

Adair Village TSP Element

February 2019



Acknowledgements

STAKEHOLDER ADVISORY COMMITTEE

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 Nick Meltzer, *Corvallis Area Metropolitan Planning Organization*
 Greg Ridler, *Emergency Management*
 Adam Steele, *City of Corvallis*
 Chris Workman, *City of Philomath*

PROJECT TEAM

Laurel Byer, *Benton County*
 Kirstin Anderson, *Benton County*
 David Helton, *Oregon Department of Transportation*
 John Bosket, *DKS Associates*
 Dock Rosenthal, *DKS Associates*
 Carl Springer, *DKS Associates*
 Melissa Abadie, *DKS Associates*
 Vanessa Choi Clark, *DKS Associates*
 Emily Guise, *DKS Associates*
 Rachel Vogt, *DKS Associates*
 Jim Owens, *Jim Owens Consulting Company*
 Jamey Dempster, *Nelson\Nygaard*
 Darci Rudzinski, *Angelo Planning Group*
 Kyra Haggart, *Angelo Planning Group*
 Emma Porricolo, *Angelo Planning Group*

ADAIR VILLAGE PLANNING COMMISSION

Dawson Officer
 Matt Vogt
 Michael Longmire
 Susan Canfield

ADAIR VILLAGE CITY COUNCIL

Charline King
 Alan Rowe
 Bret Ray
 Nicole Real

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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 part of the process for updating Benton County's TSP, which included local and countywide community and stakeholder input. The resulting Adair Village TSP is based on the transportation 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 Adair Village'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 Adair Village 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 Adair Village 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 Adair Village TSP must be consistent with transportation elements of the Corvallis Area Metropolitan Planning Organization (CAMPO) Regional Transportation Plan, the Benton County TSP, 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 Adair Village 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 and the Comprehensive Plan (2006), which defines the extent and type of growth that could be permitted during the planning period. 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 their 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 Public Infrastructure Design 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 Adair Village 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 Adair Village 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 Adair Village 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?

Adair Village'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, Adair Village-focused community input was provided through City representation on the County TSP Technical Advisory Committee (TAC), an open house held in Adair Village, and a work session with the City Council. The Adair Village 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 Adair Village 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 Adair Village TSP, starting from the County TSP recommendations but taking a more focused look at City-specific issues. The Draft Adair Village 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 TSPs 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 Adair Village.

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 North Albany and Adair Village.
- Following community workshops, online surveys were provided to engage individuals that were not able to attend the in-person meetings.
- In addition, tabling at community events (i.e., Open Streets Corvallis 2018) was used to disseminate project information and solicit public input, along with Project Team presentations to organizations and interest groups.
- Each SAC meeting was open to the public with time reserved to provide for public comment. In addition, public comment was solicited at the Adair Village 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.

