Monroe Transportation System Plan

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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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CHAPTER 1: PLAN CONTEXT

WHY CREATE A TRANSPORTATION SYSTEM PLAN?

A Transportation System Plan (TSP) is a long- range plan that sets the vision for the City's transportation system for the next 20 years and beyond. This Plan was developed as a part of the process for updating Benton County's TSP, which included local and countywide community and stakeholder input and is based on the system's needs, opportunities for future improvements to support the growing community, and anticipated funding.

Importance of a Transportation System Plan

The TSP strives to align future transportation investments to support and advance the City of Monroe's goals and values. The TSP is the City's primary tool for implementing transportation investments that address existing City needs and lays out the improvements required to reasonably serve expected local and regional growth.

A TSP is required by the State of Oregon. This TSP update will supersede the transportation element of the City of Monroe Comprehensive Plan, which is the only existing transportation planning document for the City. It establishes a new 2017 baseline condition and identifies transportation strategies and improvements that will be necessary to address existing system deficiencies and accommodate growth through 2040.

How Will the TSP Be Used?

The Monroe TSP is the guiding document for identifying the type, location and priority of transportation investments. The focus of the TSP is the City's transportation system that includes streets, shared-use paths, and transit services; however, it also identifies possible needs and suggested solutions on ODOT and County transportation facilities that serve the City.

The TSP will be used in a variety of ways, including the following examples:

- Identify priority transportation investments
- Provide background information to assist in pursuing grant applications to supplement City funds
- Establish requirements for application during the review of proposed land development applications.
- Serve as the basis for the facility standards applied for new or upgraded system improvements
- Demonstrate that the City understands the resources required to provide a transportation system that can support the growth that it expects

REGULATORY FRAMEWORK

Requirements of a TSP

The Monroe TSP must be consistent with the Benton County TSP update and relevant ODOT plans and policies including the Oregon Transportation Plan and its modal and topic plans. TSPs are required by the State's Transportation Planning Rule (TPR) documented in the Oregon Administrative Rule

660-012-0015, which explains the primary elements of the TSP. The TPR expects that a city TSP will include the following components:

- A comprehensive understanding of the existing multimodal transportation system that serves the City and how well that system performs its expected function today
- A reasonable basis for estimating how the City might grow in its population and employment over the next 20 or more years
- An evaluation of how the expected growth could change system performance
- A set of goals, policies and transportation system improvements that address travel needs
- An understanding of the on-going funding required to build and support the transportation system as the City grows

How the TSP Fits with Local Plans

The Monroe TSP is the primary long-range planning document for the City's transportation investments. The growth forecasts made for the 2040 plan horizon year are based on the regional projections discussions with City staff. Local growth would normally be informed by the Comprehensive Plan; however, the Monroe Comprehensive Plan (1986) forecasted population growth to 2000 and did not provide an appropriate reference. The pace of local growth typically varies year to year, and if the overall population and employment growth falls below the 2040 forecast then the associated improvement needs may be deferred.

The core of the TSP process is to imagine a transportation system that can serve local travel needs in a way that is consistent with the City's policies and values. The primary work products are updated multimodal project lists and design standards that inform the priority and type of improvements that the City desires. There are two basic types of roadway improvements: upgrades to existing facilities and new facilities on vacant or undeveloped land. The City will use this information to periodically update its pursuit of state and federal grant funding and to prioritize their capital improvement list for City facilities.

Any recommended changes from past practices in the transportation design standards will require coordination and updates, as appropriate, to the City's Land Use Development Code and Design and Construction Standards to ensure future improvements are consistent with the updated TSP. This could include street cross-section dimensions and the required street right of way, provisions for pedestrians, bicycles, transit vehicles and motor vehicles, as well as spacing standards for driveways and cross-streets onto City facilities.

How the TSP Fits Within the Region and State

The Monroe TSP transportation system designations and policies must be consistent with regional and state planning documents for this area. The state highways and regional routes are typically owned by either ODOT or Benton County. However, it is important that the City's plan recognize regional routes and the role they serve because the City's TSP project recommendations provide the basis for ODOT and County improvements within the City.

State facilities are not subject to the design standards or policies of the City, but County facilities will typically follow the design standards set by the City within the Urban Growth Boundary (UGB). ODOT will consider recommended projects on State highways within the City of Monroe when updating the State Transportation

Improvement Program (STIP). However, ODOT is not committed to constructing any project recommendations in this TSP.

During the development of the Monroe TSP, several other agencies in this region also updated their transportation plans, which provided the opportunity for active coordination between the planning efforts. Transportation Plan updates were initiated in Benton County, Philomath, Corvallis, the Corvallis Area Metropolitan Planning Organization (CAMPO), and the Albany Area Metropolitan Planning Organization (AAMPO).

HOW WAS THE PLAN PREPARED?

Monroe's TSP was developed as part of the Benton County TSP update process. As such, much of the public engagement and technical analysis was conducted from a regional perspective. However, Monroe-focused community input was provided through City representation on the County TSP Technical Advisory Committee (TAC), an open house held in Monroe, and a work session with the City Council. The Monroe TSP also includes supplemental technical analysis to address local needs not identified through the County TSP update process and a specific review of relevant City standards policies, and development code.

Project Roles & Decision-Making

The decision-making structure for the over-arching Benton County TSP update involved the use of community input, a Technical Advisory Committee (TAC), a Stakeholder Advisory Committee (SAC), and a Project Team (comprised of County, ODOT, and Consultant members) to form plan recommendations. The County Board of Commissioners provided periodic direction and was the ultimate decision-making body responsible for adoption of the TSP. The roles of each of these groups are described in more detail in Chapter 1 of the Benton County TSP.

The City of Monroe was represented on the County TSP SAC and provided input regarding the City's needs and plans for growth. Following development of the Draft Benton County TSP update, the Project Team worked with City staff to create the Monroe TSP, starting from the County TSP recommendations but taking a more focused look at City-specific issues. The Draft Monroe TSP was discussed with City Council at a work session to ensure alignment with local interests. The Final TSP, which will include City Council input, is anticipated to be adopted later by City Council.

Public Outreach Purpose & Strategy

Public outreach was performed through a public involvement program developed to support the needs of the Benton County TSP update, as well as the creation of the local TSP's for Adair Village and Monroe. The public involvement program was designed to share information and gather input on the needs and issues of the stakeholders of Benton County as well as community members in Monroe.

Notification & Outreach Tools

Many outreach tools were used to publicize the project and encourage public participation.

- The project website https://www.co.benton.or.us/ tsp included announcements, news entries, a calendar of meetings and events, a comment form, and a document library.

- Two series of community workshops were held at major project milestones. Meeting locations intended to facilitate attendance by community members included Monroe.
- Following community workshops, online surveys were provided to engage individuals that were not able to attend the in-person meetings.
- Each SAC meeting was open to the public with time reserved to provide for public comment. In addition, public comment was solicited at the Monroe Planning Commission and City Council adoption hearings.

One goal of the public involvement program was to reach underrepresented community members. These efforts included the following outreach strategies:

- Engaging Low-Income and Non-English-Speaking Communities: The Project Team collaborated with the County's public health department to offer materials to reach typically underserved populations, such as low-income and Spanish-speaking community members.
- Accessible locations: All SAC meetings and open houses were ADA-accessible, with additional accommodations for persons with disabilities available upon request. All project information was also available in alternative formats upon request. Meeting were held in transit-accessible locations where feasible.
- Older Adults: The County posted project advertisements in locations where seniors would be likely to see them. Such locations included drugstores, grocery stores, and retirement and assisted living communities

Technical Development

Technical analysis for the TSP was performed by the Project Team as part of the over-arching Benton County TSP update. The analysis followed a process as illustrated in Figure 1.

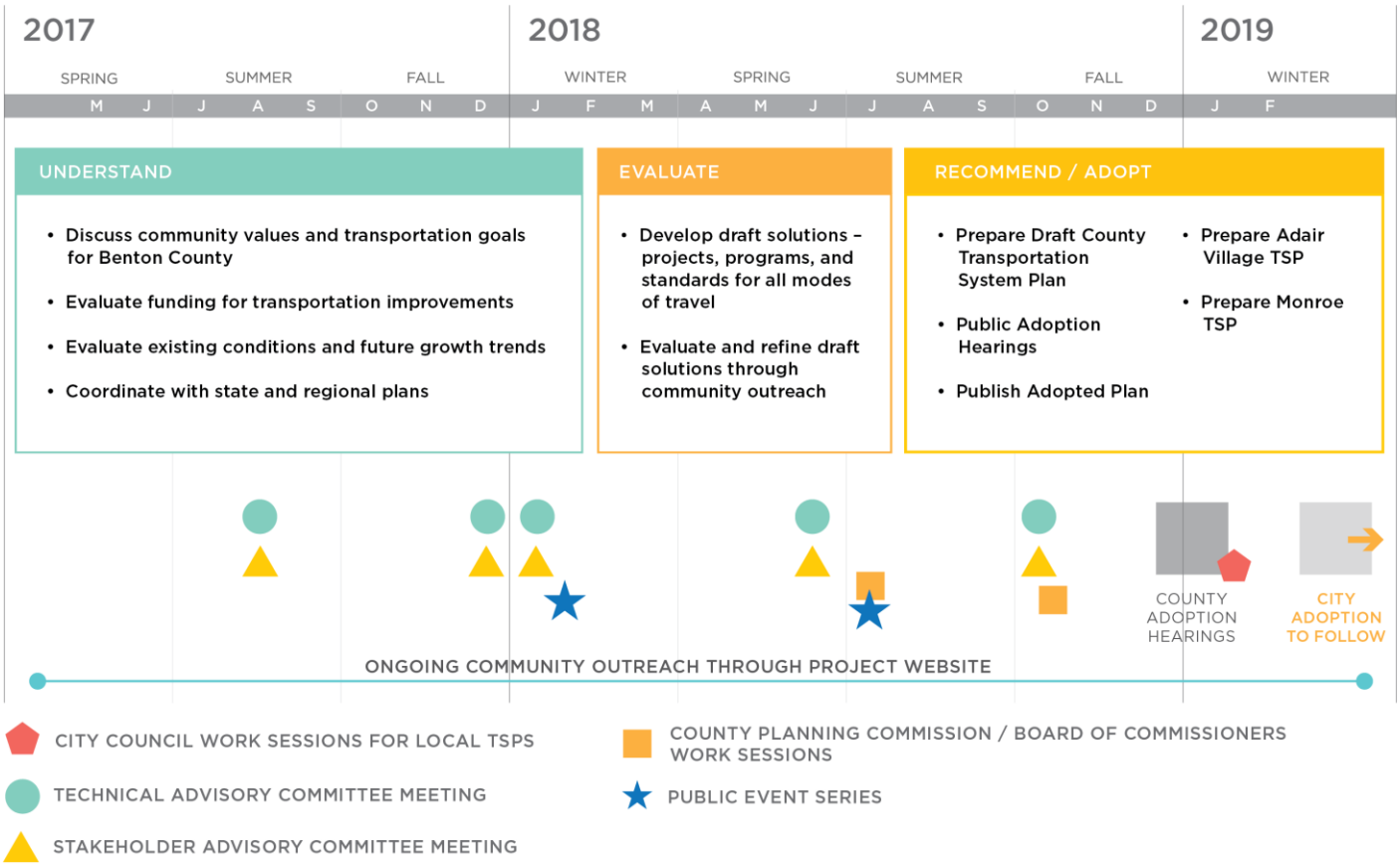


Figure 1: Process for Developing the Benton County and Monroe TSPs

The Benton County TSP update process was documented through a series of memoranda. These project documents, which included content relevant to the Monroe TSP, were reviewed by the TAC, SAC, and other project stakeholders. They were also available for public review and comment.

