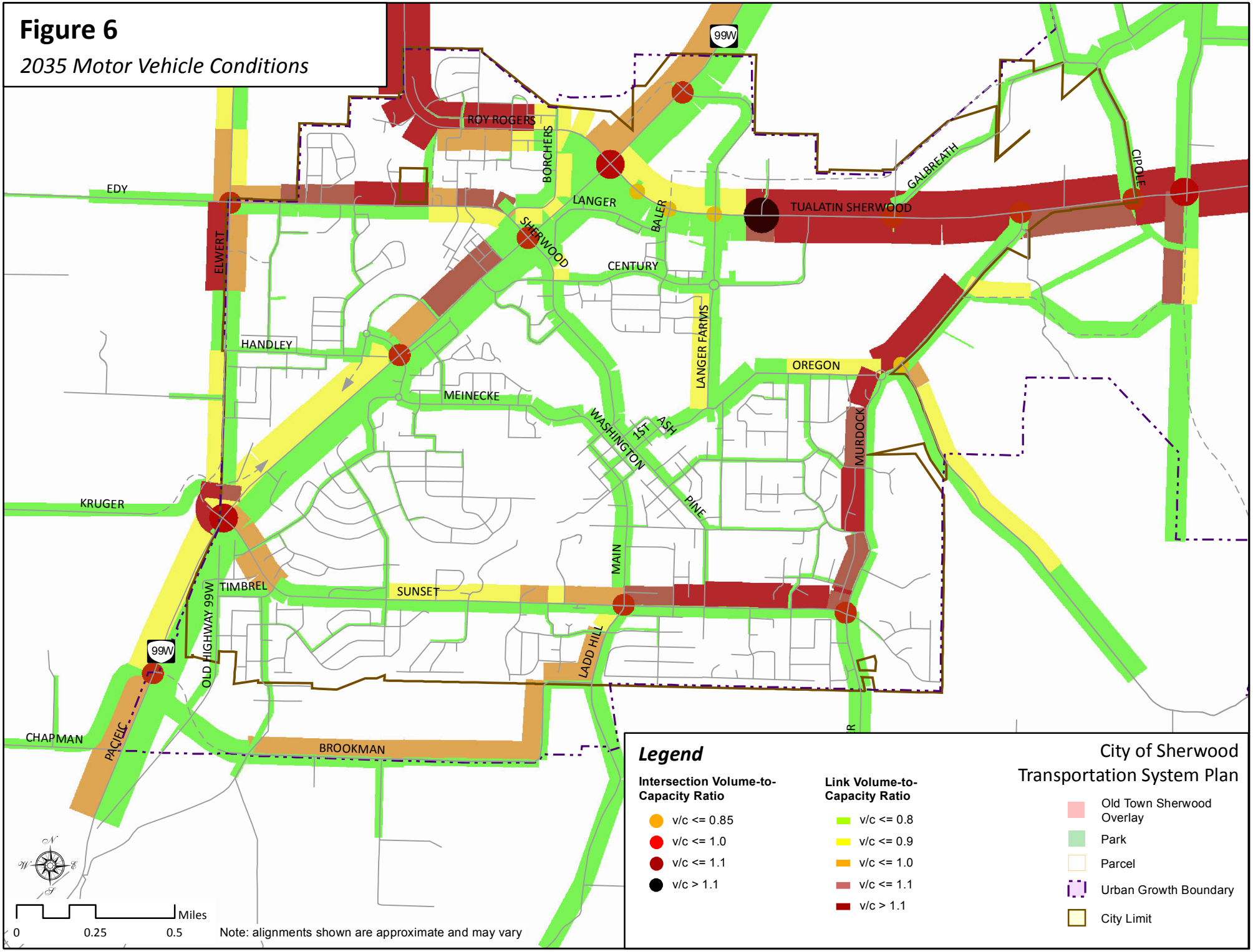
The future needs for walking, biking, and transit in Sherwood were determined by reviewing major growth areas of the city and seeing how they were served by existing facilities. In addition, the areas of the city in close proximity to key destinations (such as schools, transit stops, and shopping) with potential to attract significant walking and biking trips and areas with existing deficiencies were identified and reviewed to determine prioritized walking, biking, or transit investments.

Key routes with bike and/or pedestrian deficiencies include:

- 12th Street
- Borchers Drive
- Highway 99W
- Langer Drive
- Main Street
- Pine Street
- Sherwood Boulevard
- Sunset Boulevard
- Washington Street

Figure 6

2035 Motor Vehicle Conditions



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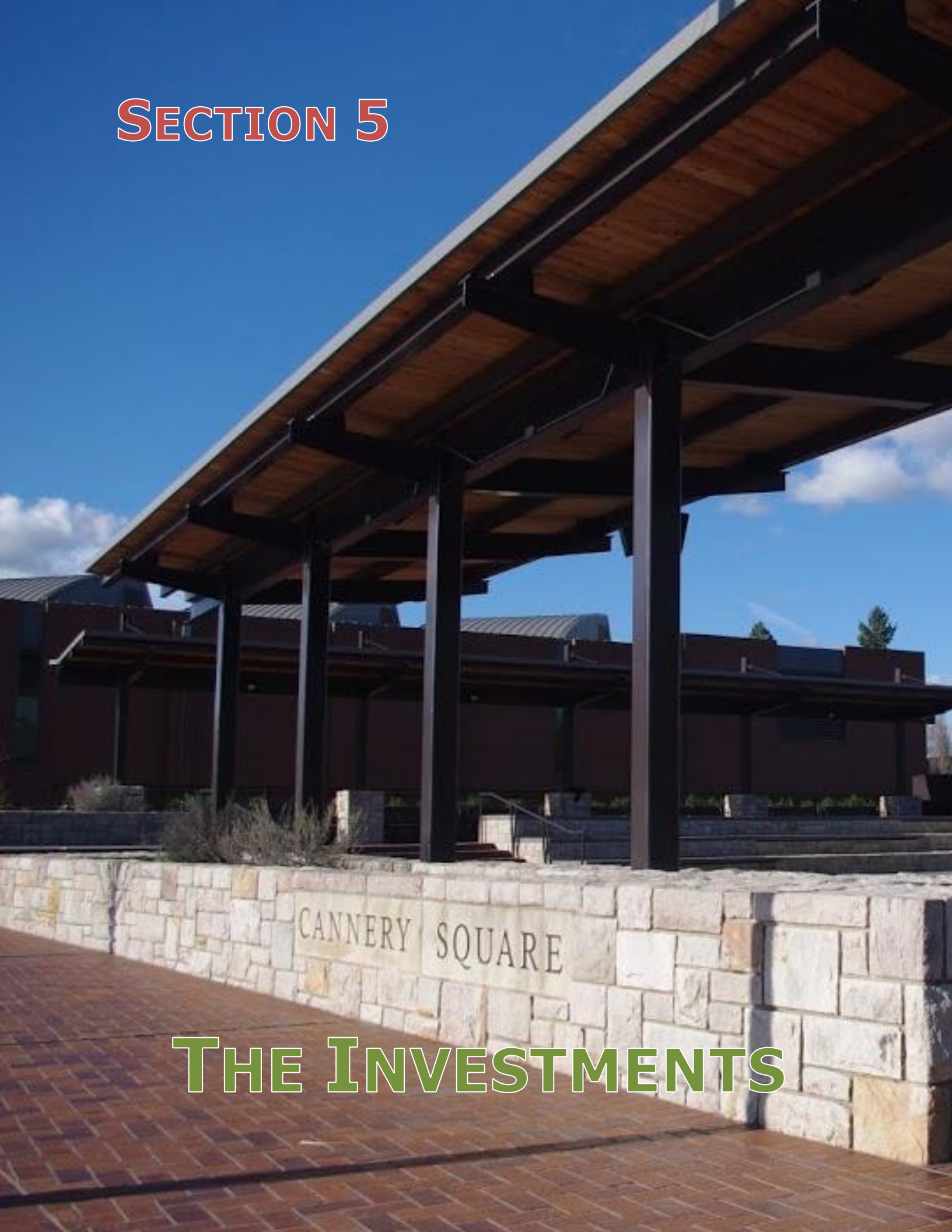
Section 5



The Investments

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The Investments

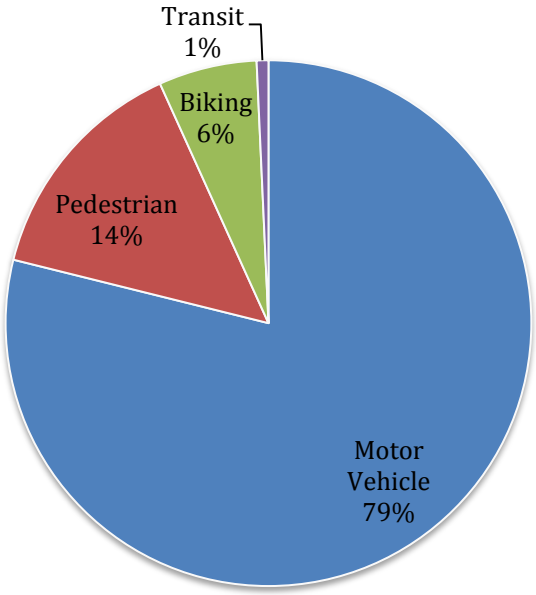
As required by Metro's Regional Transportation Functional Plan (RTFP), the Sherwood approach to developing transportation solutions placed more value on investments in smaller cost-effective solutions for the transportation system rather than larger, more costly ones as the City and regional partners will have a limited amount of funding to spend on these solutions through 2035. The approach helped to encourage multiple travel options, increase street connectivity and promote a more sustainable transportation system.

Taking the network approach to transportation system improvements, the projects in this plan—listed in Table A1 of Volume 2, Section E—are grouped into several modal categories. The following categories list the number of projects and their costs (which are in 2013 dollar amounts, and are the City's estimated share of the total cost) for each mode:

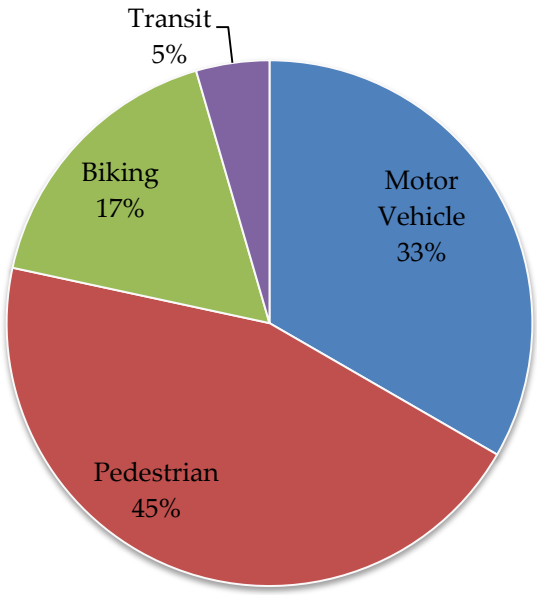
- **Motor vehicle** projects to improve connectivity, safety, and mobility throughout the city. Sherwood identified 35 driving projects that would cost the City an estimated $87.4 million to complete.
- **Pedestrian** projects for sidewalk infill, local and regional trails, and shared-use paths, providing seamless connections for pedestrians throughout the city. Sherwood identified 50 sidewalk projects that would cost the City an estimated $15.9 million to complete.
- **Biking** projects including an integrated network of bicycle lanes, marked on-street routes, and shared-use paths that facilitates convenient travel citywide. Sherwood identified 19 biking projects that would cost the City an estimated $6.7 million to complete.
- **Transit** projects to provide wider coverage, more frequent service, and more better amenities. A total of 5 transit projects were identified that would cost the City an estimated $0.8 million to complete.

Overall, Sherwood identified 109 transportation solutions, totaling an estimated $347 million worth of investments—$111 million of which is assumed to be city funded. The remainder is the assumed share for the county and state for projects not on city owned facilities. As shown in Figure 7, only about 32 percent of the improvements in the Plan are driving projects, yet these projects account for nearly 79 percent of the total project expenses in the Plan.

Figure 7: Breakdown of Projects and Expenses in the Plan



Projects Expenses in the TSP by Mode



Projects in the TSP by Mode

Section 6

The Funding

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The Funding

With an estimated $111 million worth of transportation solutions identified to potentially be funded by the City, Sherwood must make investment decisions to develop a set of transportation improvements that are reasonably likely be funded to meet identified needs through 2035. As summarized in the Existing Conditions Technical Report, it is estimated that Sherwood would have approximately $11.3 million to spend on capital improvement projects through 2035 based on historical growth that has occurred over the last several years.