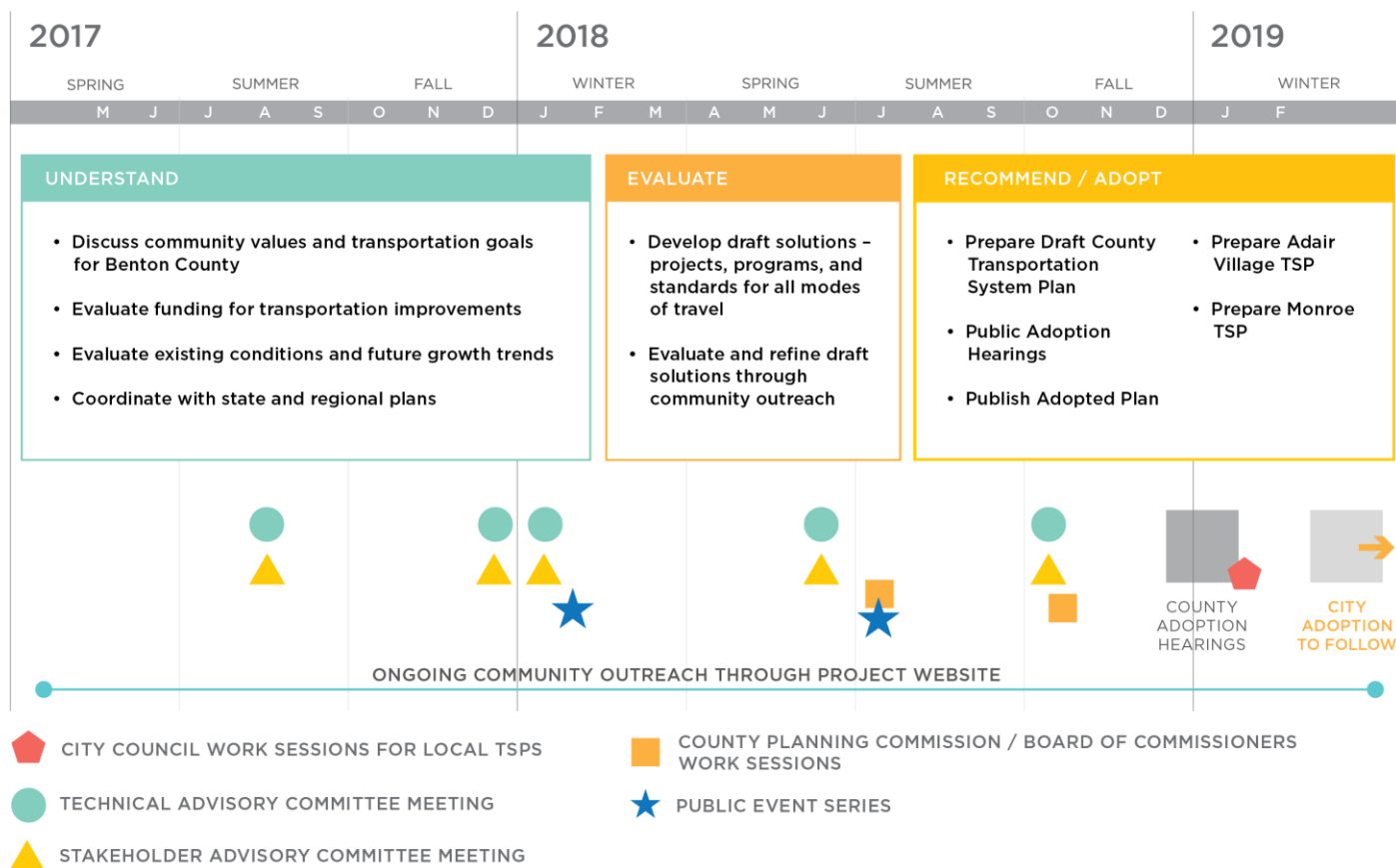


Figure 1: Process for Developing the Benton County and Adair Village TSPs

The Benton County TSP update process was documented through a series of memoranda. These project documents, which included content relevant to the Adair Village 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 Adair Village 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 Adair Village. 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 Adair Village 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

Adair Village grew by 73% between 2000 and 2017, translating to a linear annual growth rate of 4.29%. In comparison, Benton County has seen an 18% increase in population since the year 2000, translating to approximately 1.06% linear annual growth.¹ Adair Village is expected to grow to over 2,000 residents by 2040. Tables 1 and 2 show past and forecast population growth for Adair Village and Benton County as a whole. Based on recent development activity, there is reason to believe that some of this population growth may happen sooner than shown below.

Table 1: Adair Village Population Growth History and Forecast

Year	2000	2010	2017	2020	2030	2040
Adair Village	536	840	928	1,127	1,934	2,075
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: Adair Village Historic and Forecasted Population Growth Rates (Annual Averages)

Year	2000-2010	2010-2017	2017-2020	2020-2030	2030-2040
Adair Village	5.67%	1.50%	7.15%	7.16%	0.73%
Benton County Total	0.95%	1.12%	1.28%	1.11%	0.63%

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

Adair Village has a higher median household income, younger population, and fewer individuals below the poverty level compared to the county, state, and rest of the country.² The City is centrally located and provides easy access to employment and recreation opportunities in Corvallis, Albany, Independence, and Salem. Future growth will result in the need and demand for improved connections to the regional employment areas as well as improvements to the City's own infrastructure to allow for the increase in internal trips.

Committed Infrastructure Improvements Expected by 2040

Transportation system improvements that already have committed funding for near-term construction were assumed to be in place by 2040 when assessing long-range conditions and needs. Within the vicinity of Adair

¹ Population estimate of 928 for July 1, 2017 by the Portland State University Population Research Center. The American Community Survey 2016 5-year estimate (2012-2016) is 933.