The project documents reflect the development of the technical elements of the TSP and provide additional details and analysis not included in the core elements documented in the final TSP Report. The documents are included for reference, along with meeting summaries reflecting the public input received, in the Benton County TSP Background Documents. While these memoranda are primarily focused on Benton County there are many elements specific to the City of Monroe. The memoranda developed to support the TSP update process are listed here:

- Memorandum #1: Public Involvement Strategy
- Memorandum #2: Plan Assessment, Goals and Objectives
- Memorandum #3: Funding for Transportation System Improvements
- Memorandum #4: Existing Transportation System Conditions and Deficiencies

- Memorandum #5: Future Transportation Operation Conditions
- Memorandum #6: Proposed Transportation Standards
- Memorandum #7: Proposed Transportation System Improvements (Project list)
- Memorandum #8: County Comprehensive Plan and Development Code Amendments

CHAPTER 2: TRANSPORTATION SYSTEM CONDITIONS AND NEEDS

This chapter provides a summary of characteristics that describe the nature and condition of travel in Monroe under existing (2017) and future (2040) conditions. This understanding helped identify transportation system improvement needs, which were the basis for many of the projects included in the TSP.

DEMOGRAPHICS AND EXPECTED GROWTH TO 2040

Monroe grew by almost 5% between 2000 and 2017, translating to a linear annual growth rate of less than 0.3%. In comparison, Benton County has seen an 18% increase in population since the year 2000, translating to approximately 1.06% linear annual growth.[1] The population of Monroe is expected to remain relatively constant, with approximately 675 residents by 2040.

Tables 1 and 2 show past and forecast population growth for Monroe and Benton County as a whole. The City expects a higher growth rate than shown in the PSU forecast due to opportunities for new development or redevelopment to occur within the existing city limits, which do not appear to be accounted for in the growth forecast. Based on 2018 development assumptions, additional traffic volume was analyzed for this TSP. Any future development that significantly changes the expected population of the City, not included here, will be accounted for through the development review process.

Table 1: The City of Monroe Population Growth History and Forecast

Year	2000	2010	2017	2020	2030	2040
Monroe	607	617	637	643	660	675
Benton County Total	78,153	85,579	92,287	95,818	106,498	113,169

Data from PSU Population Research Center. 2000-2010 Census Counts (incorporated areas) and population forecasts (Urban Growth Boundaries).

Table 2: Monroe Historic and Forecasted Population Growth Rates (Annual Averages)

Year	2000-2010	2010-2017	2017-2020	2020-2030	2030-2040
Monroe	0.16%	0.46%	0.31%	0.26%	0.23%
Benton County Total	0.95%	1.12%	1.28%	1.11%	0.63%

Demographic Overview

Monroe has a lower median household income, older population, and fewer individuals below the poverty level compared to the county, the state, and rest of the country.[2] Due to the City's small size, future development may impact and change the City's demographic composition. According to Census data, most residents within

[1] Population estimate of 928 for July 1, 2017 by the Portland State University Population Research Center. The American Community Survey 2015 5-year estimate (2011-2015) is 86,495.

[2] Data from American FactFinder located at factfinder.census.gov, accessed 11/15/2018

the City of Monroe limits commute to work outside of Monroe, with Corvallis and Eugene attracting most of the workforce.[3] Monroe also serves as an activity center for the south Benton County region, with residents of Alpine, Bellfountain and other adjacent communities using City facilities. Future growth will result in the need for improved connections to regional employment areas, as well as improvements to the City's own infrastructure to service the additional trips.

COMMITTED INFRASTRUCTURE IMPROVEMENTS EXPECTED BY 2040

Some of the County and State routes already have committed funding for improvements that were identified in previous plans and studies. For the purposes of this assessment, these improvements were assumed to be built by 2040, since the funding is programmed in the next five years. There are no committed infrastructure improvements in the City of Monroe, however there are improvements along County facilities outside of the UGB. These projects can be found in the Benton County TSP.

EXISTING AND FUTURE CONDITIONS AND NEEDS

Auto Mobility

As travel demand grows, there will be increased congestion on the street network within and surrounding Monroe unless there is an increased shift away from traveling by single occupant vehicle or improvements to add street capacity are made. The assessment of travel conditions by motor vehicle assumes that people's choice of travel mode in 2040 remains as it is today and, considering there are no committed projects within the City, the roadway network stays the same as well. Travel activity by motor vehicle, as reflected by evening peak hour motor vehicle trips beginning or ending in the City of Monroe, is expected to increase slightly through 2040. Daily future traffic volumes were estimated along the following segments:

- Orchard Street is expected to serve an additional 1,000 daily vehicle trips or an increase of 191%
- Territorial Road is expected to serve an additional 400 daily vehicle trips or an increase of 124%
- 5th Street (OR 99W) is expected to serve an additional 1,700 daily trips or an increase of 127%

Three intersections were studied for this TSP. They are:

- 5th Street (OR 99W) & Orchard Street
- 5th Street (OR 99W) & Territorial Highway
- S 6th St & Orchard Street

All the intersections along OR 99W meet the Oregon Highway Plan mobility targets under existing conditions. The City's intersections are not held to any existing mobility target, but traffic volumes do not exceed 25% of available capacity at any studied intersections. Specific mobility targets are recommended in the standards section below. Under 2040 conditions, all study intersections are expected to comply with Oregon Highway Plan mobility targets or the local targets created by this TSP. Detailed analysis results can be found in the Benton County TSP Background Documents.

[3] Data from OnTheMap, onthemap.ces.census.gov, accessed 11/19/2018

Table 3: Existing and Future Year Weekday PM Peak Hour[4] Intersection Operations

Intersection	Control Type	Mobility Target (v/c)	2017 Existing Year (v/c)	2040 Future Year (v/c)
5th Street (OR 99W) & Orchard Street	STOP on side street	0.90 [0.95]	0.04 [0.08]	0.07 [0.24]
5th Street (OR 99W) & Territorial Highway	STOP on side street	0.90 [0.95]	0.01 [0.20]	0.01 [0.30]
6th Street & Orchard Street	STOP on side street	NA	0 [0.01]	0.01 [0.02]

v/c = volume to capacity ratio
Intersection targets and operations are shown as Major [Minor] approach

Freight Mobility

Efficient truck movement plays a vital role in the economical transport of raw materials and finished products. The designation of through truck routes provides for this efficient movement while maintaining neighborhood livability and public safety and minimizing maintenance costs of the roadway system. (Due to their heavy loads freight vehicles cause more wear on the road structure). Conflicts between freight traffic and other modes can cause mobility issues and increased freight volume will create additional areas where this conflict occurs.

OR 99W is designated by ODOT as a State Freight Route and Reduction Review Route. Reduction Review Routes require additional review during planning, project development, development review, and maintenance to examine reductions in freight-related carrying capacity. Procedures for review are established in ORS 366.215.

The former rail corridor west of OR 99W is owned by both Benton County and the City. The County owns the portion north of Orchard Street. This section of the corridor is rail banked meaning the corridor may be used as a trail until needed again for rail service. While freight rail service does not currently exist on this corridor the preservation of the right of way enables the County to ensure the possibility of future service when it is viable. The City owns the section south of Orchard Street to the southern City Limits. This section of the corridor is not rail banked.

Transit

Transit provides mobility to Monroe residents without access to a car or who do not drive. For other residents, transit provides an option to avoid some of nuisances of driving such as congestion and parking. It can play a significant role in reducing the volume of traffic on the road and reducing greenhouse gas emissions.

Fixed-route transit service is not provided to the City of Monroe. Demand response transit (Dial-A-Bus) is provided for senior citizens and disabled persons by Benton County Transit.

Identified existing and/or future transit needs include:

[4] 30th Highest Annual Hour (approximation of the weekday p.m. peak hour in the summer)

- **Service along OR 99W south and north of Corvallis**: Existing transit service along OR 99W only provides a connection between Corvallis and Adair Village. Extended service south to Monroe, Eugene, and Lane County and north to Monmouth and Polk County would provide additional connections to recreation and employment for residents of Monroe. It would also provide a connection to the Corvallis Transit System and other regional services such as the Amtrak Connector, Coast to Valley Express, and the Linn Benton Loop. Further study is needed for this potential route.
- **Demand-responsive transit capacity improvements**: Benton County Dial-A-Bus service is operating at capacity while the population continues to age, and the participation percentage of eligible users is small. There is significant potential for increased demand for this service in the future. Investments to expand the capacity of the Dial-A-Bus system will be considered.

Active Transportation

Within the City, facilities for people walking and bicycling generally include sidewalks, bike lanes, shared-use paths and shared roadways. In the surrounding rural areas on Benton County roads and State highways, walking and biking are commonly accommodated on the shoulder, or on shared-use paths in limited situations.

The performance of the pedestrian and bicycle systems in Monroe was evaluated using the Pedestrian and Bicycle Level of Traffic Stress (LTS) methodologies.[5] The result of this analysis is a number describing the LTS that can be expected while using that facility. These numbers range from 1 to 4, with a 1 indicating low traffic stress and a 4 indicating high traffic stress. Performance and needs for facilities outside of the City of Monroe are included in the Benton County TSP (2018).

Pedestrian System

Table 4 and Figure 2 show pedestrian LTS for roadway segments and intersections in Monroe. While these calculations are based on existing conditions (2017), the results are not expected to be significantly different by 2040 without system improvements.