However, assuming the level of growth related to urbanization of surrounding areas through 2035, Sherwood's available funds for transportation projects would grow to approximately $60 million. Therefore, both the $11.3 million funding estimate (referred to as "conservative funding") and the $60 million funding estimate (referred to as "projected funding") will be considered as funding scenarios.

Funding Shortfall

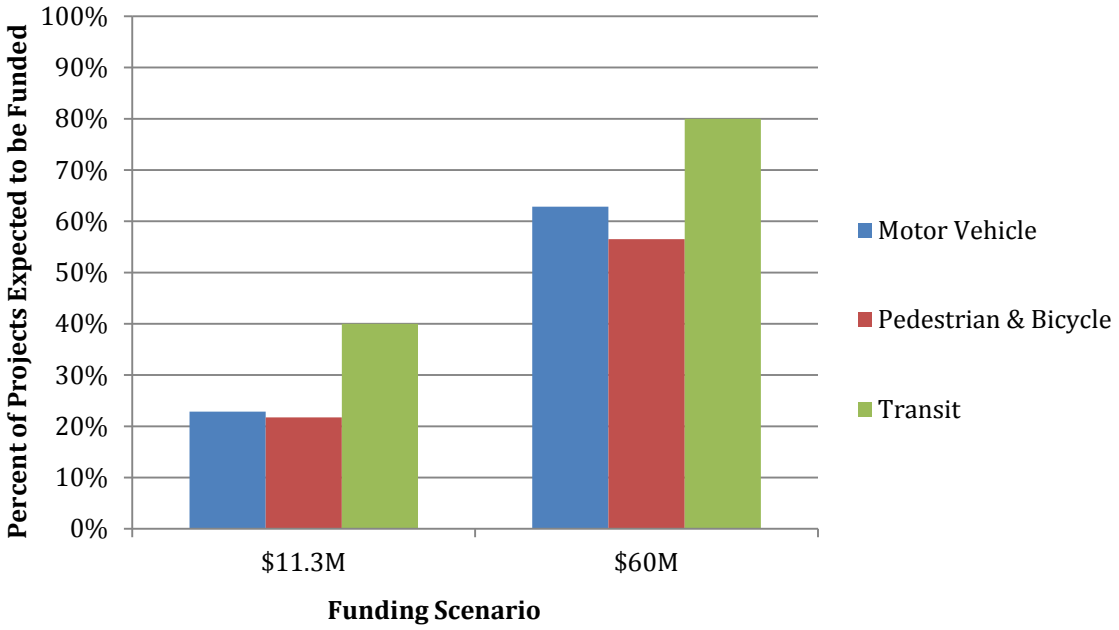
Over $187 million worth of motor vehicle projects, nearly $23 million worth of pedestrian, bicycle, and shared-use path and trail improvements, and about $1 million worth of transit projects were identified for City funding, totaling approximately $110.8 million.

Unless additional funds are developed, Sherwood will be short as much as $99 million to fund desired transportation projects if growth in the city continues as it has over the last few years. If the level of growth in the area is consistent with the regional land use growth projections, the City would be short nearly $51 million to fund transportation projects. However, the funding estimates do not consider developer contributions that would likely apply to a handful of investments shown in the TSP—therefore, the funding gap is likely to be less than $51 million, yet significant none-the-less.

As shown in Figure 8, approximately 23 percent of the motor vehicle projects, 22 percent of the pedestrian and bicycle projects, and 40 percent of the transit projects could be funded under the conservative funding estimate of $11.3 million. Under the projected funding estimate of $60 million, approximately 63 percent of the motor vehicle projects, 57 percent of the pedestrian and bicycle projects, and 80 percent of the transit projects could be funded.

In addition to Sherwood's funding shortfall, state and county funding limitations may further constrain the degree of transportation investments made in the City. Even though Sherwood may dedicate a match to support funding an investment along a state or county facility, it is not guaranteed that the county or state could provide the remaining match to complete the investment.

Figure 8: Evaluation of the Fundable Plans



Section 7

The Plan

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As detailed in the Funding section, the City is projected to have up to $60 million to cover the $111 million in project costs. Clearly, most of the transportation solutions identified for the city are not reasonably likely to be funded through 2035. For this reason, the transportation solutions were grouped into three categories based on the timing of anticipated implementation:

- The Conservatively Fundable Plan
- The Projected Fundable Plan
- The Aspirational Plan

The highest priority projects that fall within the $11.3 million scenario were included in the Conservatively Fundable Plan, the highest priority projects that fall within the $60 million scenario were included in the Projected Fundable Plan, and the complete projects list—regardless of expected funding—is referred to as the Aspirational Plan.

Determining the Investments that made the Fundable Plans

The complete list of transportation projects were prioritized based on a three-tier evaluation process, which included:

- **Tier 1: Screening for Needs**—Projects previously identified in plans prior to the update (e.g., prior transportation plans, concept plans, etc.) were screened to determine if they addressed a specific need identified in the TSP update process. Projects that were previously identified but did not directly address a given need were given a "long-term phasing status (regardless of Tier 2 and Tier 3 evaluation). Additional projects were developed to address the needs that were not otherwise addressed with previously identified projects.
- **Tier 2: Primary Evaluation Criteria**—Evaluation criteria were applied to projects across all modes based on consistency with Sherwood's transportation goals. These criteria provided a means to evaluate very different projects using the broad criteria that was applied to all project types.
- **Tier 3: Secondary Criteria**—In order to further differentiate projects that received the same primary evaluation score within a given mode, sets of secondary criteria were applied. These criteria were different for each mode and were only used to compare projects relative to other projects of the same mode. The criteria were:
  - Pedestrian/Bicycle—Project location and proximity to schools and other activity generators.
  - Motor Vehicle—Hierarchy of projects based on regional strategies (intersection improvements are highest priority and major corridor widening is lowest priority).

Incorporating the funding scenarios with the prioritized list of projects, the solutions were grouped into the fundable plans. Each

transportation solution was then assigned a time frame for the expected investment need, based on a project's contribution to achieving the transportation goals of Sherwood.

Conservatively Fundable Transportation System

The Conservatively Fundable Plan identifies the highest priority transportation solutions that are anticipated to be funded by 2035, based on historical funding data. Transportation solutions within the Conservatively Fundable Plan were recommended as short-term investments.

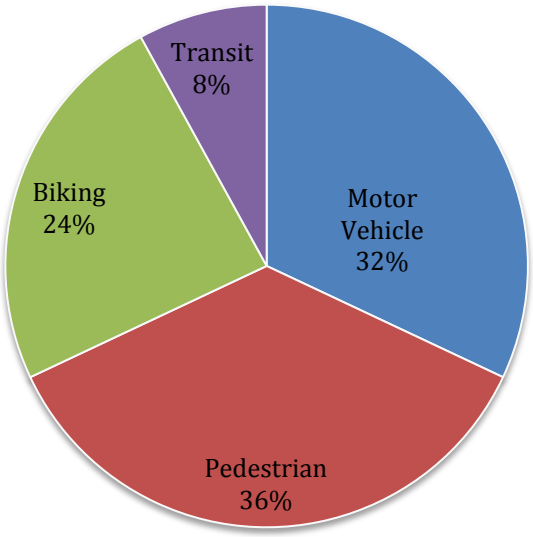
Over $11 million worth of investments are included in the Conservatively Fundable Transportation System. As shown in Figure 9, about 32 percent of these investments are motor vehicle improvements, 36 percent are pedestrian improvements, 24 percent are biking improvements, and about 8 percent of these investments are transit improvements.

The Conservatively Fundable transportation solutions are highlighted in red in Table 1 and illustrated in Figures 11 to 13. The projects numbered on Figures 11 to 13 correspond with the project numbers in Table 1. The project numbers are denoted as follows:

- Driving ("D")
- Pedestrian ("P")
- Biking ("B")
- Transit ("T")

Planning level cost estimates for the projects can be found in Table A1 of the TSP Volume 2, Section E.

Figure 9: Breakdown of Projects in the Conservatively Fundable Plan



Projected Fundable Transportation System

The Projected Fundable Plan identifies additional high priority transportation solutions that reasonably could be funded by 2035, assuming the same level of growth related to urbanization of surrounding areas. Transportation solutions within the Projected Fundable Plan that were not included in the Conservatively Fundable Plan were recommended as medium-term investments.

Nearly $60 million worth of investments are included in the Projected Fundable Transportation System. As shown in Figure 10, about 34 percent of these investments are motor vehicle improvements, 38 percent are pedestrian improvements, 22 percent are biking improvements, and about 6 percent of these investments are transit improvements.

The Projected Fundable transportation solutions are also listed in Table 1 and illustrated in Figures 11 to 13. Planning level cost estimates for the projects can be found in Table A1 of the TSP Volume 2, Section E.

Figure 10: Breakdown of Projects in the Projected Fundable Plan

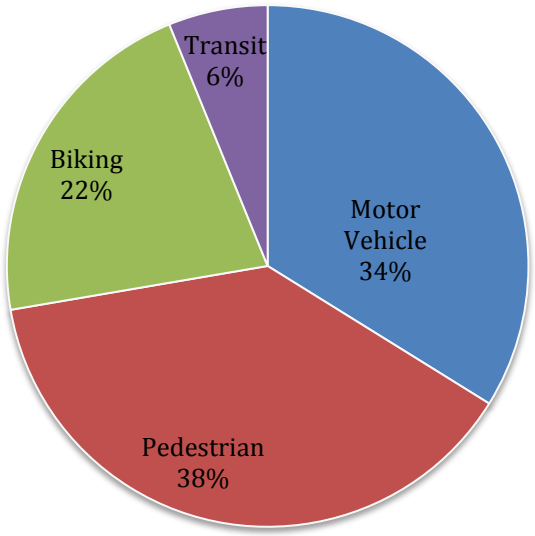


Table 1: The Fundable Transportation System

Project #	Project Name	Project Details	Priority
Projects with Committed Funding			
D13	Tualatin-Sherwood Improvements – Phase 1	Widen Tualatin-Sherwood Road/Roy Rogers Road between Borchers Drive and Baler Way to five lanes. Includes intersection modifications at OR 99W, the Sherwood Market Center, and at Baler Way.	(Funded Through MSTIP)
D19	124th Avenue Extension	Extend 124th Avenue as an arterial from Tualatin-Sherwood Road to Tonquin Road.	(Funded Through MSTIP)
D22	Kruger/Elwert Intersection Safety Improvement	Realign Elwert Road to provide more storage at Highway 99W, and realign the Kruger Road intersection to the Cedarbrook extension as a single lane roundabout.	(Funded Through MSTIP)
P13	Ice Age Tonquin Trail Segment 8	Implement Tonquin Trail Segment 8 improvements from immediately north of Park Street to immediately south of Highway 99W.	(Funded through Metro regional flex funds)
Motor Vehicle Projects (See Figure 11)			
D3	Oregon Street Intersection Improvements at Murdock and Tonquin	Install a roundabout at the Tonquin Road/Oregon Street intersection with dual westbound through lanes and a single eastbound through/right lane. Consider creating a "Dumbbell Roundabout" with the Oregon/Murdock roundabout by disallowing the west circulating lane at Oregon/Tonquin and disallowing the east circulating lane at Oregon/Murdock. Add a second westbound approach lane to the Murdock Road Oregon Street roundabout for separated westbound left and westbound through lanes. Keep three lanes on the bridge structure.	Short-Term
D4	Elwert Road Improvements	Upgrade Elwert Road (from Highway 99W to Edy Road) to a three lane arterial with bike lanes and sidewalks. This project may be phased with D30 for design and construction purposes.	Short-Term
D6	Edy Road Improvements	Upgrade Edy Road (from Borchers Drive to City Limits) to a three lane collector with bike lanes and sidewalks.	Medium-Term
D7	Ladd Hill Road Improvements	Upgrade Ladd Hill Road (from Sunset Boulevard to the Urban Growth Boundary) to a three arterial with bike lanes and sidewalks.	Medium-Term
D8	Oregon Street Improvements	Upgrade Oregon Street (from Murdock Road to the railroad crossing) to a three lane collector with sidewalks on south side and a shared-use path on the north side (part of the Ice Age Tonquin Trail).	Medium-Term
D12	Extension of Langer Farms Parkway at 99W	Extend Langer Farms Parkway from 99W west as a collector road.	Medium-Term
D14	Highway 99W/Brookman Traffic Signal and Realignment	Realign Brookman Road to intersect with Highway 99W approximately 1/4 mile north of its existing intersection; This alignment would provide future separation from the Southern Arterial connection at Highway 99W and would improve safety and driver expectancy for the intersection on the highway by moving it within the urbanized context (within future urbanized area of Brookman Concept Plan area). This improvement includes a traffic signal at the realigned intersection with a westbound left and southbound right turn lane, and a grade separated railroad crossing. All traffic signals on the state highway system would need to be approved by the state traffic engineer and design coordination with ODOT would be	Medium-Term