² Data from American FactFinder located at factfinder.census.gov, accessed 11/07/2018

Village, this included planned improvement project on Ryals Avenue that will widen travel lanes and add paved shoulders from Arnold Avenue to Independence Highway.

Existing and Future Transportation Conditions and Needs

Auto Mobility

As travel demand grows, there will be increased congestion on the street network within and surrounding Adair Village 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 assume that people's choice of travel mode in 2040 remains as it is today and that only the committed improvement projects listed above have been completed. Travel activity by motor vehicle, as reflected by evening peak hour motor vehicle trips beginning or ending in the City of Adair Village, is expected to increase significantly through 2040. Daily future traffic volumes were estimated along the following segments:

- Arnold Avenue is expected to serve an additional 1600 daily vehicle trips or an increase of 168%
- Ryals Avenue is expected to serve an additional 3750 daily vehicle trips or an increase of 495%

Conditions at three intersections with the City's UGB and three intersections just outside the City's UGB were studied for this TSP. They are:

- William R Carr Avenue and Arnold Avenue
- Ryals Avenue and Arnold Avenue
- Arnold Avenue and Laurel Drive
- OR 99W and Ryals Avenue
- OR 99W and Arnold Avenue
- OR 99W and Vandenberg Avenue

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 existing volumes do not exceed 20% of available capacity at any studied intersections. Specific mobility targets for Adair Village are recommended in Chapter 4 (Transportation Standards).

Under 2040 conditions the intersection of OR 99W and Ryals Avenue and the intersection of OR 99W and Arnold Avenue are expected to fail Oregon Highway Plan mobility targets with the forecasted increase in traffic volumes, as shown in Table 3. Both intersections are currently two-way stop controlled making them sensitive to a significant increase in left turning traffic, which is expected to occur after future development. Detailed analysis results can be found in the Benton County TSP Background Documents.

Table 3: Existing and Future Year Weekday PM Peak Hour³ Intersection Operations

³ 30th Highest Annual Hour (approximation of the weekday p.m. peak hour in the summer)

Intersection	Control Type	Mobility Target	2017 Existing Year (v/c)	2040 Future Year (v/c)
OR 99W & Arnold Avenue	STOP on side street	0.70 [0.75]	0.04 [0.43]	0.12 [1.06]
OR 99W & Ryals Avenue	STOP on side street	0.70 [0.75]	0.01 [0.14]	0.14 [>2.0]
OR 99W & Vandenburg Avenue	STOP on side street	0.70 [0.75]	0.01 [0.19]	0 [0.24]
William R Carr Avenue & Arnold Avenue	STOP on side street	NA	0.04 [0.07]	0.05 [0.10]
Ryals Avenue & Arnold Avenue	Stop on side street	NA	0.03 [0.13]	0.10 [0.41]
Arnold Avenue & Laurel Avenue	Stop on side street	NA	0.01 [0.02]	0.01 [0.02]

v/c = volume to capacity ratio

Intersection targets and operations are shown as Major [Minor] approach

While well outside of Adair Village’s UGB and not addressed directly by this TSP, the regular congestion experienced on US 20 between Albany and Corvallis affects many residents of Adair Village. The City is supportive of future efforts to relieve congestion and improve safety on this corridor, which would significantly enhance Adair Village’s access to the surrounding region.

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 efficient movement while supporting 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).

OR 99W is designated by ODOT as 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.

As a part of the Benton County TSP update, the designation of a County Freight Route has been proposed on Camp Adair Road from Independence Highway to Soap Creek Road. This route recognizes the importance of Camp Adair Road for providing access to the landfill site. If the County were to formally adopt this designation, Adair Village may be able to sign and enforce restrictions of through truck travel on Arnold Avenue and other City streets.

Transit

Transit provides mobility to Adair Village 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 provided to residents of Adair Village via the 99 Express service that provides access to Corvallis and the Corvallis Transit System. 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:

- **Expanded service along OR 99W:** Existing transit service along OR 99W provides direct access to Corvallis and the routes in the Corvallis Transit System. Expanded service could provide access further south to Eugene and Lane County and north to Monmouth and Polk County.
- **Demand responsive transit capacity improvements:** Even with a low percentage of eligible participants using the service, Benton County Dial-A-Bus is operating at capacity. As the population continues to age, there is significant potential for increased demand for this service in the future. Investments to expand the capacity on the Dial-A-Bus system should 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 shoulders, or on shared-use paths in limited situations.