Almost 85% of analyzed roadway segments have an LTS of 4, indicating a high level of pedestrian exposure. Many streets in Monroe do not have separate facilities for people walking (e.g., sidewalks or shared-use paths). Therefore, sidewalk infill, especially on busier arterials and collectors, is important.

At an intersection level, all intersections operate at a LTS of 2 or lower, indicating a moderate to low level of pedestrian stress. All streets in Monroe are only two lanes, a characteristic that makes them easier to cross on foot with minimal exposure to traffic.

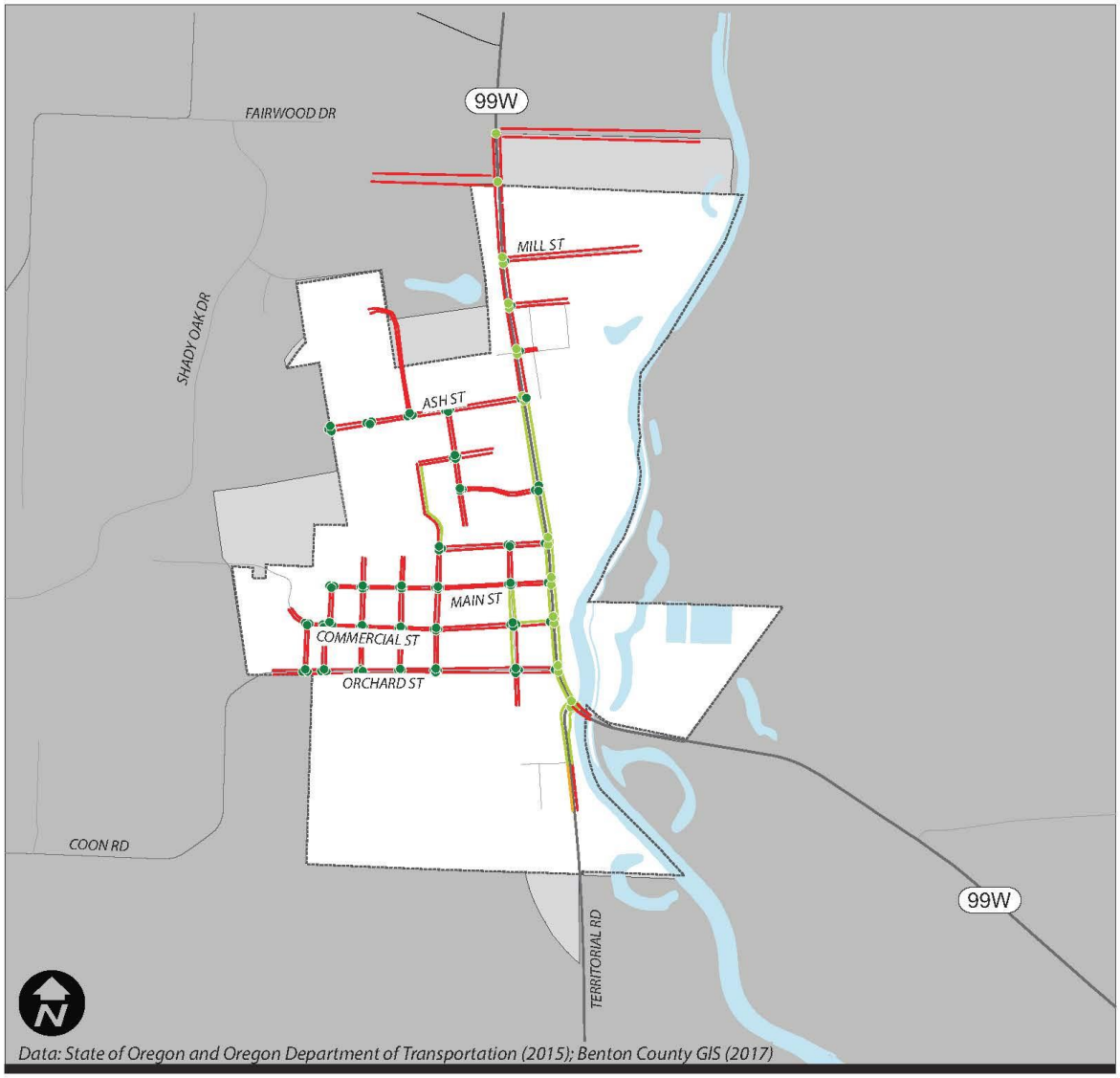
Pedestrian facility improvements will increase the attractiveness of walking and create opportunities for people to lead healthier lifestyles.

[5] Multimodal Analysis section (Chapter 14) of ODOT's Analysis Procedures Manual.

Table 4: Monroe Pedestrian LTS Summary (2017 Conditions)

Level of Traffic Stress	Block Faces		Intersection Approaches	
	Count	Percent	Count	Percent
LTS 4 (High Stress)	110	85%	0	0%
LTS 3 (Moderate Stress)	1	0%	0	0%
LTS 2 (Mild Stress)	19	15%	19	15%
LTS 1 (Low Stress)	0	0%	101	85%

Figure 2: Monroe Pedestrian Level of Traffic Stress (LTS), 2017



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Bicycle System

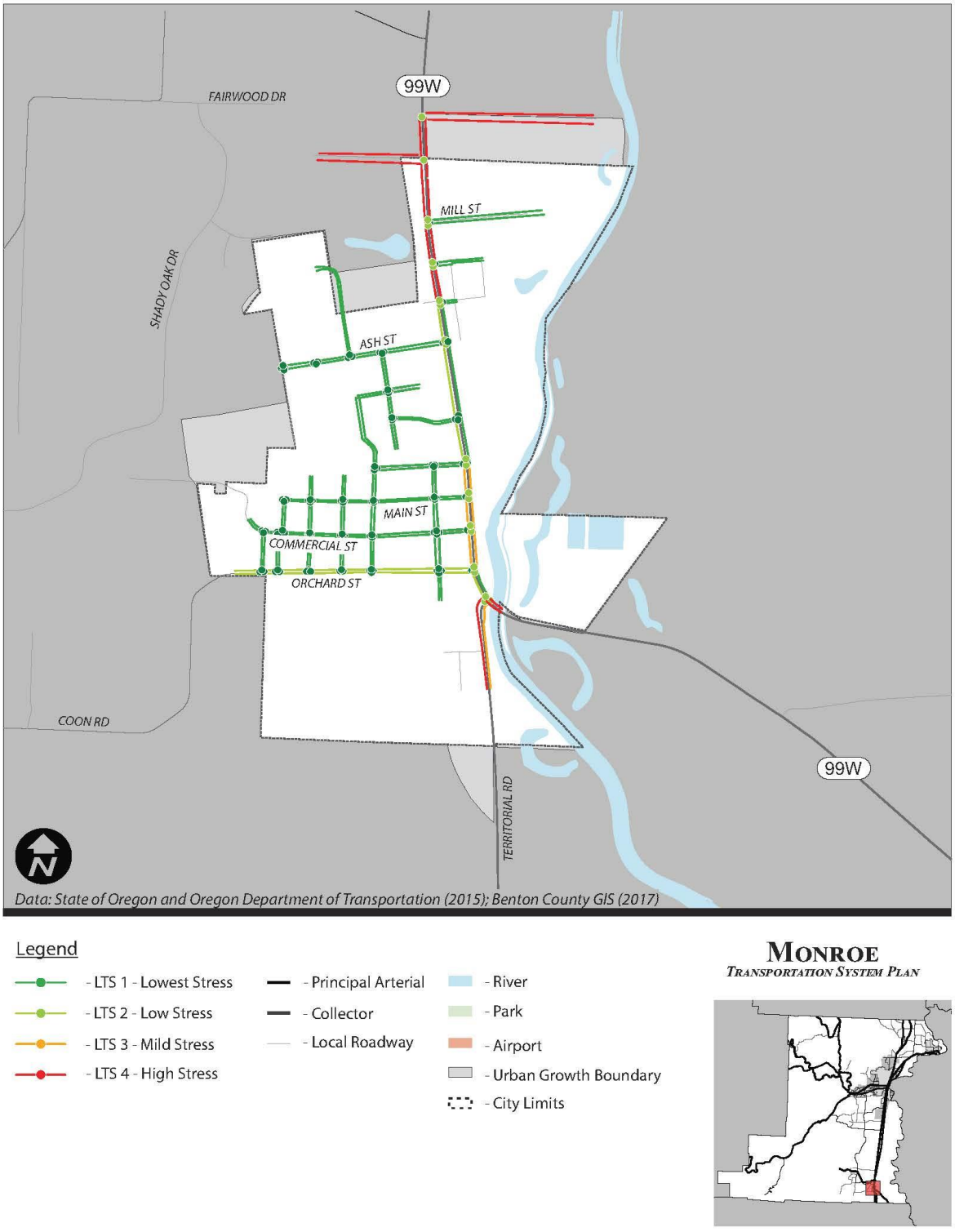
The compact size and gridded street network of Monroe make it easily navigable by bicycle. However, there is no recorded data on commuters traveling by bicycle in Monroe. Most streets are shared streets with no exclusive right of way for bicycles. These streets typically have a low speed limit resulting in lower stress interactions between bicycles and vehicles.

The bicycle LTS analysis for Monroe is summarized in Table 5 and illustrated in Figure 3. The average LTS is 1.4, indicating a low exposure to traffic stress. Over 87% of studied roadway segments are LTS 2 or lower. Of the eight segments at LTS 4, six are on OR 99W north of Fir Street and two are along Territorial Road. The existing adjacent parcels for both segments are unlikely to generate significant bicycle demand. If future development occurs along northern OR 99W and Territorial Road, improving the bike facilities could be tied into other system improvements. The results of the bicycle LTS analysis are illustrated in Figure 3.

Table 5: Monroe Bicycle LTS Summary (2017 Conditions)

	Segments	
Level of Traffic Stress	**Count**	**Percent**
LTS 4 (High Stress)	8	6%
LTS 3 (Moderate Stress)	8	6%
LTS 2 (Mild Stress)	18	14%
LTS 1 (Low Stress)	96	74%

Figure 3: Monroe Bicycle Level of Traffic Stress (LTS), 2017



Safety

Safety is one of the most important considerations when assessing transportation system performance. The safety of Monroe roadways was evaluated by reviewing crash data and identifying patterns of motor vehicle, pedestrian, and bicyclist crashes. Study intersection evaluation and network screening techniques help to identify locations with potential safety problems. High crash rates, fatal or severe injuries, and crashes involving pedestrians and bicyclists are all indicators of potential safety concerns.