Project #	Project Name	Project Details	Priority
		needed to ensure that the improvements were done in a manner that would improve driver expectancy and safety.	
D15	Sunset Boulevard Improvements	Upgrade Sunset Boulevard (from Aldergrove Avenue to Eucalyptus Terrace) to a three lane arterial with sidewalks and bike lanes. Address vertical crest sight distance issues near Pine Street.	Medium-Term
D16	Edy/Highway 99W Intersection Improvements	Restripe the westbound Sherwood Boulevard approach to have a single left turn lane, a single through lane, and a single right turn lane. Eliminate the split phase timing for the side streets, and maintain the existing green time on OR 99W for the northbound and southbound through movements. Add the missing crosswalk to the south approach. Consider implementing P3 alongside this project.	Short-Term
D17	Meinecke/Highway 99W Intersection Improvements	Change the eastbound and westbound left turn phasing on Meinecke Road from permitted to permitted/protected and maintaining the existing green time on OR 99W for the northbound and southbound through movements. Consider implementing P3 alongside this project.	Medium-Term
D18	Langer Drive Improvements	Construct improvements to Langer Drive between Baler Way and Sherwood Boulevard that are consistent with the Sherwood Town Center Plan. Major improvements include: buffered bike lanes, on-street parking, wider sidewalks, narrower travel lanes, removal of the center turn lane, and landscaping.	Short-Term
D24	Sherwood Boulevard Intersection Modifications	Remove the Sherwood Boulevard/Langer Drive traffic signal (allow right-in, right-out, and left-in movements only), and install a traffic signal at the Sherwood Boulevard/Century Drive intersection (add eastbound and westbound left turn lanes).	Short-Term
D25	Sunset/Pine Improvements	Restripe Sunset Boulevard at Pine Street to add eastbound and westbound left turn lanes.	Medium-Term
D27	Baker Road Improvements	Upgrade Baker Road (from Sunset Boulevard to the urban growth boundary) to a two lane arterial with bike lanes and sidewalks.	Medium-Term
D30	Elwert/Edy Roundabout	Install a single lane roundabout at the Elwert Road/Edy Road intersection. This project may be phased with D4 for design and construction purposes.	Medium-Term
D31	Highway 99W/Sunset Improvements	Add westbound and eastbound left turn lanes at Highway 99W/Sunset Boulevard with protective-permissive phasing. Consider implementing D22 and P3 alongside this project.	Medium-Term
D33	Sunset/Murdock Turn Lanes	Add a southbound right turn lane and a northbound left turn lane at the Sunset Boulevard/Murdock Road intersection.	Medium-Term
D34	Brookman/Middleton Traffic Control Enhancements	Move the stop signs to the north and south approaches, and add a southbound left turn lane at the Brookman Road/Middleton Road intersection.	Medium-Term
D35	Area 59 Neighborhood Route	Build a neighborhood roadway, connecting Elwert Road and Copper Terrace as identified in the Area 59 concept plan.	Medium-Term
Pedestrian Projects (See Figure 12)			
P1	Handley Street Sidewalk Infill	Construct sidewalk along the north side of Handley Street from Elwert Road to the existing sidewalk terminus approximately 250 feet east of Elwert Road.	Medium-Term
P2	Highway 99W Sidewalk Infill	Construct sidewalks along both sides of Highway 99W between the north Urban Growth Boundary and the south Urban Growth Boundary.	Medium-Term

Project #	Project Name	Project Details	Priority
P3	Highway 99W Crosswalks	Add missing crosswalks at existing traffic signal locations on Highway 99W between Edy Road and Sunset Boulevard. The crosswalk enhancements may be phased individually with their corresponding intersection improvements (D16, D17, D31).	Short-Term
P4	Ice Age Tonquin Trail/Highway 99W Connection	Construct a shared use path that connects the proposed Cedar Creek/Tonquin Trail to Highway 99W.	Medium-Term
P5	10th Street Neighborhood Greenway	Add sidewalks and shared lane markings to 10th Street and Gleneagle Drive from Sherwood Boulevard to the planned Cedar Creek/Ice Age Tonquin Trail connection.	Medium-Term
P6	Sherwood Boulevard Improvements	Construct improvements to Sherwood Boulevard between Langer Drive and 3rd Street that are consistent with the Sherwood Town Center Plan. Major improvements include: a shared-use path on the east side, wider sidewalks on the west side, narrower travel lanes, and landscaping.	Short-Term
P12	Ice Age Tonquin Trail Segment 7	Implement Tonquin Trail Segment 7 improvements from immediately west of the Tonquin/Oregon Street intersection to immediately north of Park Street.	Short-Term
P14	Ice Age Tonquin Trail Segment 9	Implement Tonquin Trail Segment 9 improvements from immediately south of Highway 99W to Roy Rogers Road (including Roy Rogers intersection).	Short-Term
P16	Ice Age Tonquin Trail Segment 11	Implement Tonquin Trail Segment 11 improvements from immediately east of the Tonquin Road/Oregon Street intersection to immediately west of Cipole Road.	Medium-Term
P18	Cipole Road Sidewalk Infill	Construct sidewalk along the east side of Cipole Road from approximately 1,250 feet north of Tualatin-Sherwood Road to the existing sidewalk terminus approximately 450 feet north.	Medium-Term
P19	12th Street Sidewalk Infill	Construct sidewalk along the south side of 12th Street from Highway 99W to Sherwood Boulevard.	Short-Term
P20	Division Street Sidewalk Infill	Construct sidewalk along both sides of Division Street from Main Street to Cuthill Place.	Short-Term
P21	Meinecke Road Sidewalk Infill	Construct sidewalk along the north side of Meinecke Road from Lee Drive to the existing sidewalk terminus to the east (approximately 400 feet).	Medium-Term
P22	Pine Street Sidewalk Infill Segment 1	Construct sidewalk along the west side of Pine Street from Willamette Street to Columbia Street.	Medium-Term
P23	Pine Street Sidewalk Infill Segment 2	Construct sidewalk along the east side of Pine Street from Division Street to Sunset Boulevard, and fill the sidewalk gap along the west side of Pine Street just north of Sunset Boulevard.	Short-Term
P26	Highway 99W Grade Separated Crossing	Build a grade-separated crossing of Highway 99W for pedestrians and bicyclists, providing a direct connection for the Ice Age Tonquin Trail east and west of the highway.	Medium-Term
P30	Sunset Boulevard/St Charles Way Crossing Improvements	Install marked crosswalks at the Sunset Boulevard/St Charles Way intersection.	Medium-Term
P31	Sunset Boulevard/Redfern Drive Crossing Improvements	Install enhanced pedestrian crossing at the Sunset Boulevard/Redfern Drive intersection.	Medium-Term

Project #	Project Name	Project Details	Priority
P32	Sunset Boulevard/Galewood Drive Crossing Improvements	Install enhanced pedestrian crossing at the Sunset Boulevard/Galewood Drive intersection.	Medium-Term
P44	Oregon Street Sidewalk Infill	Construct sidewalk along the south side of Oregon Street between Hall Street and Orland Street.	Medium-Term
P45	Murdock Road Sidewalk Infill Segment 1	Construct sidewalk along the east side of Murdock Road from Willamette Street to Oregon Street.	Medium-Term
P47	Downtown Streetscapes Master Plan Phases 1 and 2 (Old Town Core)	Complete Phase 1 (Old Town Core) and Phase 2 (Cannery Arterials) of the Downtown Streetscapes Master Plan.	Medium-Term
P48	Downtown Streetscapes Master Plan Phase 3 (Old Town Secondary Streets)	Complete Phase 3 (Old Town Secondary Streets) of the Downtown Streetscapes Master Plan.	Short-Term
P49	Downtown Streetscapes Master Plan Phase 4 (Old Town Residential Neighborhoods)	Complete Phase 4 (Old Town Residential Neighborhoods) of the Downtown Streetscapes Master Plan.	Short-Term
Biking Projects (See Figure 13)			
B1	Murdock Shared-Use Path	Build a shared-use path along the west side of Murdock Road from Oregon Street to Upper Roy Street.	Medium-Term
B2	Meinecke Bike Lanes	Add bike lanes on Meinecke Road from Marshall Street to 3rd Street.	Short-Term
B5	Main Street Shared Lane Markings	Add shared lane markings to Main Street between 1st Street and Sherwood Boulevard.	Medium-Term
B6	Pine Street Shared Lane Markings	Add shared lane markings to Pine Street between 3rd Street and Sherwood Boulevard.	Medium-Term
B7	Borchers Bike Lanes	Build bike lanes on Borchers Road between Edy Road and Roy Rogers Road.	Short-Term
B8	3rd Street Shared Lane Markings	Add shared lane markings on 3rd Street from Washington Street to Sherwood Boulevard.	Medium-Term
B9	1st Street Shared Lane Markings	Add shared lane markings on 1st Street from Main Street to Pine Street.	Medium-Term
B10	Century Drive Shared-Use Path	Widen the sidewalk on the south/east side of Century Drive between Tualatin-Sherwood Road and the existing terminus to provide a shared-use path	Short-Term
B12	Old Highway 99W Shared-Use Path	Widen the sidewalk along the west side of Old Highway 99W between Timbrel Lane and Crooked River Lane to provide a shared-use path	Medium-Term
B13	Old Highway 99W Improvements Segment 2	Upgrade Old Highway 99W (from Crooked River Lane to Brookman Road) to a two lane collector with a shared use path on the west side and sidewalks on the east side.	Short-Term
B16	Baler Way Bike Lanes	Rebuild Baler Way to a collector between Century Drive and Tualatin-Sherwood Road to include bike lanes.	Short-Term
B17	12th Street Bike Lanes	Add bike lanes on 12th Street between Highway 99W and Sherwood Boulevard.	Short-Term

Project #	Project Name	Project Details	Priority
B18	Washington Street Shared Lane Markings	Add shared lane markings on Washington Street between 3rd Street and 1st Street.	Medium-Term
B19	Sunset Boulevard Bike Lanes	Add bike lanes on Sunset Boulevard between Aldergrove Avenue and Murdock Road	Medium-Term
Transit Projects			
T1	Provide Transit Amenities at Major Transit Stops	Provide Transit Amenities at Major Transit Stops.	Medium-Term
T2	Improve Pedestrian Connections to Transit Facilities	Improve Pedestrian Connections to Transit Facilities.	Short-Term
T3	Increase Density Adjacent to Transit	Increase Density Adjacent to Transit.	Short-Term
T5	Provide Local Service	Provide local service to enhanced regional service.	Medium-Term

Full project list (including aspiration projects) can be found in Volume 2, Section E
Projects may be constructed through private development

Aspirational Transportation System

The projects within the fundable plans will significantly improve Sherwood's transportation system. If the city is able to implement a majority of the Projected Fundable Plan, nearly two decades from now Sherwood residents will have access to a safer, more balanced multimodal transportation network.