The performance of the pedestrian and bicycle systems in Adair Village was evaluated using the Pedestrian and Bicycle Level of Traffic Stress (LTS) methodologies.⁴ 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 Adair Village are included in the Benton County TSP.

Pedestrian System

Approximately 1.2% of commuters in Adair Village walk to work, with another 0.9% utilizing public transportation to get to work, which sometimes includes walking at the beginning or end of the trip. The pedestrian Level of Traffic Stress (LTS) results for streets and intersections in Adair Village are shown in Figure 2. Table 4 shows a summary of LTS conditions on Adair Village street segments and intersections. While these calculations are based on existing conditions (2017), the results are not expected to be significantly different by 2040 without system improvements.

The average pedestrian LTS on street segments in Adair Village is 3.3, indicating a moderate to high exposure to traffic stress. Less than 25% of street segments evaluated for Adair Village provide a LTS of 2 or less, indicating a deficit of adequate pedestrian facilities overall. Many streets in Adair Village 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.

⁴ Multimodal Analysis section (Chapter 14) of ODOT's Analysis Procedures Manual.

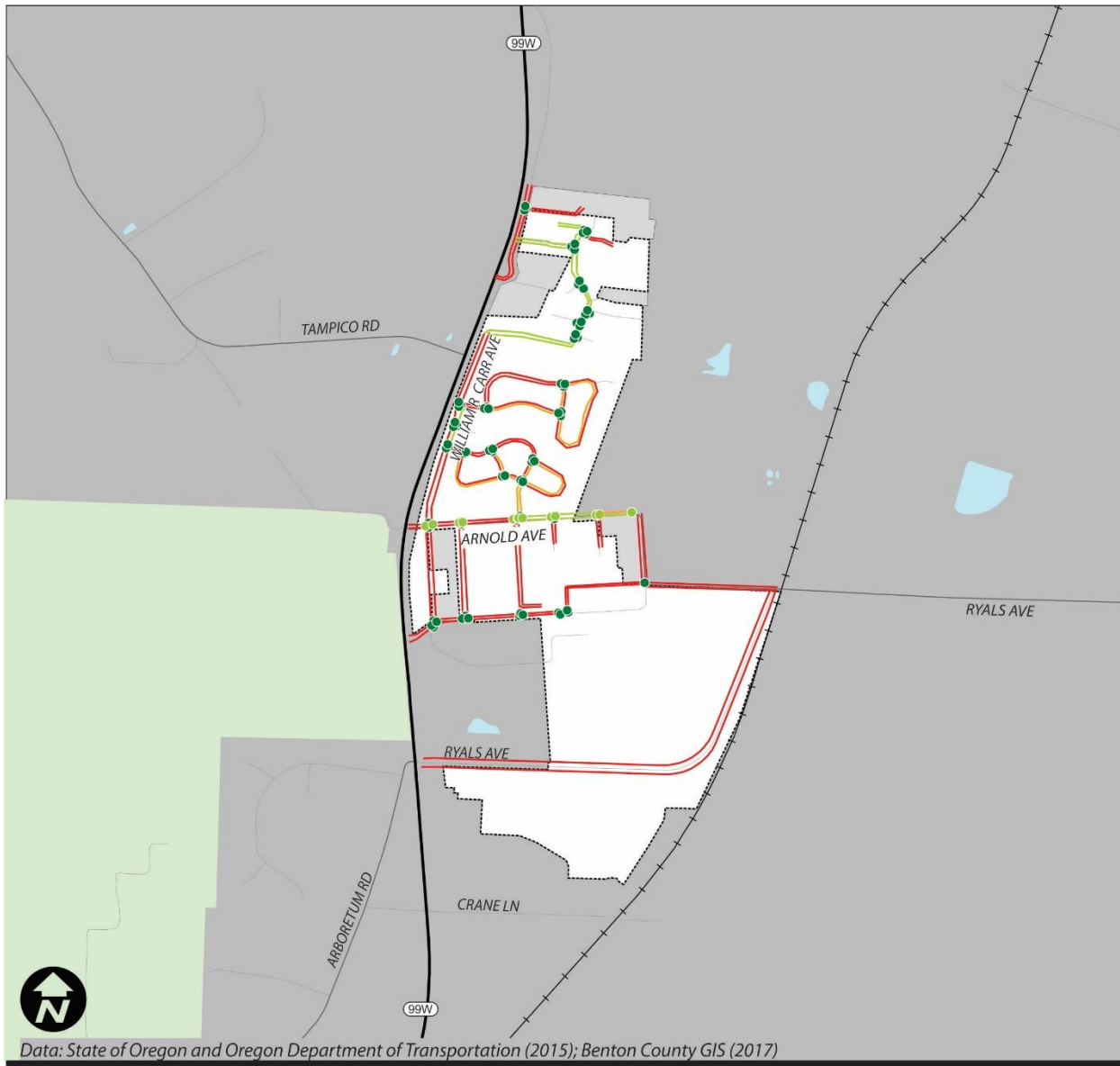
At an intersection level, the average pedestrian LTS is 1.2, indicating a low level of exposure. Intersections in Adair Village are typically not very wide, making them easier to cross on foot with minimal exposure to traffic.