There were 41 crashes in or near Monroe between 2011 and 2015 with the majority (29) occurring along OR 99W between Alpine Road and W Ingram Island Road. Three state highway segments were flagged as having a high crash rate: two segments of OR 99W near the city (both north and south of the city limits) and Territorial Highway (from OR 99W to the County line). Alpine Cut-off Road, just outside the city limits, was flagged as a county road with a high crash rate. Of the 17 crashes occurring on OR 99W between the north city limits and Alpine Road, 59% were roadway departure crashes where the vehicle ended in a ditch. Half of all crashes on OR 99W south of the city limits to W Ingram Island Road were attributed to speeding or traveling too fast for conditions. The Benton County TSP update includes two projects that identify the need to widen OR 99W to cross-section standards to the north and south of Monroe. Also included in the Benton County TSP is a project to widen Alpine Road and Alpine Cut-off Road. The wider shoulders provide more space for drivers to recover prior to departing the roadway.

Many of the remaining crashes (nine) occurred on Alpine Cut-off Road, Orchard Tract Road and Coon Road. These are all State and County facilities. There were three crashes on City facilities: two near the intersection of Commercial Street/5th Street and one near the intersection of Main Street/9th Street. All three of the collisions were property damage only. There are no Safety Priority Index System sites (SPIS)[6] or intersections with a high crash rate within or nearby the City of Monroe.

Funding Constraints

The City of Monroe receives most of its street fund revenue from the State Highway Trust Fund. If significant growth occurs through 2040, then System Development Charges could be another significant revenue source. Major transportation system improvements will require supplemental funding sources. Additional revenue can be expected from HB 2017. In the table below, all the additional funding from HB 2017 is assumed to be available for capital improvements, such as the projects in this TSP. This results in approximately $600,000 available for projects between 2017 and 2040.

[6] The Safety Priority Index System is produced by ODOT. It identifies locations with unusually high occurrences of crashes.

Table 6: Monroe Transportation Revenues and Expenses with 2040 Projections

Revenues	Annual Average	Projected Total (2017 to 2040)
State Highway Trust Fund	$30,700	$706,100
System Development Charge[7]	$393	$9,040
General Revenue from HB 2017 (Assumed for capital improvements)	$7,000	$154,000
Total Revenues	**$38,093**	**$869,140**
Expenses	**Annual Average**	**Projected Total (2017 to 2040)**
Materials and Services	$17,800	$409,400
Total Expenses	**$17,800**	**$409,400**
Available Transportation Revenue (Revenue - Expenditures)	**$20,293**	**$459,740**

[7] Based on 2.5 people per Equivalent Dwelling Unit (EDU) and population growth of 38 through 2040 from the PSU Population Research Center. Monroe currently charges $620.36 per EDU.

CHAPTER 3: TRANSPORTATION GOALS AND OBJECTIVES

GOALS AND OBJECTIVES

The TSP identifies goals and objectives to guide development of the transportation system to reflect the City of Monroe's vision and values. Goals and objectives create stepping-stones by which the community vision can be achieved. Goals are brief clear statements of the outcomes to be achieved to realize the vision. Each goal is supported by objectives, which outline the specific actions to be taken to achieve the outcomes described by the goals.

Goal 1 – Safety: A safe transportation system minimizes risks and conflict.

- Objective 1: Provide safe facilities for all modes.
- Objective 2: Reduce the frequency of crashes and strive to eliminate crashes resulting in serious injuries or fatalities.
- Objective 3: Proactively improve areas where crash risk factors are present.
- Objective 4: Provide both primary and secondary access for emergency services.

Goal 2 – Equity: Transportation investments should serve everyone in the community and recognize disparities in people's access to transportation modes.

- Objective 1: Ensure mobility to the transportation disadvantaged.
- Objective 2: Consider the needs of the population that are unable to afford housing in close proximity to employment and daily needs in the project selection process.

Goal 3 – Health: The transportation system should encourage healthy lifestyles.

- Objective 1: Support access to public spaces and encourage active transportation and social interaction.
- Objective 2: Provide healthy transportation options for students traveling to school.
- Objective 3: Consider the impact of particulate emissions in transportation projects.
- Objective 4: Work with neighboring jurisdictions to identify and promote opportunities to commute to and around the City by means other than single occupant vehicles.

Goal 4 – Mobility and Circulation: The transportation system should efficiently connect people with where they want to go.

- Objective 1: Develop a transportation system to facilitate appropriate travel modes.
- Objective 2: Ensure sufficient capacity is provided concurrent with future travel demand to, within, and through the City.
- Objective 3: Coordinate with local agencies and providers to expand transit services countywide.
- Objective 4: Ensure an adequate truck route network to reduce commercial/ neighborhood conflicts.

Goal 5 – Economic Development: Transportation should support a thriving economy.

- Objective 1: Preserve and protect transportation corridors essential to the economic vitality of the City and region.
- Objective 2: Promote efficient and affordable ground transportation to existing regional airports (Portland, Eugene, and Salem) and the Albany Amtrak Station.

Goal 6 – Financial Stewardship: Investments in transportation should manage assets efficiently and responsibly.

- Objective 1: Maximize the useful life of existing facilities.
- Objective 2: Maximize the cost effectiveness of transportation improvements.
- Objective 3: Ensure adequate and equitable long-term funding mechanisms.

Goal 7 – Environment: The transportation system should allow a community to live harmoniously with the environment.

- Objective 1: Provide transportation services that preserve and protect scenic and natural resources.
- Objective 2: Provide a transportation system that allows a community to absorb the impact of and quickly recover from natural disasters.
- Objective 3: Minimize conflicting uses on the transportation system that degrade neighborhoods.
- Objective 4: Establish a Hazard Event Plan.

The transportation goals and objectives were used to develop evaluation criteria to inform the selection and prioritization of alternative investments and strategies for the TSP by indicating how likely the solutions are to support the goal areas and achieve the stated objectives. Once this TSP is adopted, the City of Monroe can use the key evaluation criteria to periodically monitor plan outcomes over time or reprioritize projects.

CHAPTER 4: TRANSPORTATION STANDARDS

Monroe applies transportation standards and regulations to the construction of new transportation facilities and to the operation of all facilities to ensure the system functions as intended and investments are used efficiently. These standards enable consistent future actions that reflect the goals of the City for a safe and efficient transportation system.

STREET FUNCTIONAL CLASSIFICATION

Traditionally, roadways are classified based on the type of vehicular travel they are intended to serve. In the City of Monroe, the functional classification provides an organizational mechanism for developing roadway design standards, establishing traffic speeds, controlling access, designing intersections, and allocating funds for maintenance and improvements.

Monroe's functional classification system categorizes all public roadways to provide for a context-sensitive network that balances local access and regional connectivity. Higher classified roadways prioritize safe and efficient through travel, while lower classified roads are designed to provide access to the adjacent land uses. The naming convention used in Monroe's functional classification system has been amended as shown below to better align with the federal functional classification system. Being able to clearly align with the federal functional classification system is important for the City to qualify for federal funding that is reserved for arterial and collector street projects. Functional Classification will be periodically reviewed and updated as changes occur in the transportation network.

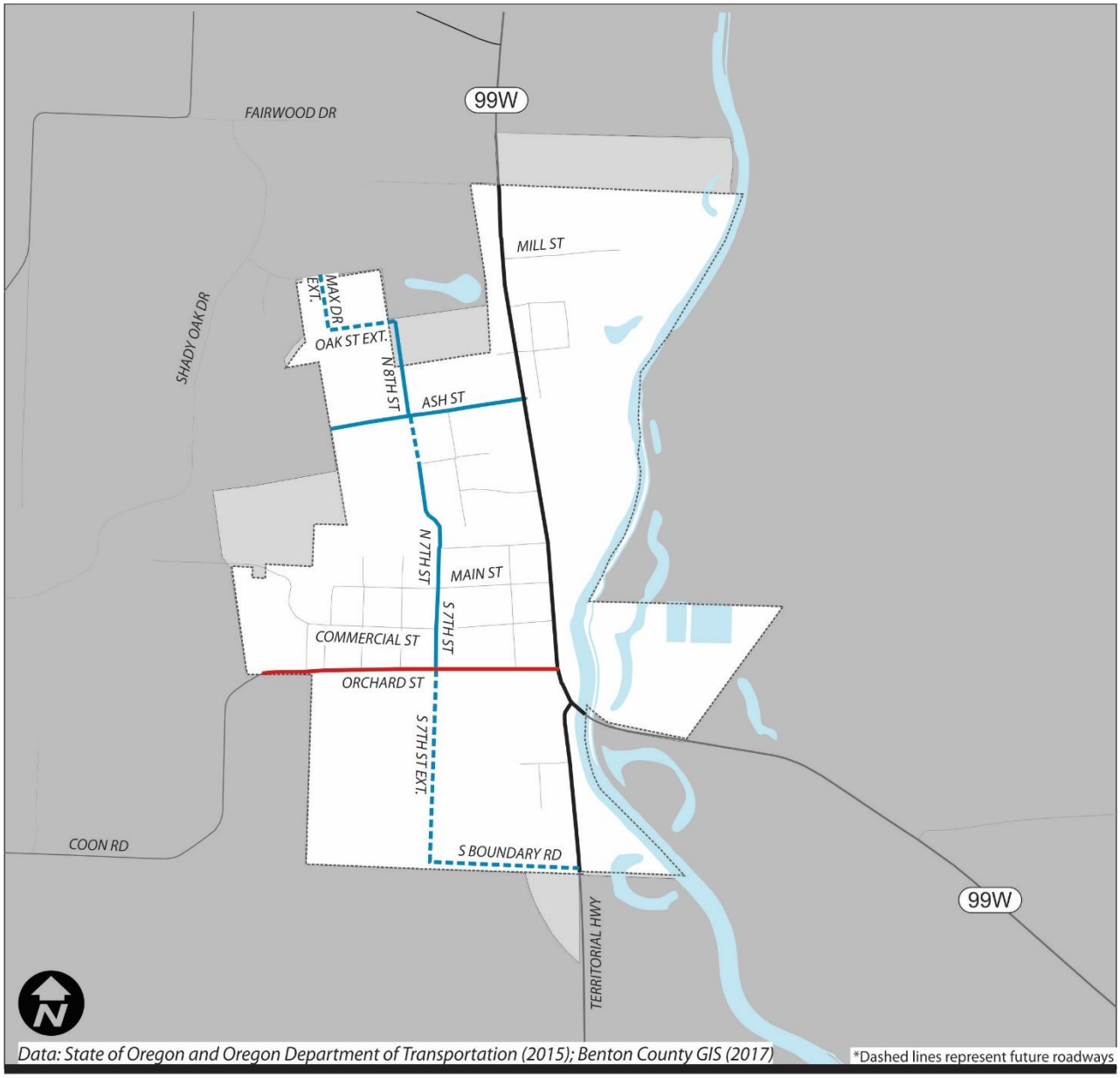
- **Principal Arterials (formerly Highways)** carry regional traffic with origins and destinations outside the area.
- **Minor Arterials (formerly Arterials – Local)** carry major local traffic between communities or nearby areas, or between community districts.
- **Major Collectors and Minor Collectors (formerly Collectors)** carry major local traffic between communities or nearby areas, or between community districts.
- **Local Streets (formerly Minor Streets)** carry primarily local traffic seeking access to adjacent property.