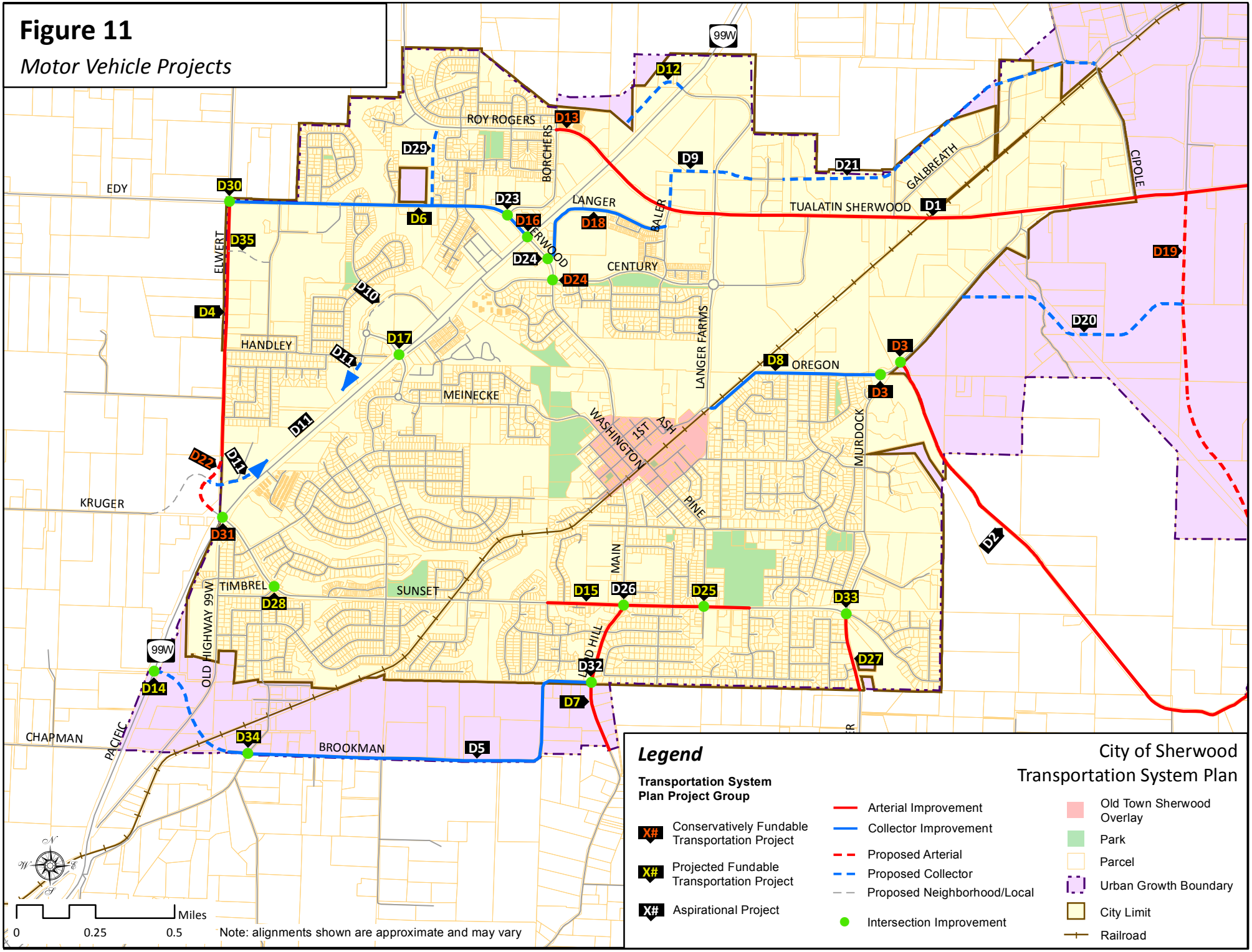
The Aspirational Transportation System identifies those transportation solutions that are not reasonably expected to be funded by 2035, but many of which are critically important to the transportation system. Some of the projects will require funding and resources beyond what is available in the time frame of this plan. Others are contingent upon redevelopment that makes it possible to create currently missing infrastructure, such as street connections.

The Aspirational Transportation System solutions are illustrated in Figures 12 to 14 and summarized in the TSP Volume 2, Section E. The Aspiration Transportation Plan includes about $111 million worth of investments. Planning level cost estimates for the projects can be found in Table A1 of the TSP Volume 2, Section E.

Transportation solutions within the Aspirational Transportation System, but not in a fundable plan, were recommended as long-term investments.

Figure 11

Motor Vehicle Projects



Legend

Transportation System Plan Project Group

- X# Conservatively Fundable Transportation Project
- X# Projected Fundable Transportation Project
- X# Aspirational Project

- Arterial Improvement
- Collector Improvement
- Proposed Arterial
- Proposed Collector
- Proposed Neighborhood/Local
- Intersection Improvement

City of Sherwood
Transportation System Plan

- Old Town Sherwood Overlay
- Park
- Parcel
- Urban Growth Boundary
- City Limit
- Railroad

Figure 12

Pedestrian Projects

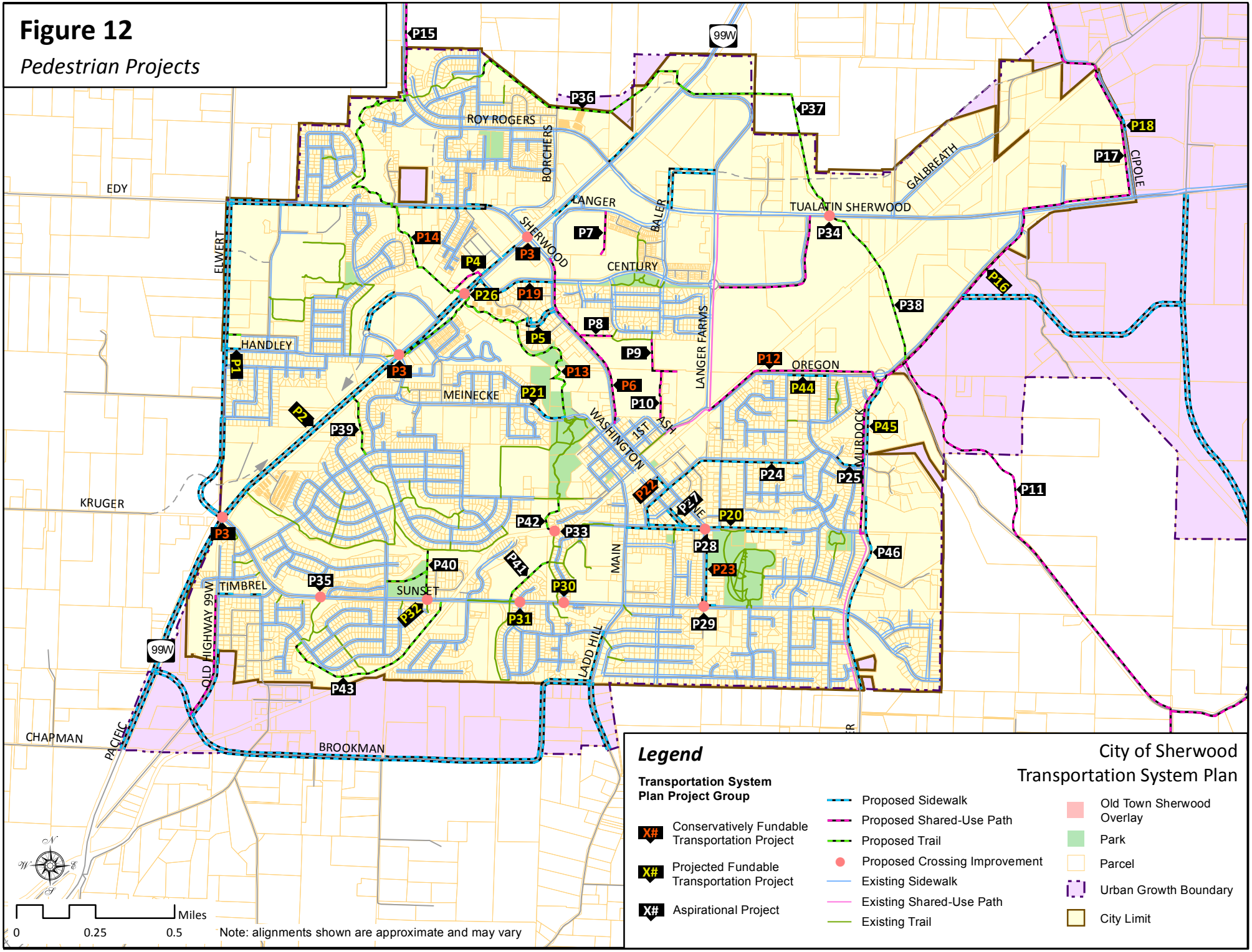
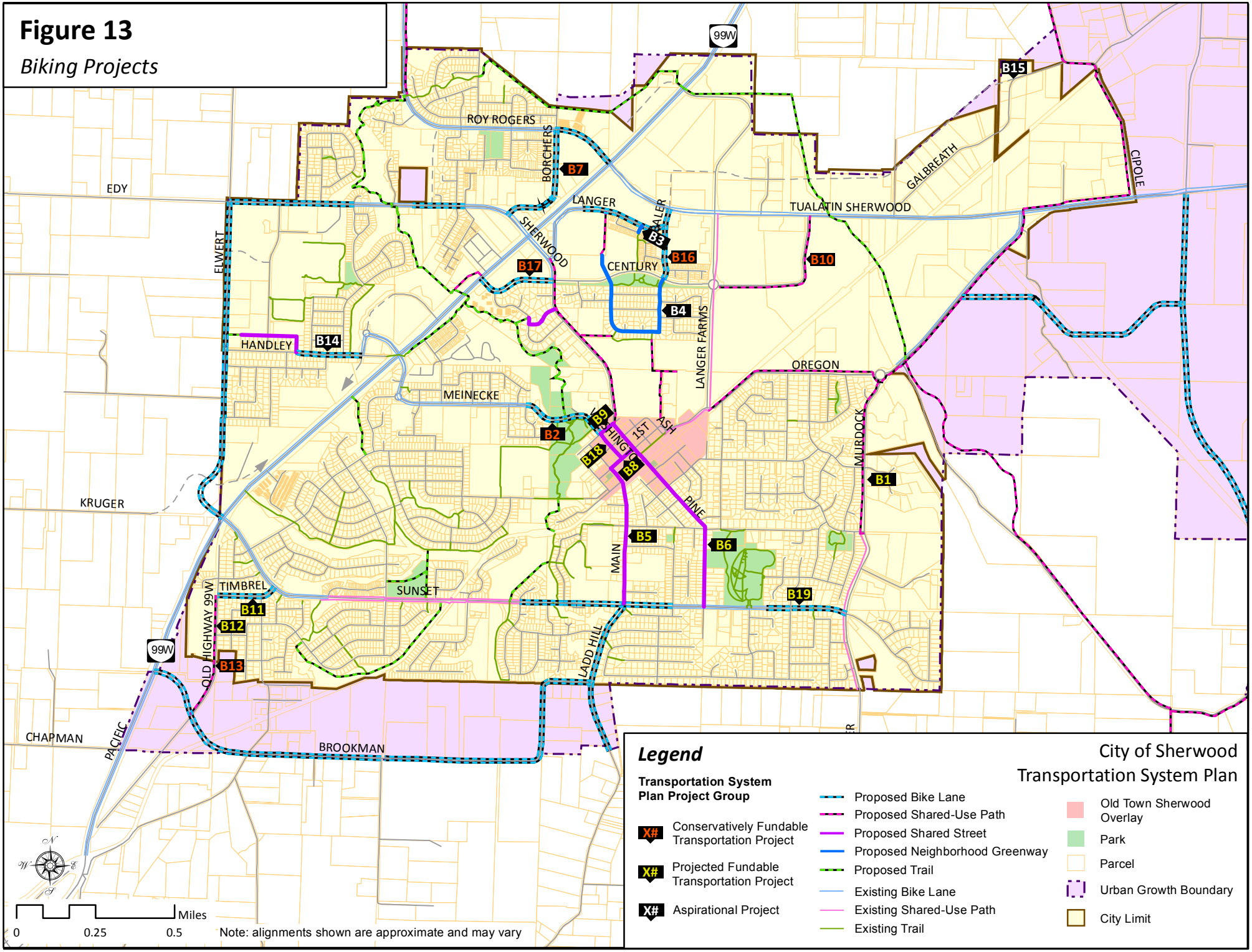


Figure 13

Biking Projects



Legend

Transportation System Plan Project Group

- X# Conservatively Fundable Transportation Project
- X# Projected Fundable Transportation Project
- X# Aspirational Project

- Proposed Bike Lane
- Proposed Shared-Use Path
- Proposed Shared Street
- Proposed Neighborhood Greenway
- Proposed Trail
- Existing Bike Lane
- Existing Shared-Use Path
- Existing Trail

City of Sherwood
Transportation System Plan

- Old Town Sherwood Overlay
- Park
- Parcel
- Urban Growth Boundary
- City Limit

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Section 8

The Standards

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THE STANDARDS

Now that the vision and associated investments for transportation in Sherwood have been established, standards and regulations must be applied to ensure future development or redevelopment of property is consistent.

Functional Classification for Sherwood Streets

Roadway design typically focuses on the safety and flow of motor vehicle traffic. However some streets have other functions that might take precedent over vehicle mobility, such as ensuring sidewalks or bike facilities for vulnerable users like children or the elderly.

While the functional classification system is designed to serve transportation needs within the community, sometimes competing priorities can have opposing effects. For example, as access increases, the facility design dictates slower speeds, narrower travelways, and non-exclusive facilities. The goal of selecting functional classes for particular roadways is to provide a suitable balance to competing objects, which are depicted in Figure 14.