Pedestrian facility improvements will increase the attractiveness of walking and create opportunities for people to lead healthier lifestyles. A specific area for improvement in Adair Village is sidewalk infill, supplemented by shared-use paths where feasible.

Table 4: Adair Village Pedestrian LTS Summary (2017 Conditions)

Level of Traffic Stress	Block Faces		Intersection Approaches	
	Count	Percent	Count	Percent
LTS 4 (High Stress)	63	64%	0	0%
LTS 3 (Moderate Stress)	12	12%	0	0%
LTS 2 (Mild Stress)	24	24%	17	18%
LTS 1 (Low Stress)	0	0%	77	82%

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



Legend

- | | | |
|-------------------------|----------------------|-------------------------|
| - LTS 1 - Lowest Stress | - Principal Arterial | - River |
| - LTS 2 - Low Stress | - Collector | - Park |
| - LTS 3 - Mild Stress | - Local Roadway | - Airport |
| - LTS 4 - High Stress | - Railroad | - Urban Growth Boundary |
| | - City Limits | |

BENTON COUNTY
TRANSPORTATION SYSTEM PLAN



Bicycle System

Adair Village's size makes it very bicycle-friendly. However, only about 0.6% of Adair Village commuters travel by bicycle, which is largely due to the distance between local housing and employment opportunities.