Table 6: Functional Classification (not including Local)

Street Name	Functional Classification	From	To
5th Street (OR 99W)	Principal Arterial	Long Tom River Crossing	Monroe Cemetery Road
S 7th Street	Minor Collector	Orchard Street	Main Street
N 7th Street	Minor Collector	Main Street	Kelly Street

Street Name	Functional Classification	From	To
S 7th Street Extension (Future)	Minor Collector	Southern Boundary Road (Future)	Orchard Street
N 8th Street	Minor Collector	Kelly Street	Pine Street
N 8th Street	Minor Collector	Ash Street	Oak Street Extension (Future)
N 8th Street Extension (Future)	Minor Collector	Pine Street	Ash Street
Max Drive Extension (Future)	Minor Collector	Max Drive	8th Street Extension (Future)
Oak Street Extension (Future)	Minor Collector	Max Drive Extension (Future)	8th Street
Orchard Street	Minor Arterial	Coon Road	5th Street (OR 99W)
Territorial Highway	Principal Arterial	Southern Boundary Road (Future)	5th Street (OR 99W)
Southern Boundary Road	Minor Collector	7th Street Extension (Future)	Territorial Highway

Figure 4: Functional Classification



Legend

- Principal Arterial
- Minor Arterial
- Major Collector
- Minor Collector
- Local
- River
- Park
- Urban Growth Boundary
- City Limits

MONROE
TRANSPORTATION SYSTEM PLAN

TYPICAL ROADWAY CROSS-SECTION STANDARDS

This TSP implements new cross-section standards for the City of Monroe. The following tables present the standard and minimum cross-sections for City roadways within the UGB. Minimum standards are meant to be applied when outside constraints prevent the feasibility of the standard widths and include optional removal of center turn lane, parking, and planter strip elements. The standard width will be applied unless approved by the Planning Commission. Outside of the UGB, roads are subject to either the county or state design standards, as appropriate. These updated roadway cross-sections will need to be coordinated with the City's Design and Construction Standards.

Within UGBs, Benton County applies City design standards to improvements on county roads. The TSP does not include a design type for OR 99W or Territorial Highway, the only Principal Arterials in the area. These roads are state highways and subject to the design criteria in the State's Highway Design Manual.[8]

Following each table, Figures 5 through 9 include typical cross-section standards for roadways within the City's UGB. Figure 10 depicts the standard cross-section for a shared-use path. Every cross-section standard corresponds with a unique functional classification except for Local streets, which have two cross-section standards. The two Local street cross-section options, Local and Neighborhood Local, provide flexibility in the facility type provided in low traffic residential areas. The standard Local cross-section provides two travel lanes with parking and should be constructed in areas with higher traffic volumes. The Neighborhood Local does not provide for two adjacent travel lanes resulting in mandatory yielding for one driver to allow vehicles to pass, when parked cars are present. For this reason, the Neighborhood Local should be used in low volume residential areas where trip distances along a single facility are short so that conflicts between conflicting vehicles are minimized. To aid in emergency vehicle access on Neighborhood Local streets, parking may be restricted to ensure that parked vehicles are staggered to maintain 20 feet of open street.

[8] Highway Design Manual, ODOT, 2012. https://www.oregon.gov/ODOT/HWY/ENGSERVICES/Pages/hwy_manuals.aspx.

Table 7: Minor Arterial Cross-section Standards

	Standard (feet)	Minimum (feet)
ROW	69’	41’
Surface Width	46’	30’
Lane Widths	11’	10’
Center Turn Lane	12’	No
Parking	No	No
Bike Lanes	6’	5’
Curb	0.5’	0.5’
Planter Strip	5’	No
Sidewalk	6’	5’

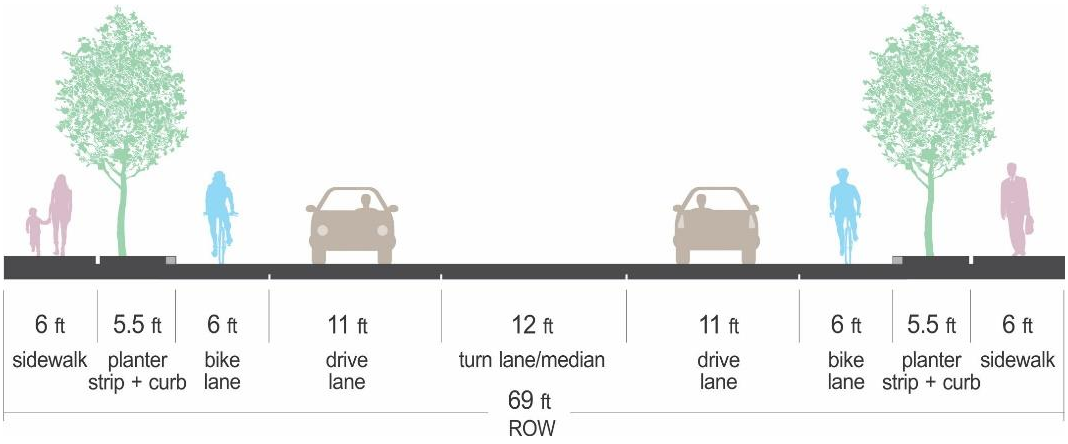


Figure 5: Minor Arterial Standard Cross-Section

Table 8: Major Collector Cross-section Standards

	Standard (feet)	Minimum (feet)
ROW	73’	41’
Surface Width	50’	30’
Lane Widths	11’	10’
Center Turn Lane	No	No
Parking	8’	No
Bike Lanes	6’	5’
Curb	0.5’	0.5’
Planter Strip	5’	No
Sidewalk	6’	5’

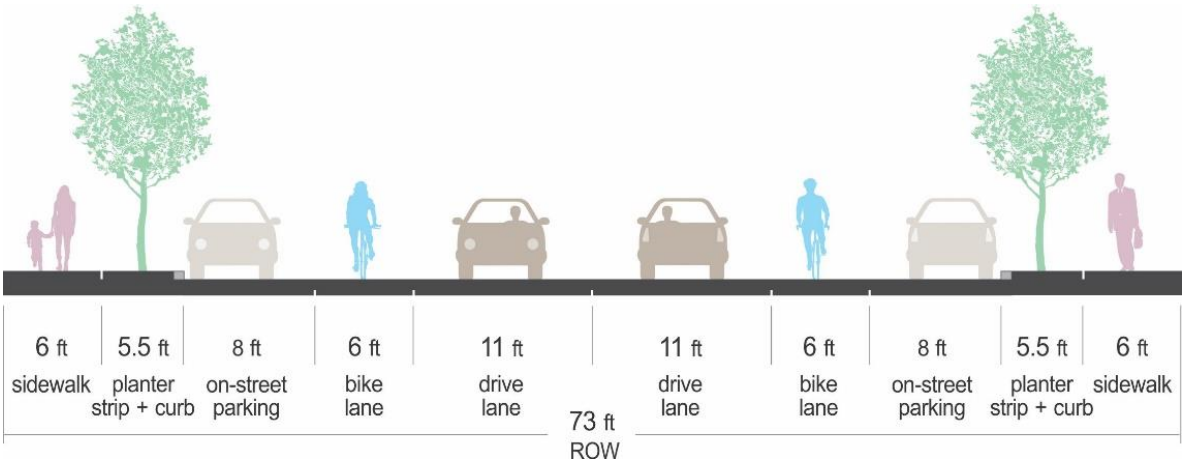


Figure 6: Major Collector Standard Cross-Section

Table 9: Minor Collector Cross-section Standards

	Standard (feet)	Minimum (feet)
ROW	69’	41’
Surface Width	46’	30’
Lane Widths	10’	10’
Center Turn Lane	No	No
Parking	7’	No
Bike Lanes	6’	5’
Curb	0.5’	0.5’
Planter Strip	5’	No
Sidewalk	6’	5’

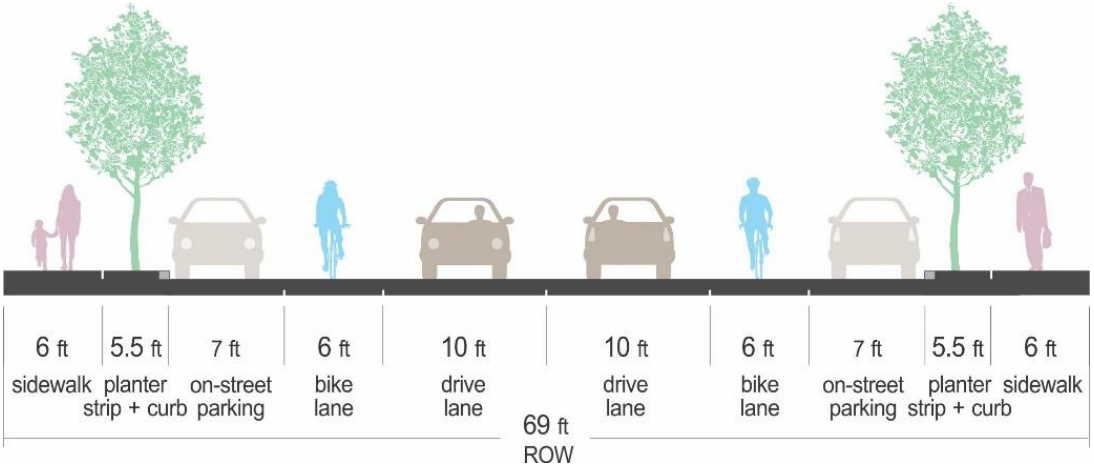


Figure 7: Minor Collector Standard Cross-Section

Table 10: Local Street Cross-section Standards

	Standard (feet)	Minimum (feet)
ROW	55’	31’
Surface Width	36’	20’
Lane Widths	10’	10’
Center Turn Lane	No	No
Parking	8’	No
Bike Lanes	No	No
Curb	0.5’	0.5’
Planter Strip	4’	No
Sidewalk	5’	5’