Figure 14 shows that as street classes progress from local to collector to arterial to freeway (top left corner to bottom right corner) the following occur:

- Mobility Increases
- Integration of Pedestrian and Bicycles Decreases
- Access Decreases
- Facility Design Standards Increase

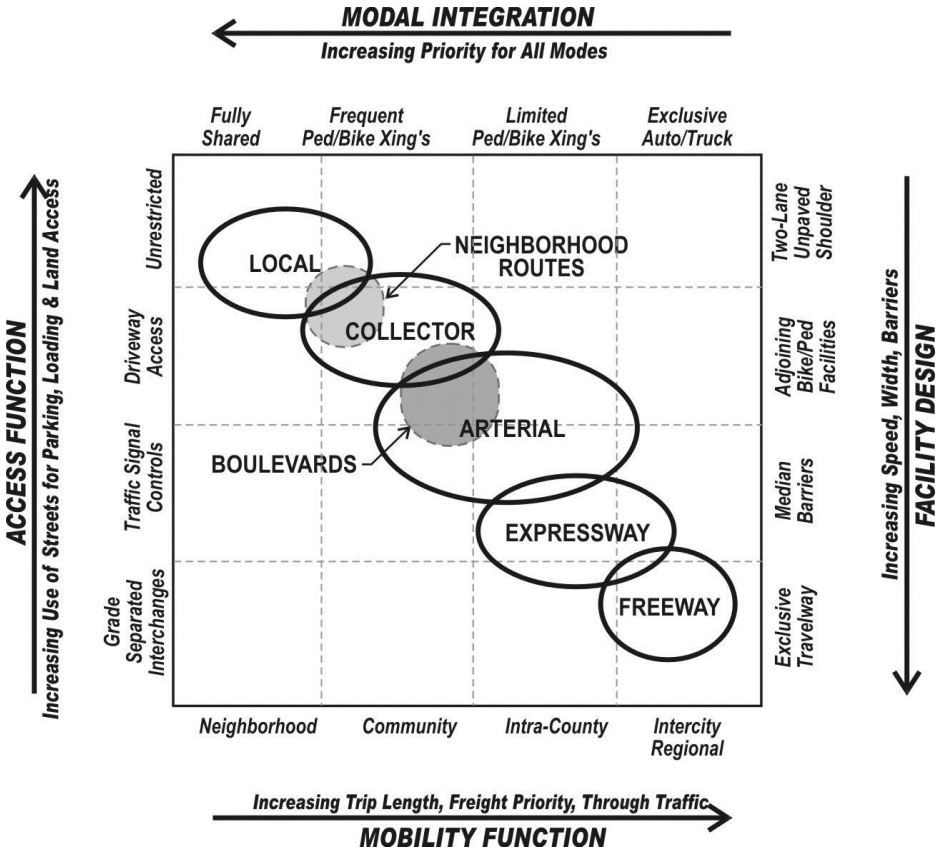


Figure 14: Functional Classification Matrix

The City of Sherwood links functional class to road design standards, and this has enabled the City to construct uniform high-quality improvements that were much needed with recent growth. However, the City also recognized that relying on this system has limitations. Functional classification has commonly been mistaken as a determinate for traffic volume, road size, urban design land use and various other features which collectively are the elements of a roadway but do not represent function. The factors can be outcomes of function, but do not define the function.

Functional Classification Designations

The types of roadways designated in Sherwood are described below.

Principal Arterials are typically freeways and state highways that are access controlled and provide the highest level of connectivity. These routes connect over the longest distance (sometimes miles long) and are less frequent than other arterials or collectors. These highways generally span several jurisdictions and many times have statewide importance (as defined in the State Highway Classification System). In Sherwood, OR 99W is the only route designated as a Statewide Highway. Tualatin-Sherwood Road is not designated in the State Highway Classification System.

Arterial streets serve to interconnect and support the principal arterial highway system. These streets link major commercial, residential, industrial and institutional areas. Arterial streets are typically spaced about one mile apart to assure accessibility and reduce the incidence of traffic using collectors or local streets for through traffic in lieu of a well place arterial route. Arterials are typically multiple miles in length and many connect to cities surrounding Sherwood.

Collector streets provide both access and circulation within and between residential and commercial/ industrial areas. Collectors differ from arterials in that they provide more of a citywide circulation function, do not require as extensive control of access (compared to arterials), and penetrate residential neighborhoods, distributing trips from the neighborhood and local street system. Collectors are typically greater than 0.5 to 1.0 miles in length.

Neighborhood routes are usually long relative to local streets and provide connectivity to collectors or arterials. Because neighborhood routes have greater connectivity, they general have more traffic than local streets and are used by residents in the area to get into and out of the neighborhood, but do not serve citywide/ large area circulation. Traffic from cul-de-sacs and other local streets may drain onto neighborhood routes to gain access to collectors or arterials. Because traffic needs are greater than a

local street, certain measures should be considered to retain neighborhood character and livability of these routes.

Neighborhood traffic management measures are often appropriate (including devices such as speed humps, traffic circles and other devices). However, it should not be construed that neighborhood routes automatically get speed humps or any other measures. While these routes have special needs, neighborhood traffic management is only one means of retaining neighborhood character and vitality.

Local streets have the sole function of providing access to immediate adjacent land. Service to "through traffic movement" on local streets is deliberately discouraged by design.

Characteristics of Streets for each Functional Classification

The design characteristics of streets in Sherwood were developed to meet the function and demand for each facility type. Because the actual design of a roadway can vary from segment to segment due to adjacent land uses and demands, the objective was to define a system that allows standardization of key characteristics to provide consistency, but also to provide criteria for application that provides some flexibility, while meeting standards.

Under some conditions a variance to the adopted street cross-section may be requested from the City Engineer. Typical conditions that may warrant consideration of a variance include—but are not limited to—the following:

- Infill sites
- Innovative designs (such as shared streets known as "woonerfs")
- Severe topographic constraints
- Existing developments and/or buildings that make it extremely difficult or impossible to meet the design standards

The street cross sections for each facility type in the city can be found in the city's *Engineering Design and Standard Details Manual*[7]. Streets under ODOT control (OR 99W) are subject to the design criteria in the Oregon Highway Plan and Highway Design Manual. Streets under Washington County's control are subject to County design standards.

[7] *Engineering Design and Standard Details Manual,* Adopted July 1, 2009.

Functional Classification Changes

Figure 16 shows the street functional classification system in the city, including changes made to the existing functional classification. Changes made to the functional classification system are discussed in Table 2.

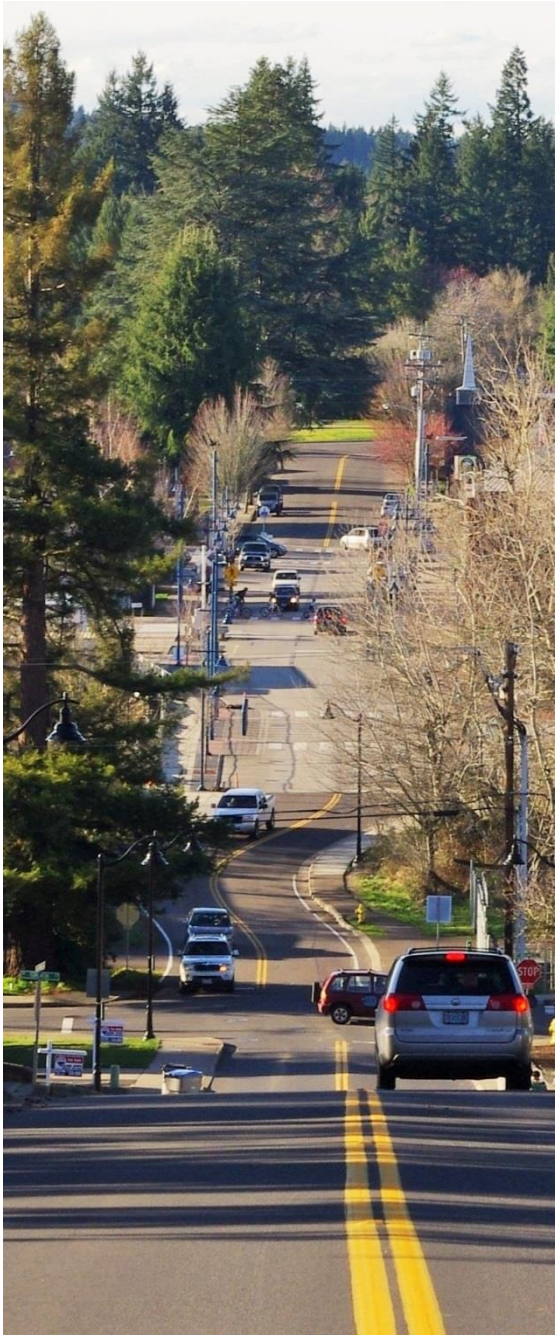
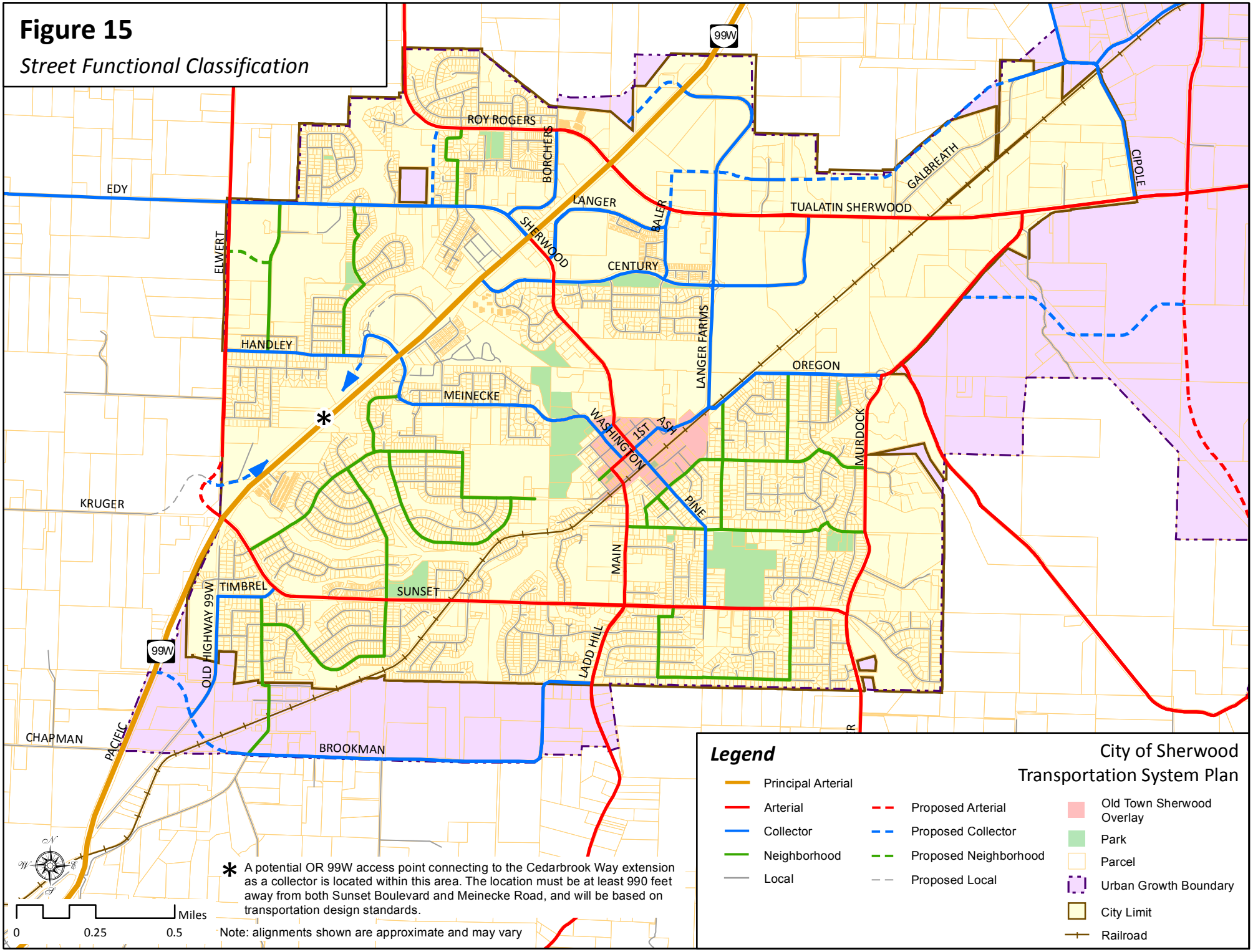


Table 2: Functional Classification Changes

Street	Existing Class	Proposed Class	Comment
Gerda Lane	Collector	Local	The future Herman Road extension will replace Gerda Lane/Galbreath Drive as the collector facility in the area
Galbreath Drive	Collector	Local	The future Herman Road extension will replace Gerda Lane/Galbreath Drive as the collector facility in the area
Herman Road	Local	Collector	Herman Road will be rebuilt as a collector and extended west as part of the I-5 to 99W Connector project
Baler Way (between Langer Drive and Century Drive)	Local	Collector	Removal of the signal at Sherwood Boulevard/Langer Drive will shift demand to Century Drive and Baler Way

Figure 15

Street Functional Classification



Access Spacing Standards

Access Management is a broad set of techniques that balance the need to provide efficient, safe and timely travel with the ability to allow access to the individual destination. ODOT and Washington County have clear access management policies and the supporting documentation to ensure that the highway system is managed as wisely as possible for the traveling public.