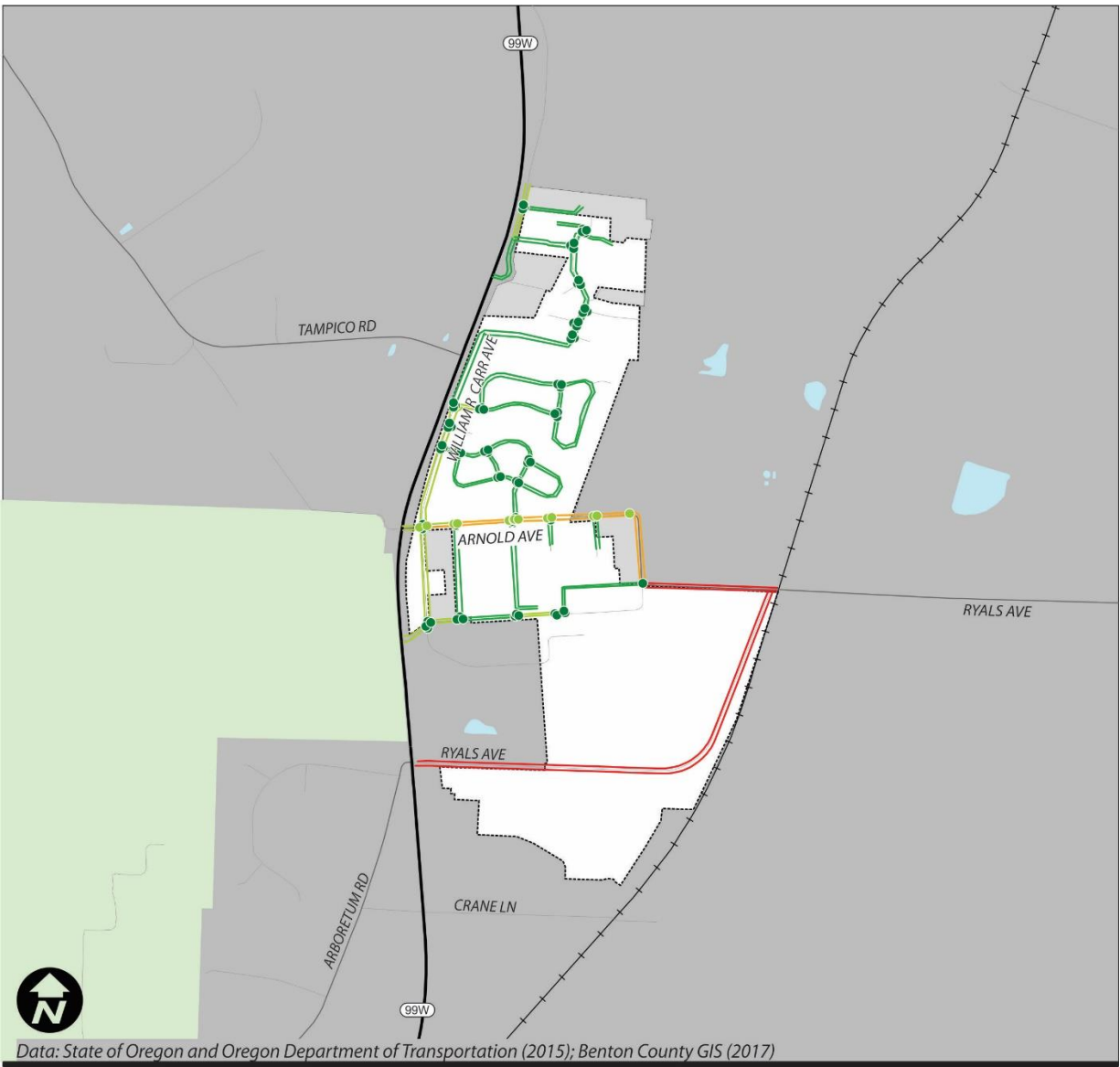
Most of the roads do not have a separate bike lane or accessible shoulder but traffic speeds are low.

The bicycle LTS analysis for Adair Village streets is summarized in Table 5 and illustrated in Figure 3. The average LTS for the system is 1.3, indicating low exposure to traffic stress. About 93% of studied streets provide an LTS of 2 or lower. In general, even though most streets in the City do not have separate biking facilities (e.g., bike lanes), the low traffic speeds and volumes make them relatively comfortable to ride on. Ryals Avenue is the longest stretch of street with a high bicycle LTS. However, development activity in that area will provide an opportunity to reconstruct the street to meet urban standards, which include bike lanes.

Table 5: Adair Village Bicycle LTS Summary (2017 Conditions)

Level of Traffic Stress	Block Faces	
	Count	Percent
LTS 4 (High Stress)	0	0%
LTS 3 (Moderate Stress)	7	7%
LTS 2 (Mild Stress)	23	24%
LTS 1 (Low Stress)	68	69%

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



Legend

- | | | |
|-------------------------|----------------------|-------------------------|
| - LTS 1 - Lowest Stress | - Principal Arterial | - River |
| - LTS 2 - Low Stress | - Collector | - Park |
| - LTS 3 - Mild Stress | - Local Roadway | - Airport |
| - LTS 4 - High Stress | - Railroad | - Urban Growth Boundary |
| | - City Limits | |

BENTON COUNTY
TRANSPORTATION SYSTEM PLAN



Safety

Safety is one of the most important considerations when assessing transportation system performance. The safety of Adair Village 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 38 crashes near Adair Village between 2011 and 2015 with all but four occurring along OR 99W. No segments of OR 99W near the City were flagged as having a high crash rate and there are no Safety Priority Index System (SPIS)⁵ sites or intersections with a high crash rate within or nearby the City of Adair Village. Therefore, while crashes do occur in Adair Village, there does not appear to have been a trend that should be targeted for improvement.