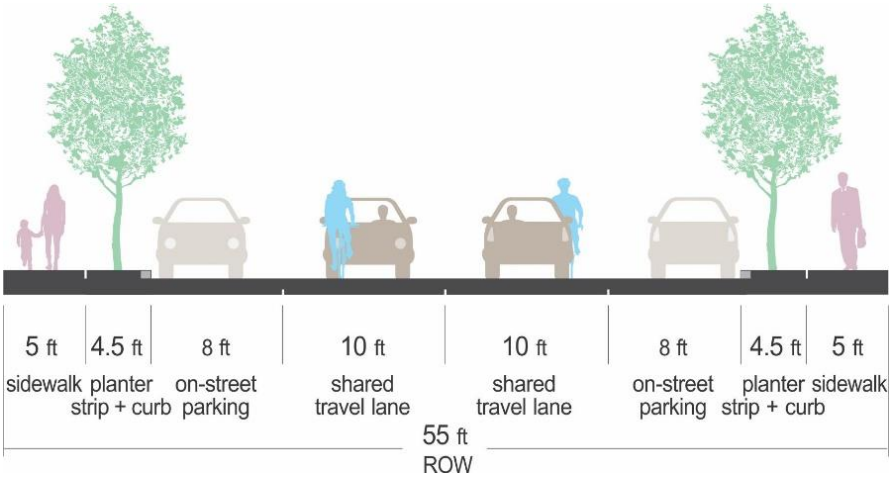


Figure 8: Local Street Standard Cross-Section

Table 11: Neighborhood Local Street Cross-section Standards

	Standard (feet)	Minimum (feet)
ROW	47’	39'
Surface Width	28’	28’
Lane Widths[9]	12’	12’
Center Turn Lane	No	No
Parking	8’	8’
Bike Lanes	No	No
Curb	0.5’	0.5’
Planter Strip	4’	No
Sidewalk	5’	5’

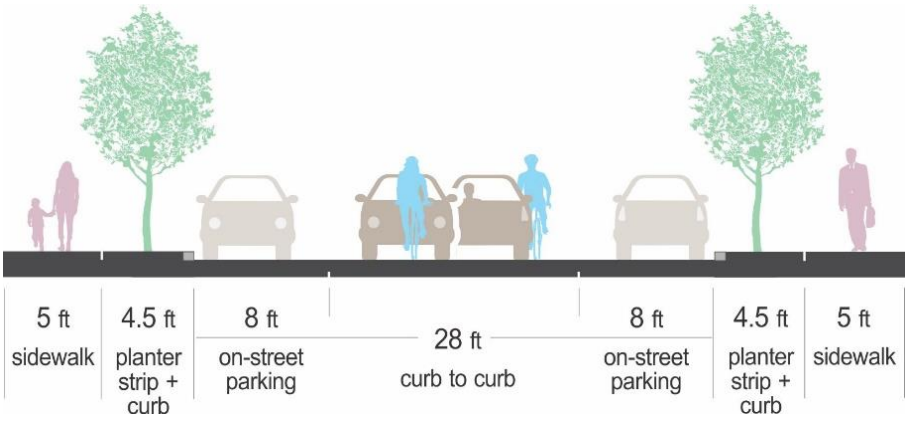


Figure 9: Neighborhood Local Street Cross-Section

[9] For this cross-section there is only one effective lane.

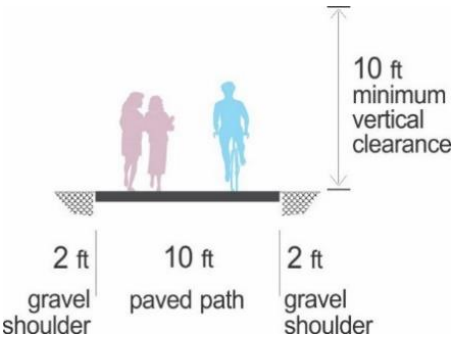


Figure 10: Shared-use Path Standard Cross-Section

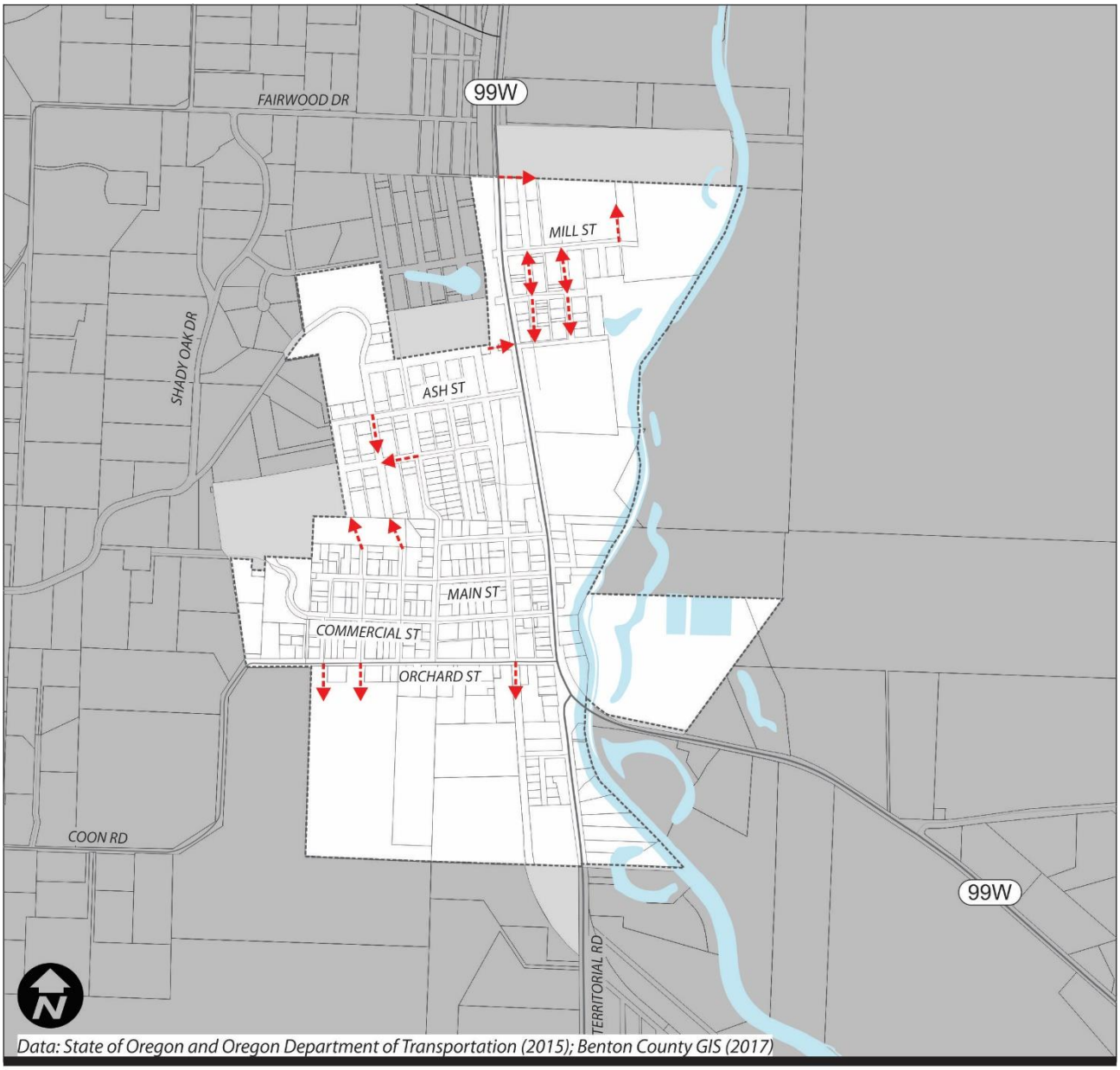
Street Connectivity

Local street connectivity is required by the state Transportation Planning Rule (OAR 660-012). Providing adequate connectivity can reduce the need for wider roads, traffic signals, and turn lanes. Increased connectivity can reduce overall vehicle miles traveled (VMT), balance the traffic load on major facilities, encourage citizens to walk or bike, and reduce emergency vehicle response times. While improvement to local street connectivity is easier to implement in newly developed areas, retrofitting existing areas to provide greater connectivity will also be attempted.

The design and construction of connector roadways must evaluate whether neighborhood traffic management strategies are necessary to protect existing neighborhoods from potential traffic impacts caused by extending stub end streets. In addition, to establish appropriate expectations, the City will require the installation of signs indicating the potential for future connectivity when development constructs temporary stub streets.

Figure 11 below shows the approximate locations where new local street connections will be provided as development occurs to avoid the creation of stub streets.

Figure 11: Local Street Connectivity Plan



ACCESS SPACING STANDARDS

Access management is a broad set of techniques that balance the need to provide for efficient, safe, and timely travel with the ability to allow access to individual destinations. Appropriate access management standards and techniques can reduce congestion, accident rates, and may lessen the need for construction of additional roadway capacity. The spacing of street and driveway (i.e., accesses) intersections on a roadway is a key element of access management.

Access spacing standards are the minimum separation required between all access points (public or private) to a roadway, measured from center to center of adjacent access points on the same side of the roadway. Local street access spacing is measured from edge of driveway to edge of driveway.

This TSP includes new access spacing standards included in Table 12 below. New roadways or redeveloping properties must comply with these standards to the extent practical, as determined by City staff. As the opportunity arises through redevelopment, roadways not complying with these standards could improve with strategies such as shared access points, access restrictions (median or channelization islands), or closure of unnecessary access points, as feasible.

Table 12: Minimum Roadway and Access Spacing Standards

Minor Arterial	Major and Minor Collector	Local Street
150 feet	125 feet	10 feet

Access spacing standards for OR 99W and Territorial Highway are determined by ODOT and are defined in the Oregon Highway Plan, OAR 734-051, and ODOT's Highway Design Manual.

MOBILITY STANDARDS

Prior to adopting this TSP, Monroe had no mobility standards to provide a metric for assessing the impacts of new development on the existing transportation system and for identifying where capacity improvements may be needed. Mobility Standards are the basis for requiring improvements needed to avoid undesired levels of congestion as growth and development occur.