Access management is control or limiting of access on arterial and collector facilities to preserve their functional capacity. Several access management strategies that have been developed in prior plans are noted below to improve access and mobility in Sherwood:

- Provide left turn lanes where warranted for access onto cross streets
- Work with land use development applications to consolidate driveways where feasible
- Meet ODOT and Washington County access requirements on arterials and collectors under their jurisdiction
- For streets under the City's control, implement the spacing standards established in the *City Code*[8]

Sherwood's minimum access spacing standards on locally owned streets are designated in the *City Code*[9] (which takes precedence) and are listed in the TSP for reference purposes only:

- Local streets – 10 feet from the point of curvature or 25 feet if no radius exists
- Neighborhood routes – 50 feet
- Collectors – 100 feet
- Arterials – 600 feet

Access management is not easy to implement and requires long institutional memory of the impacts of short access spacing – increased collisions, reduced capacity, poor sight distance and greater pedestrian exposure to vehicle conflicts. Many of the pre-existing driveways that do not meet access spacing requirements were put in when traffic volumes were substantially lower and no access spacing criteria were mandated. With higher and higher traffic volume in the future, the need for access control on all arterial roadways is critical – the outcome of not managing access properly is inefficient roadways with poor mobility, which leads to building additional wider roadways to compensate for the mobility inefficiency (which then have much greater impact than access control).

Traffic Calming

Traffic calming refers to street design techniques used to create safer, slower residential and mixed-use streets to mitigate the impacts of motor vehicle traffic volume and speed in neighborhoods and business districts where a greater balance between safety and mobility is needed. Traffic calming seeks to influence driver behavior through physical and psychological means, resulting in lower vehicle speeds or through-traffic volumes. Physical traffic calming techniques include:

- Narrowing the street by providing curb extensions or bulbouts, or mid-block pedestrian refuge islands
- Deflecting the vehicle path vertically by installing speed humps, speed tables, or raised intersections

[8] Sherwood Municipal Code, Section 16.106.040.M.2.

[9] Ibid.

- Deflecting the vehicle path horizontally with chicanes, roundabouts, and traffic circles

Narrowing travel lanes and providing visual cues such as placing buildings, street trees, on-street parking, and landscaping next to the street also create a sense of enclosure that prompts drivers to reduce vehicle speeds.

Determining the appropriate traffic calming technique will require careful thought as well as coordination with TVFR as each situation is unique and there is no standard solution. Section F in Volume 2 of the TSP provides a complete list of traffic calming techniques and their applicability to assist in the decision-making process.

Local Street Connectivity

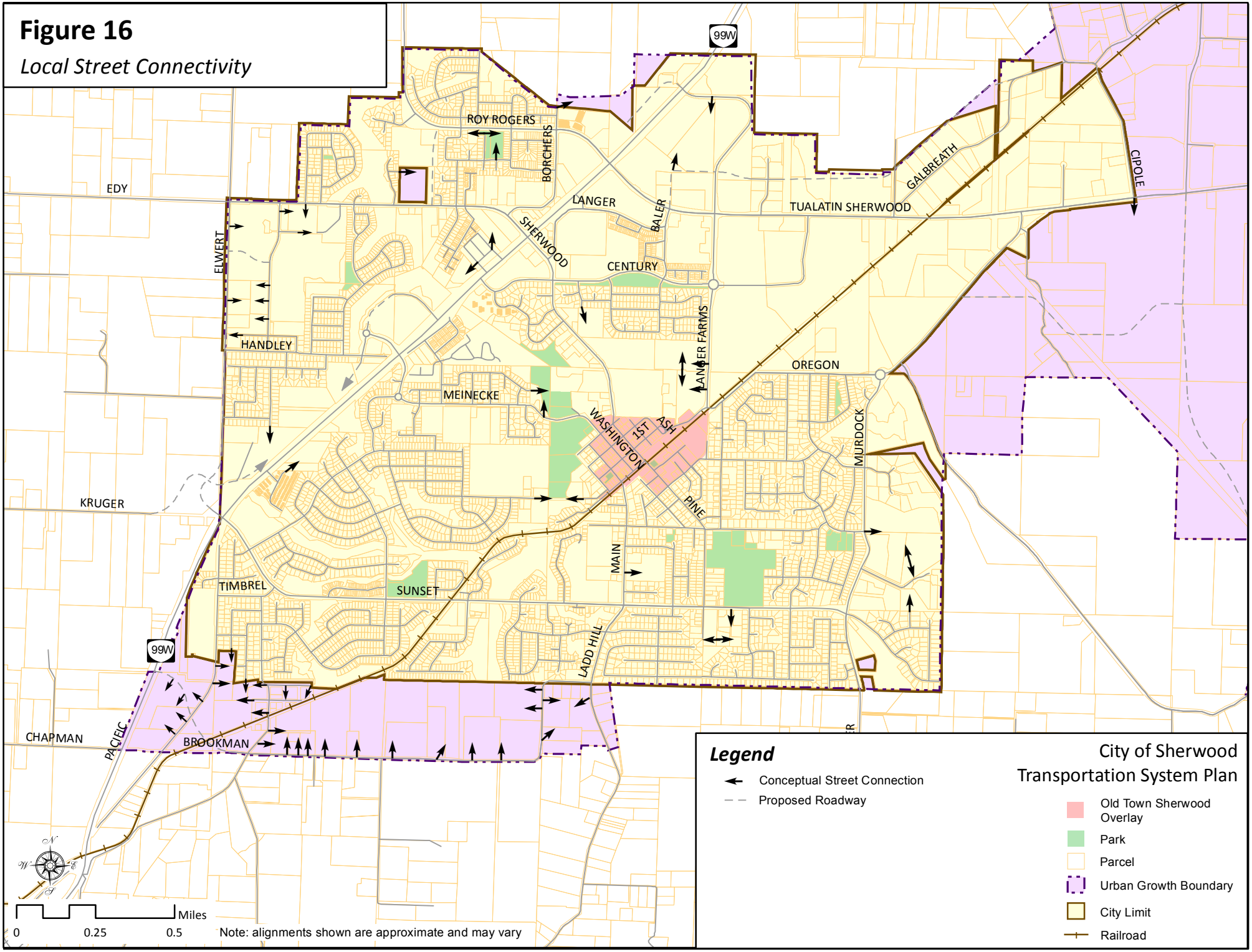
The aggregate effect of local street design impacts the effectiveness of the regional system when local travel is restricted by a lack of connecting routes, and local trips are forced onto the regional network[10]. Therefore, streets should be designed to keep through motor vehicle trips on arterial streets and provide local trips with alternative routes. Street system connectivity is critical because roadway networks provide the backbone for bicycle and pedestrian travel in the region. Metro's local street connectivity principal encourages communities to develop a connected network of local streets to provide a high level of access, comfort, and convenience for bicyclists and walkers that travel to and among centers.

A local connectivity plan for Sherwood is shown in Figure 16. It specifies the general location where new local streets could potentially be installed as nearby areas are developed or as the opportunity arises. The conceptual locations shown consider block length and access spacing requirements but do not necessarily reflect develop-ability due to topographic, environmental or manmade constraints. Locations identified are conceptual and must still go through city review to determine the appropriate location for a local street connection, if any, in the vicinity. The purpose of the plan is to ensure that new developments accommodate circulation between adjacent neighborhoods to improve connectivity for all modes of transportation.

[10] Metro 2035 Regional Transportation Plan, Local Street Network Concept.

Figure 16

Local Street Connectivity



Mobility Targets

Establishing new mobility targets for intersections in Sherwood will help encourage a sustainable transportation system by providing a metric to assess the impacts of new development on the existing transportation system. Two mobility targets that are commonly used by agencies include level of service (LOS) or volume-to-capacity (V/C) ratios.

- LOS – A "report card" rating (grade A through F) based on the average vehicle delay
- V/C – A ratio of how much available use or "how much of the pipe" is being used for a roadway or intersection. Values range from 0 to 1.0 in actual conditions but are sometimes expressed over 1.0 for projected conditions (where traffic demand or the amount that wants to use the system exceeds what can really fit in the system)

Metro requires that agencies do not adopt mobility standards that are more restrictive (lower level of service or volume to capacity ratio) than the regional standard, on facilities where the regional standards apply. In addition, facilities that are under the jurisdiction of ODOT or Washington County would have precedence over the City standard. However, for remaining transportation facilities in Sherwood under the City's jurisdiction, the local City standard would apply.

The mobility standards should be applied based on facility type and location in the following manner and precedence:

- Regional - For all streets designated on the Arterial and Throughway Network in the Metro Regional Transportation Plan[11], intersections should comply with the mobility targets included in the Regional Transportation Functional Plan (RTFP)[12].
  - All streets within the Sherwood Town Center boundary (1.1 v/c in the highest p.m. peak hour and 0.99 v/c in the second hour).
  - All streets not in the Town Center, but on the Arterial and Throughway Network (0.99 v/c in both the highest and second hour in the p.m. peak hour). These streets include Tualatin-Sherwood Road, Roy Rogers Road, Tonquin Road, Sunset Boulevard, Murdock Road, Oregon Street (east of Murdock Road), Elwert Road, Main Street, and Ladd Hill Road.

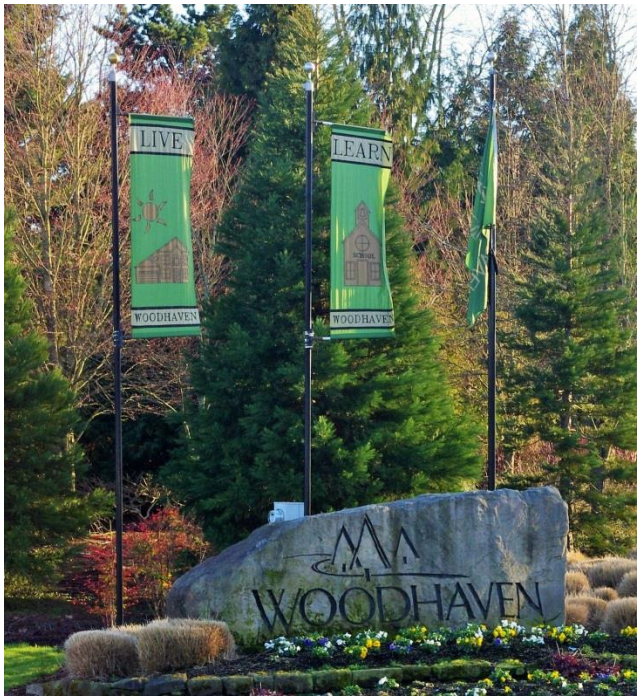
[11] 2035 Regional Transportation Plan, Metro, June 2010.

[12] Regional Transportation Functional Plan, Chapter 3.08, Metro, Effective August 2010.

- Other Agency - For county-owned streets not on the Arterial and Throughway Network and not within the Town Center, intersections should comply with the Washington County TSP[13] (0.99 v/c in the highest hour in the p.m. peak and 0.90 in the second hour). Most county facilities are on the Arterial and Throughway Network, however. ODOT controlled streets (OR 99W) outside the Town Center should meet the appropriate mobility target designated in the Oregon Highway Plan[14] (currently 0.99 v/c for OR 99W outside the Town Center in both the highest and second hour in the p.m. peak).
- For city-owned streets not on the Arterial and Throughway Network and not within the Town Center, intersections should comply with Sherwood's standard. The City standard for signalized, all way stop, or roundabout intersections is level of service D or a volume to capacity ratio equal to or less than 0.90. The standard for unsignalized two way stop control intersections is level of service D or a volume to capacity ratio equal to or less than 0.90. Mobility should be evaluated by methods approved by the City Engineering Department (e.g., Highway Capacity Manual or Sidra). For all intersections, level of service performance would first be assessed and if it is not met the v/c target would be considered. Information for both measures should be provided with traffic studies for the consideration of City staff review.

[13] Washington County 2020 Transportation System Plan, Washington County, November 2003.

[14] 1999 Oregon Highway Plan, OHP Policy 1F Revision, ODOT, Adopted December 2011.



Truck Routes

Truck routes are designated in Sherwood to ensure trucks can efficiently travel through and access major destinations in the city. Efficient truck movement plays a vital role in the economical movement of raw materials and finished products. The designation of through truck routes provides for this efficient movement, while maintaining neighborhood livability, public safety, and minimizing maintenance costs of the roadway system.