Funding Constraints

Adair Village receives most of its street fund revenue from the State Highway Trust Fund. If the City's growth meets expectations, it will generate over \$500,000 from System Development Charges. However, major transportation system improvements will require supplemental funding sources. For the fiscal years of 2006-2007 and 2007-2008, the City received a Small Cities Allotment and a general MPO grant. Future grants like these could provide additional funding for the City. 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 \$1.4 million available for projects between 2017 and 2040.

⁵ The Safety Priority Index System is produced by ODOT. It identifies locations with unusually high occurrences of crashes.

Table 6: Adair Village Transportation Revenues and Expenses with 2040 Projections

Revenues	Annual Average	Projected Total (2017 to 2040)
State Highway Trust Fund	\$43,400	\$998,200
System Development Charges ⁶	\$21,900	\$503,700
General Revenue from HB 2017	\$19,000	\$418,000
Total Revenue	\$84,300	\$1,919,900
Expenditures	Annual Average	Projected Total (2017 to 2040)
Personal Services	\$22,700	\$522,100
Materials and Services	\$1,600	\$36,800
Total Expenditures	\$24,300	\$558,900
Available Transportation Revenue (Revenue - Expenditures)	\$60,000	\$1,361,000

⁶ Based on 2.5 people per Equivalent Dwelling Unit (EDU) and population growth of 1,147 through 2040 from the PSU Population Research Center. Adair Village current charges \$1,096 per EDU.

CHAPTER 3: TRANSPORTATION GOALS AND OBJECTIVES

Goals and Objectives

The TSP goals and objectives guided the development of the plan and will continue to guide future decision making by the City. Since Adair Village's TSP was developed as part of the Benton County TSP update process, the goals and objectives for this TSP are the same as for the Benton County TSP, with only minor revisions made to approve applicability to the City. Adair Village was provided opportunities to provide input on the goals and objectives through City representation on the County TSP Technical Advisory Committee, an open house held in Adair Village, and a work session with the City Council.

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.

- 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 the use of freight rail and air service to reduce trucking activity on City roads.
- Objective 3: 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.

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 Adair Village can use the evaluation criteria to periodically monitor plan outcomes over time or reprioritize projects.