The new Monroe mobility standards use volume-to-capacity (v/c) ratios to measure congestion, which is consistent with the methodologies used by Benton County and ODOT. A v/c ratio is a decimal representation (between 0.00 and 1.00) of the proportion of capacity that is being used at a turn movement, approach leg, or intersection. The ratio is the peak hour traffic volume divided by the hourly capacity of a given intersection or movement. A lower ratio indicates smooth operations and minimal delays. A ratio approaching 1.00 indicates increased congestion and reduced performance.

The new Monroe mobility standards are described below for each type of intersection control that may apply.

Signalized, All-way Stop, or Roundabout Controlled Intersections: The intersection must operate with a volume to capacity (v/c) ratio not higher than 0.85 during the highest one-hour period on an average weekday (typically, but not always, the evening peak period between 4 p.m. and 6 p.m. during the spring or fall).

Two-way Stop and Yield Controlled Intersections: All intersection approaches serving more than 20 vehicles during the highest one-hour period on an average weekday (typically, but not always, the evening peak period between 4 p.m. and 6 p.m. during the spring or fall) shall operate with a v/c ratio not higher than 0.90. Mobility targets do not apply to approaches at intersections serving 20 vehicles or fewer during the peak hour.

All roadways and intersections under the jurisdiction of ODOT must operate at the required mobility targets presented in the 1999 Oregon Highway Plan.[10] All roadways and intersections owned by Benton County must operate at the required mobility targets presented in the 2018 Benton County TSP. Benton County does allow the application of City mobility standards within the UGB as long as they do not allow for a lesser degree of mobility.

[10] Oregon Highway Plan, ODOT, 1999, Last amended March 2018.

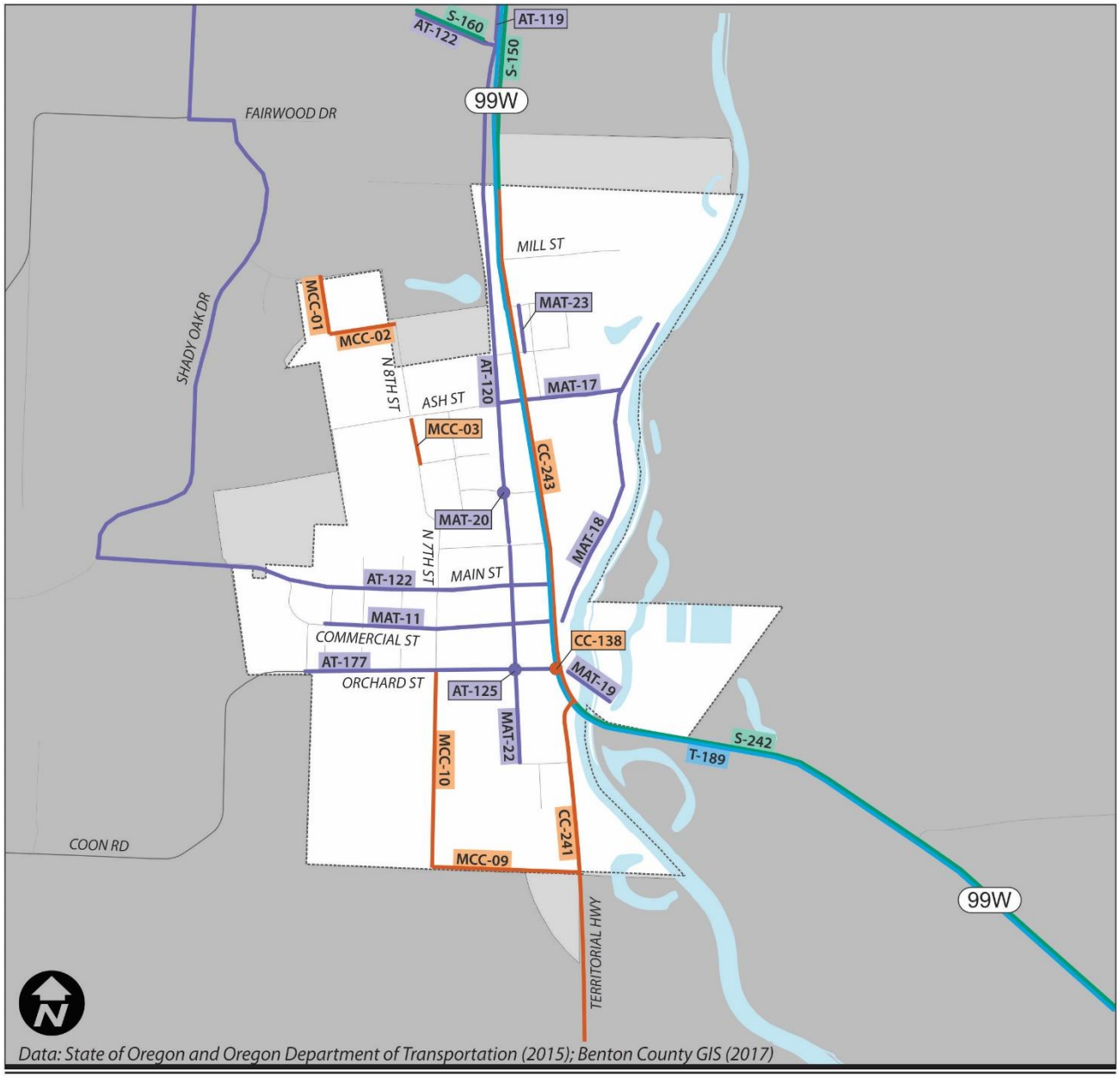
CHAPTER 5: PROJECTS

This chapter presents the transportation plan solutions in tabular and map formats. Each project includes a description, the travel mode affected, the responsible lead agency, the likely funding source, and preliminary cost estimate. This is a master list of all projects regardless of cost, priority, or the likelihood of being constructed within the planning horizon. Projects developed specifically for this TSP include a “M” preceding the project ID. Other projects from the Benton County TSP (2018) along County or State facilities are also shown in the map and table below. Local street connections, outside of the UGB, will be coordinated with Benton County. These connections may be possible if determined feasible and appropriate by the County Engineer.

The project categories include the following types (order does not imply priority):

- **Safety (S)**
- **Active Transportation (AT or MAT)**
- **Connectivity and Congestion (CC or MCC)**
- **Transit (T)**

Figure 12: City of Monroe Projects



Legend

- S-00 - Safety Project
- AT-00 - Active Transportation Project
- CC-00 - Connectivity/Congestion Project
- T-00 - Transit Project
- MAT-00 - Monroe Active Transportation Project
- MCC-00 - Monroe Connectivity/Congestion Project

- Principal Arterial
- Collector
- Local Roadway

- River
- Park
- Airport
- Urban Growth Boundary
- City Limits

MONROE
TRANSPORTATION SYSTEM PLAN

Table 13: Monroe Project List

Project ID	Project Name	Cost (2018 dollars)	From	To	Primary Funding Source
AT-119	OR 99W Alpine Road to Alpine Cut-Off Shared-Use Path	$300,000	Alpine Road	Alpine Cut-off Road	ODOT
Description: Improve path surface to accommodate various users and improve drainage; add bollards, where feasible. Project is subject to ODOT approval.					
AT-120	OR 99W Alpine Cut-off to Kelly Street Shared-Use Path	$450,000	Alpine Cut-off	Kelly Street	ODOT
Description: Add improved path surface and drainage; add bollards, where feasible; marked crosswalks recommended at major cross street intersections. Project is subject to ODOT approval.					
AT-122	Monroe Cross Country Shared-Use Path	$1,250,000	Monroe Library	Alpine Cut-off Road	Monroe/County
Description: Project may begin at Monroe Library and follow the Alpine Cut-off to Kelly Street Shared-use Path (AT-120) pathway south to Main Street (or Commercial St), turning west up through the Reservoir Heights Park to Shady Oak Drive/Orchard Street to the Alpine Cutoff Road/Bailey Branch access point. An alternative route could connect Shady Oak/Fairwood Drive with the Cemetery Road and Alpine Cut-off to Kelly Street Shared-use Path. Way finding signage is also recommended.					
AT-125	Orchard Street/6th Street Intersection Improvements	$50,000	-	-	County
Description: Project may include new striping, pedestrian and bicycle yield signage, and Rectangular Rapid Flashing Beacons (RRFBs).					
AT-177	Orchard Street Modernization	$650,000	S 11th Street	OR 99W	County
Description: Project may upgrade to cross-section standards including sidewalk on north and south side and bike lanes.					
MAT-17	City of Monroe Library Connection	$100,000	Monroe Community Library	Corvallis to Monroe Active Transportation Corridor	Monroe
Description: Project may improve pathway connection between the Monroe Community Library sidewalks and the Alpine Cut-off to Kelly Shared-use Path.					

Project ID	Project Name	Cost (2018 dollars)	From	To	Primary Funding Source
MAT-18	Long Tom River Trail	$290,000.	Oak Street	Commercial Street	Monroe
Description: Project may connect future housing developments near the currently undeveloped Brickyard residential area southward along the west side of the Long Tom River, linking to the proposed footbridge to the Monroe City Park on the east side of the River, and the downtown commercial district. An additional connection could be made to OR 99W and the Alpine Cut-off to Kelly Shared-use Path. Project development may consider emergency vehicle access due to the lack of an adjacent local street.					
MAT-19	Long Tom Foot Bridge	$1,500,000	Monroe City Park	US Army Corps of Engineers easement	Monroe
Description: Project may provide a direct access point to the Monroe City Park from Monroe via a foot bridge across the Long Tom River.					
MAT-20	OR 99W Kelly to Alpine Cutoff Shared-use Path/Depot Street Improvements	$ 50,000	-	-	Monroe
Description: Project may add bollards to the Alpine Cut-off to Kelly Shared-use Path and add stop signs for Depot Street travel.					
MAT-21	Commercial Street Modernization	$350,000	S 10th Street	OR 99W	Monroe
Description: Project may upgrade to cross-section standards including sidewalk on north side.					
MAT-22	6th St Modernization	$200,000	Kelly Street	Monroe Grade School	Monroe
Description: Project may upgrade to cross-section standards including sidewalk and enhanced pedestrian crossings are recommended at major intersections.					
MAT-23	OR 99W Modernization	$100,000	Fir Street	Oak Street	ODOT
Description: Project may construct sidewalk along the east side of OR 99W between to Fir Street and Oak Street that connects with existing sidewalk to provide a continuous pedestrian facility from Oak Street to Orchard Street. Project is subject to ODOT approval.					