Truck routes should provide mobility for freight movement and therefor are generally located on facilities that are classified as mobility-focused corridors (collectors and arterials). These facilities typically include design elements (such as managed access and sufficient lane width) to accommodate trucks. Such design and signing to identify these routes will help maintain freight movement and keep through trucks off of the local street system.

Washington County identifies through truck routes in the Sherwood area as OR 99W and Tualatin-Sherwood Road-Roy Rogers Road, as shown in Figure 17. In addition, ODOT has several designations for OR 99W (a Statewide facility) related to mobility and goods movement, including:

- National Highway System
- National Network
- Freight Route
- Reduction Review Route

These designations can limit reductions to vehicle-carrying capacity and (under the Reduction Review Route designation) subjects proposed reductions to review (ORS 366.215).

Washington County is currently in the process of updating their TSP, which is proposing the 124th Avenue extension as a truck route. This route would connect Tualatin-Sherwood Road with Tonquin Road and Grahams Ferry Road.

Transportation System Management & Operations

Transportation System Management and Operations (TSMO) is a set of integrated transportation solutions for improving the performance of existing transportation infrastructure through a combination of system and demand management strategies and programs. The Sherwood TSMO plan incorporates planned improvements and strategies detailed in the Metro Regional TSMO Plan[15].

Transportation System Management

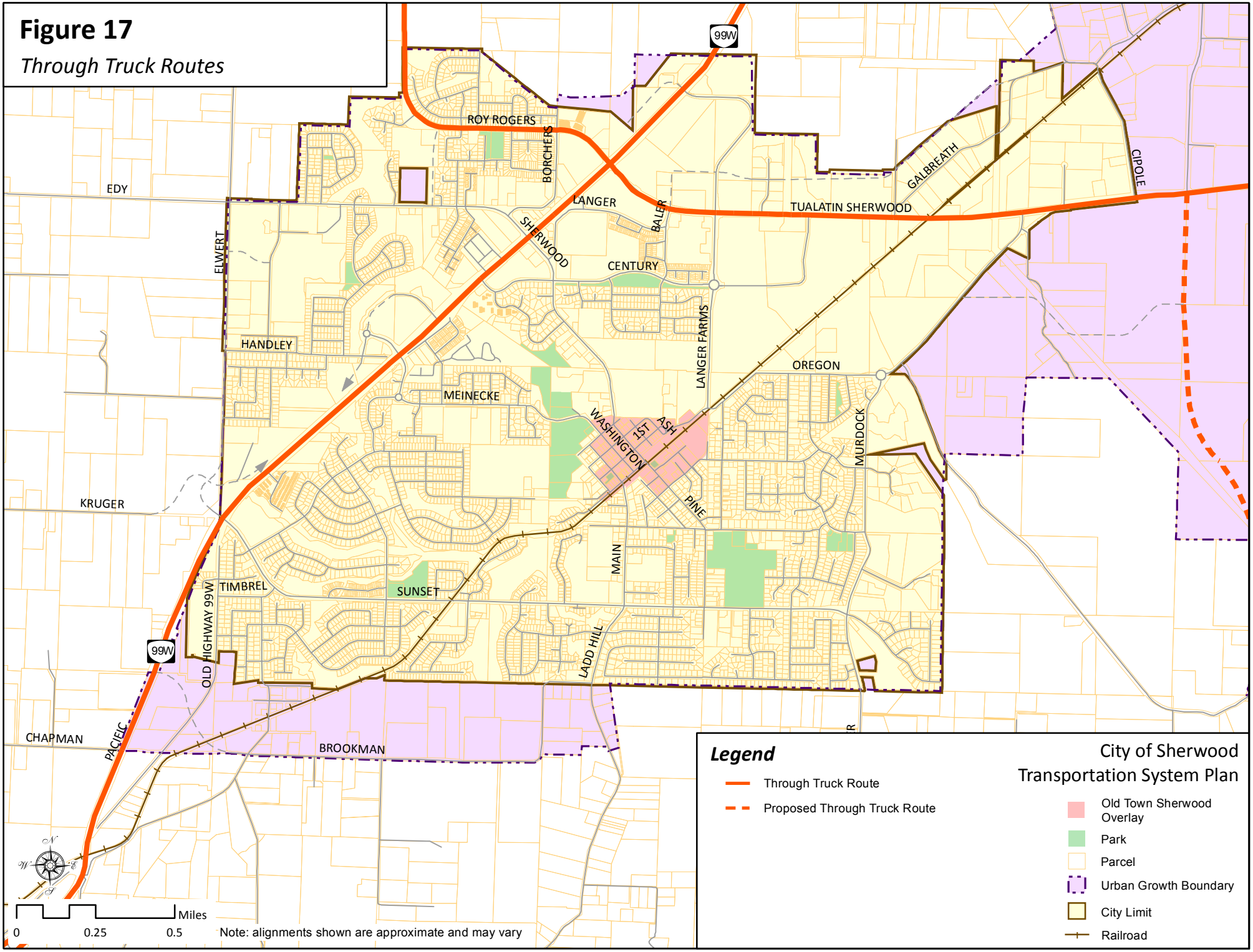
Transportation System Management (TSM) focuses on low cost strategies to enhance operational performance of the transportation system. Measures that can optimize performance of the transportation system include signal improvements, intersection channelization, access management (noted in prior section), rapid incident response, and programs that smooth transit operation. The most significant measure that can provide tangible benefits to the public is traffic signal system improvements since these directly address intersection bottleneck locations.

In developing a set of improvements for Sherwood's motor vehicle system, the TSP took a TSM approach, prioritizing low cost improvements that provide significant operational and safety benefits. These projects include traffic signal modifications, traffic control enhancements, or additional turn lanes.

[15] 2010 – 2020 Regional Transportation System Management and Operations Plan, Metro, June 2010.

Figure 17

Through Truck Routes



Transportation Demand Management

Transportation Demand Management (TDM) solutions encourage travelers to choose alternatives to driving alone in their car by providing services, incentives, supportive infrastructure and awareness of travel options. These strategies improve the performance of the existing system by having fewer vehicles on the roadway system.

State and regional policy both call for encouraging and promoting transportation demand management. The policy of this plan calls for the city to support TDM. Unlike the motor vehicle, pedestrian, and biking projects, implementation of this policy does not require capital infrastructure. The TDM plan for Sherwood consists of:

- Support efforts by Washington County, Metro and ODOT to develop productive TDM measures that reduce commuter vehicle miles and peak hour trips. The City currently requires preferential carpool parking for new development with at least twenty employees.
- Encourage the development of high speed communication in all parts of the city (e.g., fiber optic). The objective would be to allow employers and residents the maximum opportunity to rely upon other systems for conducting business and activities than the transportation system during peak periods. Fiber optic broadband is currently provided through much of the city.
- Encourage developments that effectively mix land uses to reduce vehicle trips. These plans may include development of linkages (particularly non-auto) that support greater use of alternative modes. Mixed land use projects have demonstrated the ability to reduce vehicle trips by capturing internal trips between land use types, encouraging walk/bike trips and producing shorter vehicle trips.

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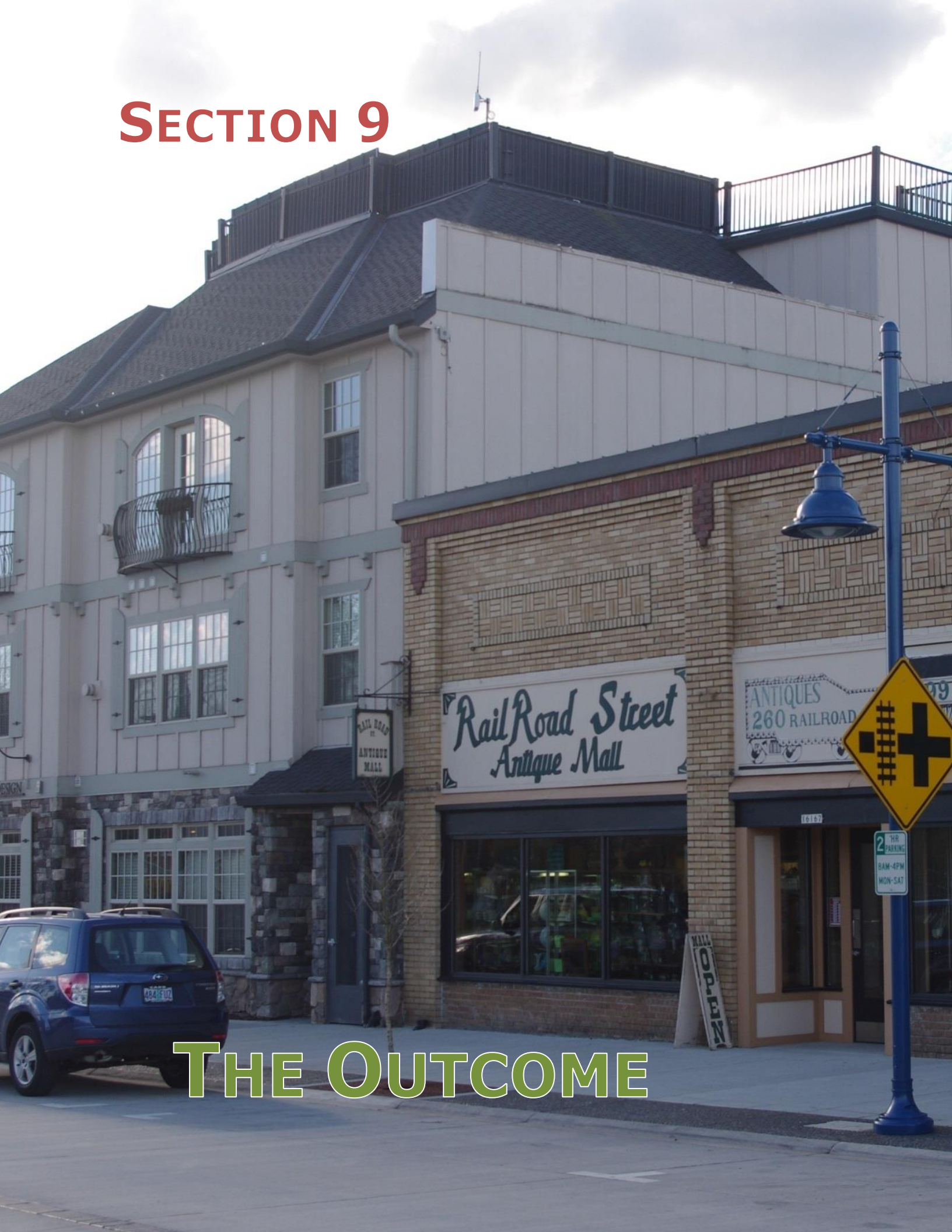
Section 9



The Outcome

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The Outcome

The Sherwood TSP employs a performance based approach, focusing on measurable outcomes of investments to the transportation system. The approach allows the City to measure the degree to which its investments support regional and city-wide priorities. In this manner, the City is able to track how its investment decisions impact a set of performance objectives through 2035. While the performance objectives do not represent the complete picture, they do offer a baseline against which to assess how the policies, investments, and planning decisions made in this plan may affect the future.

Tracking Performance of Transportation System Investments

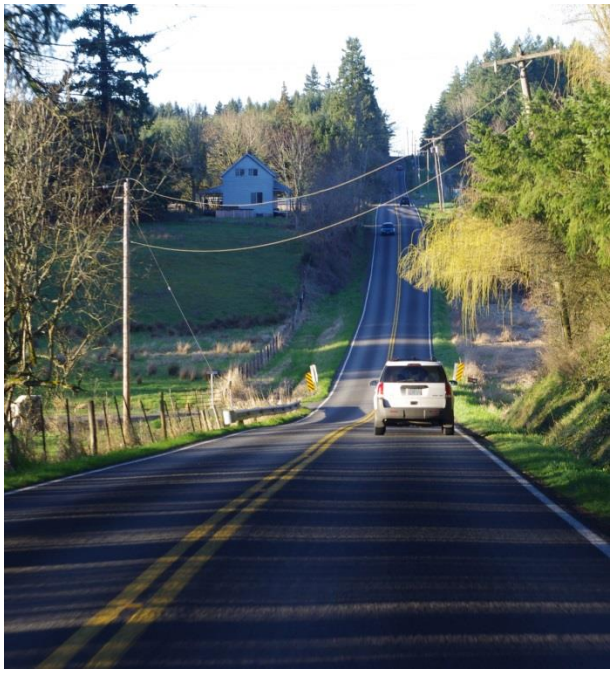
The Metro 2035 Regional Transportation Plan (RTP)[16] identifies performance targets for the Portland Metropolitan region to work towards a multi-modal transportation system that meets the goals and objectives of the regional plan. These measures focus on "high level" area-wide trends based on overall strategies, rather than focusing on minute details of specific locations (such as an individual property or intersection). The intent of these measures is to determine if local agency planning efforts are consistent with making progress towards the overall regional strategies related to transportation and the region's vision for the future. The performance measures include:

Economy

- **Safety:** Reduce fatalities and serious injuries by 50 percent.
- **Congestion:** Reduce vehicle hours of delay (VHD) per person by 10 percent, and work towards meeting intersection mobility targets.
- **Freight Reliability:** Reduce delay for truck trips by 10 percent.

Environment

- **Travel:** Reduce the vehicle miles traveled (VMT) per person by 10 percent.
- **Active Transportation:** Work towards achieving the non-single occupant vehicle (SOV) mode share targets.



[16] 2035 Regional Transportation Plan, Metro, June 2010.

Putting the Plan to the Test

To understand how the investment decisions of the TSP (the projected funding of $60 million worth of projects), improve the performance of the transportation network in Sherwood, the plan's transportation system improvements were evaluated against the performance measures to determine long-term trends through 2035. The results of the individual measures are presented in the following sections.

> *Overall, Sherwood meets or is making progress towards meeting each of the performance requirements of the RTFP and is therefore consistent with regional planning requirements and the RTFP.*

Collision Severity is Expected to Remain Low

Over the past five years of available collision data (between 2008 and 2012), there have been zero fatalities and ten serious injury-collisions within the City, averaging two serious injury-collisions a year. This equates to 1.5% of the collisions involving a serious injury. With investments in improved street crossings, multimodal facilities, and improvements to high collision locations, the severity of collisions in the city is expected to remain low.

Progress is expected to be made towards Mitigating Future Congestion

Regional strategies that focus on low-cost improvements to better manage existing transportation infrastructure will allow a better return on investment for capital expenses. The transportation system management and operations projects (which include intersection traffic control and intersection lane geometry) have relatively lower impact and lower cost than corridor widening projects, yet can provide efficiency benefits by targeting system bottlenecks (which typically are located at intersections).

Vehicle Hours of Delay (VHD): The RTP objective envisions decreasing delay by approximately ten percent through 2035 (measured from an existing year point of 440 VHD in the evening peak hour). However, without transportation improvements beyond those that already have committed funding, the future trend for delay along Sherwood streets during the evening peak hour is expected to increase. The VHD is projected to triple (1,420 VHD) by year 2035 without additional investments to the transportation system, which is largely due to the rapid growth expected in the Sherwood area, including the urban reserves.

With the $60 million worth of planned transportation investments, the total VHD during the evening peak hour would decrease to 1,250 VHD. This reduction would not meet the overall target due to funding limitations, however it would present progress towards the targets and an improvement over the conditions that would exist without the planned projects. Figure 20 shows projected levels of delay with projected funding levels of $60 million.

Intersection Mobility: Following a similar trend to the overall system VHD, intersection mobility would make progress towards improvement for year 2035 conditions with the additional investments. The motor vehicle project list focused on improving system efficiency through TSMO projects, which include intersection traffic control and lane channelization at several locations. Intersections that would require additional

improvements beyond the projected $60 funding package are primarily located along Roy Rogers Road and Tualatin Sherwood Road, where intersection management options would be exhausted and additional corridor widening would be needed.

Progress is Expected to be made Towards Reducing Freight Delay

Like the overall system VHD, progress for reducing delay along freight routes is projected to occur with the projected $60 million funding package. Total delay (VHD) in year 2035 along the freight corridors (Highway 99W, Roy Rogers Road, and Tualatin-Sherwood Road) is projected to decrease from 870 VHD with only the committed investments to 780 VHD (a 10% reduction) with the projected funding package. While this is an increase from present levels (estimated at 240 VHD), this represents improved progress towards meeting the target. In addition, widening the Tualatin-Sherwood Road and Roy Rogers Road arterial corridors to five lanes would make significant strides in reducing freight delay in Sherwood.

Motor Vehicle Travel is Expected to Outperform the Travel Target

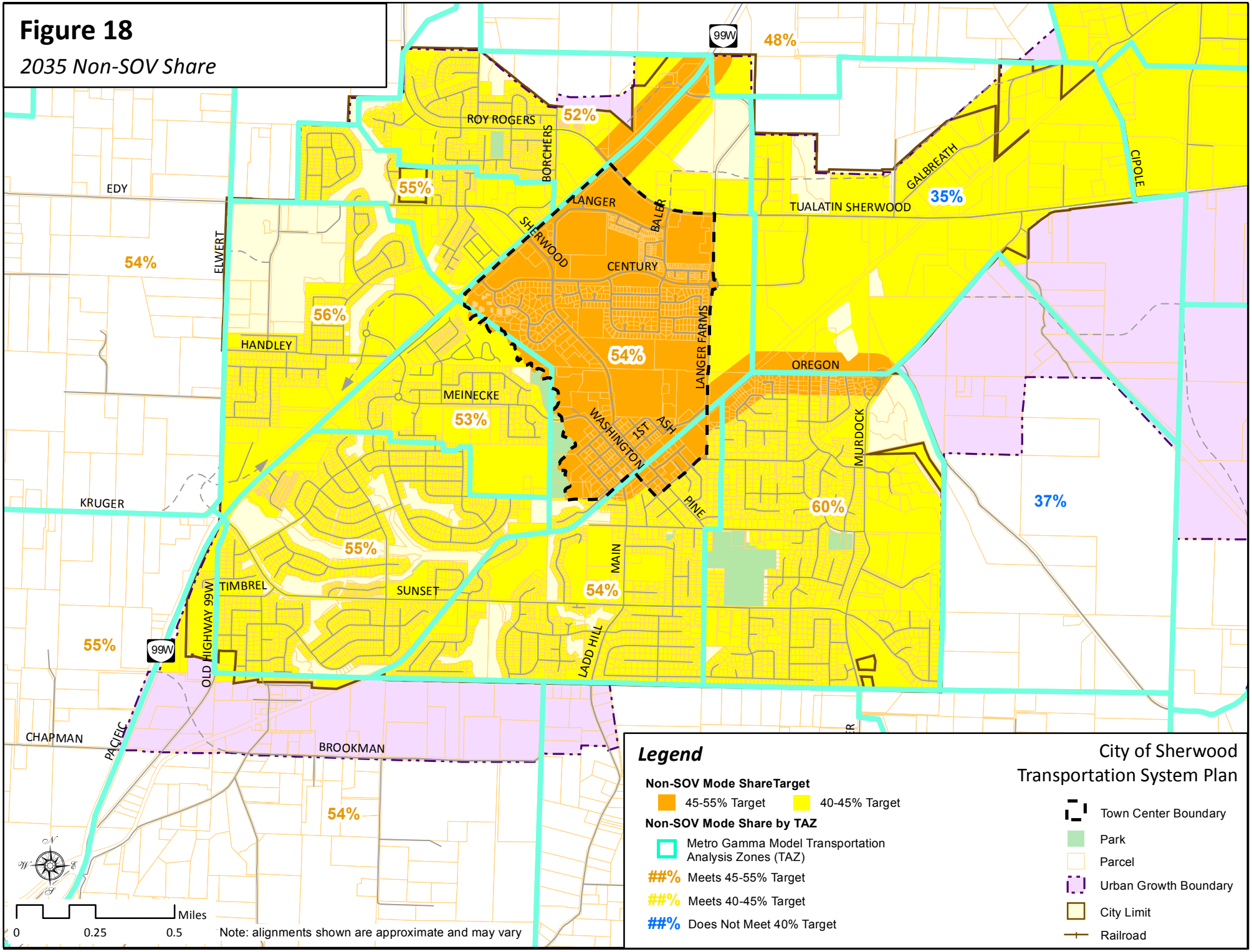
While the overall distance traveled by vehicles is projected to increase in the future along with future population and employment growth, the average motor vehicle distance traveled per person in Sherwood is projected to decrease from 1.4 vehicle miles traveled (VMT) / capita to 1.3 VMT/capita in year 2035. This decrease represents a reduction of seven percent, which nearly meets the ten percent target. In general, this decrease is consistent with Metro's goals related to reducing reliance on the motor vehicle.

A Reduction in Single Occupant Vehicle Travel is expected

Figure 18 summarizes the level of non-SOV mode share estimated for 2035 in comparison to the modal targets set in Metro's Regional Transportation Plan (RTP). These non-SOV targets are aggregated by design type groupings and colored in Figure 2 as orange (45-55% target) and yellow (40-45% target). For each area, the 2035 non-SOV share is listed. The 2035 non-SOV share for each zone is also colored to indicate the highest target that is satisfied (orange for 45-55% target, and yellow for 40-45% target). Based on the model data, it appears that the targets are typically achieved for the western areas but not met for areas east of Langer Farms Parkway. As these areas develop, a continued focus on multimodal amenities and availability of travel options may further reduce the reliance on SOV.

Figure 18

2035 Non-SOV Share



Areas for further Refinement

In addition to the investment decisions of the 2014 Sherwood TSP, several areas have been identified through the TSP Update process that will need to be explored through 2035 and beyond. These items have been identified as requiring more attention and detail beyond the scope of a local TSP effort and/or the greater involvement and coordination with other stakeholders or agencies

Function and Design of Brookman Road

Brookman Road is a rural corridor that sits on the southern edge of the Urban Growth Boundary (UGB). Through the Brookman Addition Concept Plan, it was identified that the road was needed to provide access to areas south of Sunset Road. The I-5 to 99W Connector project had conceptually identified the "Southern Arterial" as the primary east-west mobility route through the area, with an alignment along or just south of Brookman Road. Since the time of those planning efforts, additional planning efforts in the Basalt Creek area have refined the eastern portion of the "Southern Arterial". To establish additional clarity about the western portion of the facility, a coordinated multiagency effort is needed to determine the future function and general capacity and design needs for Brookman Road and the Southern Arterial. These efforts will help ensure that appropriate right of way can be reserved as the area is urbanized while providing accessibility to future development. Consistent with the Brookman Plan, an interim project in the TSP is included that identifies Brookman Road as a three-lane collector with right of way preservation for a potential five-lane arterial in the event that future refinement planning efforts identify the Brookman Road corridor as the appropriate location for the Southern Arterial.

Highway 99W Cross-Sections

The cross section for Highway 99W through Sherwood currently identifies sidewalks and bike lanes for the extent of the highway. Additional refinement to the planned location, width, and elements that comprise the multimodal components would help to address pedestrian and bicycle needs through the area. This process would potentially identify segments where it may be advantageous to provide multimodal facilities with more of a barrier from the highway and would include collaboration with ODOT.

Capacity Allocation Program (CAP)

The City's CAP currently sets a trip density limit on new development (with some exceptions) of 43 net trips per acre. This program was established as an alternate means to preserve transportation mobility on Highway 99W prior to the adoption of the City's 2005 TSP. This program has been observed to result in challenges for new development and does not result in an efficient use of land, particularly in commercial areas. Since subsequent plans and actions have been taken to address and preserve mobility in Sherwood (TSP implementation, Town Center Plan, etc.), the CAP should be revisited to determine if it is still needed.

Local Service Enhancements

Sherwood's location at the edge of the Portland Metropolitan area limits the current availability of transit service as a travel options. Limited route coverage and long headways between buses both challenges ridership. As further development occurs in the Town Center and other areas urbanize,

the need for improving transit connectivity within the City for residents will increase. A placeholder project has been identified to provide local transit service to enhance regional service.

Parking Management Plan

The City should pursue implementation of the parking management plan for the Sherwood Town Center as the opportunity arises. This will help ensure that development within the Town Center aligns with the objectives of the TSP and region as a whole.

Bypass Route Support

The City may consider additional policies to support and explore future options for potential bypass routes that would remove regional through trips from Sherwood. These policies could include continued support and development of previous regional efforts (including I-5 to 99W Connector projects such as the Southern Arterial and northern arterial components including the extension of Herman Road from Cipole Road to Langer Farms Parkway) as well as participation in future endeavors such as Washington County's Westside Solution Study. Due to the regional nature of bypass routes, multi-agency coordination would be needed and it is not anticipated that this effort would be led by Sherwood.

Geological Hazards

All proposed street extensions included in this plan are shown with conceptual alignments. These conceptual street alignments represent a planning-level illustration that street connectivity enhancements are needed in these areas. Before construction of any of the projects can begin, more detailed surveys will need to be undertaken to identify hydrological, topographical, or other geological constraints that could hinder the alignment of the planned streets. Final street alignments will be identified after these surveys have been completed.