Project ID	Project Name	Cost (2018 dollars)	From	To	Primary Funding Source
CC-138	OR 99W/Orchard Street Intersection Improvements	$850,000	-	-	ODOT
Description: Project may construct a traffic signal or roundabout, if feasible, when warranted. Project is subject to ODOT approval. May be addressed through CC-243.					
CC-241	Territorial Highway Widening	$ 5,250,000.00	Lane Co Line	OR 99W	County/ODOT
Description: Project may include widening to standard cross-section, project likely contingent on jurisdictional transfer to the County. Project is subject to ODOT approval.					
CC-243	Riverside District Master Plan	$140,000.00	Monroe Cemetery Road	Territorial Highway	ODOT
Description: The plan will integrate land uses (commercial, industrial, public, parks, residential), transition the area's connectivity towards human-scale transportation options, enhance and protect riparian and aquatic ecosystems, and develop place-making strategies. Consider including gateway treatments along OR 99W entering the City to slow traffic.					
MCC-01	Max Drive Extension	$400,000.00	Terminus	OR 99W	Monroe
Description: Extend Max Drive south from existing terminus to Oak Street Extension as a new Minor Collector.					
MCC-02	Oak Street Extension	$350,000.00	Terminus	Max Drive Extension	Monroe
Description: Extend Oak Street from existing terminus of N 8th Street to Max Drive Extension as a Minor Collector.					
MCC-03	N 8th Street Extension 2	$400,000.00	Pine Street	Ash Street	Monroe
Description: Extend 8th Street between Pine Street and Ash Street as a Minor Collector to provide alternate north-to-south connectivity.					
MCC-09	Southern Boundary Road	$1,100,000.00	S 7th Street Extension	Territorial Highway	Monroe
Description: Construct new Minor Collector Street between S 10th Street Extension and S 6th Street Extension.					

Project ID	Project Name	Cost (2018 dollars)	From	To	Primary Funding Source
MCC-10	S 7th Street Extension	$1,100,000.00	Orchard Street	Southern Boundary Road	Monroe
Description: Extend S 7th Street between Orchard Street and new Southern Boundary Road as a Minor Collector.					
S-150	OR 99W Widening (Dawson to Monroe Cemetery Rd)	$7,500,000.00	Dawson Road	Monroe Cemetery Road	ODOT
Description: Project may widen shoulders to provide safety for drivers and active transportation users. Project is subject to ODOT approval.					
S-160	Alpine Rd/Alpine Cut-off Road Widening	$4,400,000.00	Bellfountain Road	OR 99W	County
Description: Project may improve to cross-section standard.					
S-242	OR 99W Widening (Territorial Hwy to Lane Co)	$10,100,000.00	Territorial Highway	Lane County Line	ODOT
Description: Project may widen shoulders to provide safety for drivers and active transportation users; this project may include widening the bridge over the Long Tom River. Project is subject to ODOT approval.					
T-189	OR 99W South - Phase 1	$100,000.00	Corvallis	Eugene	County/LTD
Description: In conjunction with ODOT public Transit and LTD, conduct a corridor evaluation and service development plan for regional public transit bus service on OR 99W between Corvallis and Eugene, with stops in Monroe, Junction City, and Eugene Airport.					
T-204*	Demand Response Phase IV	$105,000	-	-	County
Description: Expand demand response transit services to the Alsea River Valley corridor, Bellfountain, and the South Benton County communities, for improved access to services for the senior and disabled population of these communities.					

Project ID	Project Name	Cost (2018 dollars)	From	To	Primary Funding Source
T-245*	South County Shopper Shuttle	$90,000	-	-	County
Description: Establish a 2-3 Day-per-Week shopper shuttle service for seniors and individuals with disabilities, serving the communities of Monroe, Alpine, and potentially Harrisburg, with alternating shopping service to Junction City and to Corvallis and/or Albany. Coordinate with Linn County as feasible.					

* This project does not have a defined extent and is not shown on the map

FINANCIALLY CONSTRAINED PROJECTS

The Oregon Transportation Planning Rule (TPR) (OAR 660-012) requires that local agencies identify a Financially Constrained list of projects within their TSP document. Aside from complying with this regulation, this project list and expected funding value provides a basis of comparison for subsequent proposed amendments to the TSP. For example, if a major land use amendment is proposed that would significantly intensify travel activity beyond what is identified in the TSP, then Monroe would need to demonstrate that the transportation system could still adequately serve the increased needs in the 2040 horizon year. In answering that question, the Financially Constrained system improvements would be assumed to be in place since it is reasonably likely, based on historical trends, that enough funding would be available to construct them.

As noted in Chapter 2, Monroe is expected to have roughly $460,000 available for transportation system improvements through the planning horizon. Most of that funding comes from federal and State discretionary programs.[11] The projections over the planning horizon of current funding levels compared to estimated expenditures indicates there will not be any available discretionary money to allocate to moving projects identified in the TSP forward. The Financially Constrained table is shown below.

Table 14: Financially Constrained Project

Project ID	Project Name	Cost
AT-120	OR 99W Alpine Cut-off to Kelly Street Shared-Use Path	$450,000

[11] Funding does not include new revenues provided by House Bill 2017

CHAPTER 6: STRATEGIES

Finding solutions to identified needs requires additional strategic approaches to supplement the investments in infrastructure. This chapter presents the strategies around safety education, travel demand management, and preparing for how innovations in technology will change transportation. Chapters 4 and 5 provide the transportation standards and list of projects that will be implemented along with the strategies and actions described in this section. This section includes a discussion of strategies to reduce the number of single occupancy vehicle trips by investing in active transportation and transit network improvements, and finally a discussion of the future of transportation and some of the innovative technologies that exist today.

TRANSPORTATION DEMAND MANAGEMENT

Transportation Demand Management (TDM) or “transportation options” are terms for strategies that support transportation system efficiency by encouraging a shift from drive-alone trips to other means of travel such as carpooling, transit, bicycling, walking, and ridesharing. Successful implementation of these strategies can result in reduction in vehicle miles traveled (VMT)

ACTIVE TRANSPORTATION

With the recommended active transportation improvement projects in place, the safety of walking and biking along major travel corridors in Monroe will be significantly improved and walking and biking connections will be established between major local destinations. As a result, more inviting recreational opportunities will be provided, access to future transit services will be enhanced, and non-motorized travel options for trips to work, schools, and daily activities will be better supported. The South Benton County Connectivity Plan provided the basis for the active transportation projects in this TSP and many, if not all, of the recommendations for active transportation investment are copied from that plan. Further description of the needs that drove the development of these projects can be found in that document.

PUBLIC TRANSPORTATION

Public Transportation in Monroe will help create a safe, equitable, and efficient component of the transportation system that supports healthy lifestyles, environmental health, and economic development by connecting people with where they want to go. The public transportation recommendations address the needs for:

- **Improved on-demand transit:** Benton County’s demand response transit system supports a wide range of travel needs for some of the City’s most transportation-disadvantaged residents. The system is experiencing increased delays and trip denials at peak periods. The ADA-accessible vehicles are aging out and need replacement. The system will need continuous improvements and capacity expansion as the older adult population continues to grow and demand for transportation increases.
- **Enhanced Service on OR 99W:** The Eugene Connector is envisioned as a deviated fixed-route bus offering four round trips per day, or a bus every two hours, between the Corvallis and Eugene Downtown Transit Centers. The communities of Monroe, Halsey, Harrisburg, and Junction City share a transportation nexus, with convenience shopping in Junction City provided for the other two communities; an exploration of the needs of these three communities should be undertaken if a Connector service is developed.

- **South County Shopper Shuttle:** This service recognizes the need to connect Monroe to the larger communities of Corvallis and Junction City for shopping trips. It provides an alternative to driving to these other cities and is valuable for those Monroe residents without access to a car.

PREPARING FOR THE FUTURE AND SMARTER MOBILITY

Emerging transportation technologies will shape our roads, communities, and daily lives for generations. Vehicles are becoming more connected, automated, shared, and electric. This future is highly uncertain, but it may have significant impacts for how Monroe plans, designs, builds, and uses the transportation system. These technologies are resulting in new vehicle types that are described below.

Connected vehicles (CVs) will enable communications between vehicles, infrastructure, and other road users, see Figure 13. This means that our vehicles will be able to assist human drivers and prevent crashes while making our system operate more smoothly.

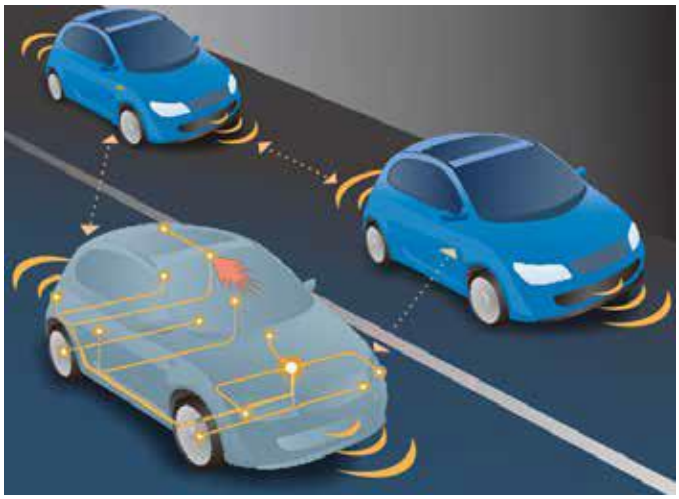


Figure 13: Vehicle-to-Vehicle Communication

Automated vehicles (AVs) will, to varying degrees, take over driving functions and allow travelers to focus their attention on other matters. Already today we have vehicles with combined automated functions like lane keeping and adaptive cruise control. However, these still require constant driver oversight. In the future, more sophisticated sensing and programming technology will allow vehicles to operate with little to no operator oversight.

Shared vehicles (SVs) that allow ride-hailing companies to offer customers access to vehicles through cell phone applications are already on the road today. Ride-hailing applications allow for on-demand transportation with comparable convenience to car ownership without the hassle of maintenance and parking. Ride-hailing applications can enable customers to choose whether to share a trip with another person along their route or travel alone.

Electric Vehicles (EVs) have been on the road for decades and are becoming more economically feasible as the production costs of batteries decline.

Many of these vehicles will not be exclusive of the others and it is important to think of the host of implications that arise from the combination of these technologies. When discussing these vehicles, they can be referred to as connected, automated, shared, and electric **(CASE) vehicles**. As emerging transportation technologies, such as CASE vehicles, begin to influence transportation within Monroe, the City will work with ODOT, Benton County, and other regional partners to better understand the impact to the community.