CHAPTER 4: TRANSPORTATION STANDARDS

Adair Village 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

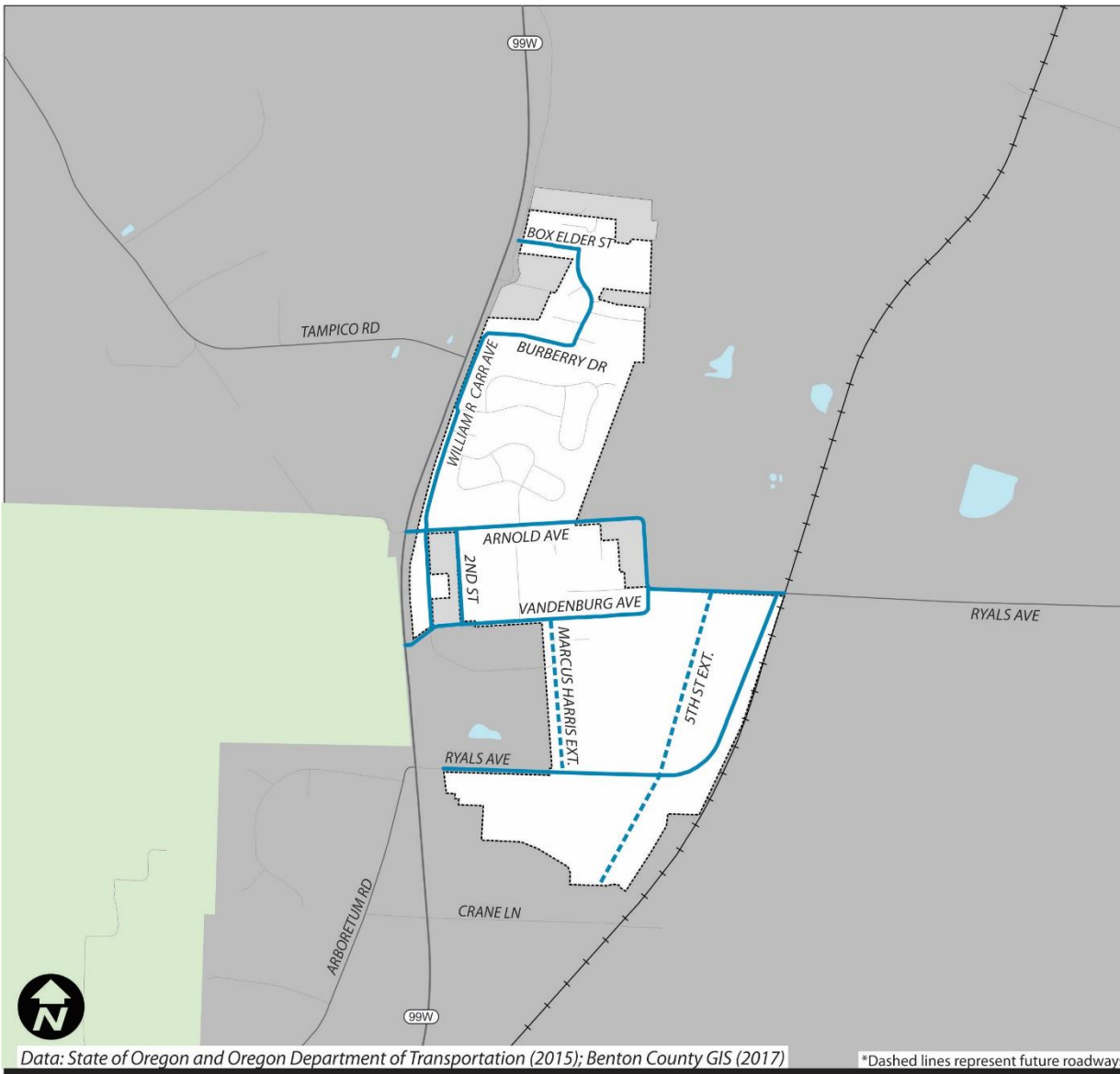
Traditionally, roadways are classified based on the type of vehicular travel they are intended to serve. In Adair Village, the functional classification system provides an organizational mechanism for developing street design standards, establishing appropriate traffic speeds, controlling access, designing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

Adair Village'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 movement, while lower classified roads are designed to provide access to the adjacent land uses. The naming convention used in Adair Village'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.

- **Principal Arterials (formerly Highways)** carry regional traffic with origins and destinations outside the area.
- **Minor Arterials (formerly Arterials)** 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. Major Collectors typically carry higher traffic volume than Minor Collectors.
- **Local Streets (formerly Local Service Streets)** carry primarily local traffic seeking access to adjacent property.

Figure 4 maps the streets in Adair Village and shows assigned functional classifications.

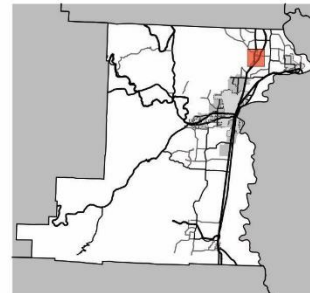
Figure 4: Street Functional Classification



Legend

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

ADAIR VILLAGE
TRANSPORTATION SYSTEM PLAN



Typical Roadway Cross-Section Standards

Table 7 below presents the typical cross-section standards for City roadways within the UGB. Outside of the UGB, roads are subject to either the County or State design standards, as appropriate. These standards remain unchanged from the previous cross-section standards in the City of Adair Village Public Infrastructure Design Manual, with the following exceptions:

- Lane widths for Minor Arterials and Major Collectors have been reduced from 12 feet to 11 feet.
- Center turn lane widths have been reduced from 14 feet to 12 feet.
- A new Neighborhood Local Street with a 28-foot curb-to-curb width has been included for compliance with state requirements to establish standards for local streets and accessways that minimize pavement width and total right-of-way.
- The new functional classification system naming convention has been applied.
- Planter Strips and Bike Lanes are standard cross-section elements

Within UGBs, Benton County applies City design standards to improvements on County roads. The TSP does not include a design type for OR 99W, the only Principal Arterial in the area. OR 99W is a state highway and subject to the design criteria in the State's Highway Design Manual.⁷

These typical roadway cross-section standards are illustrated in Figures 5 through 11. Figure 12 provides a typical cross-section standard for shared-use paths. These cross-section standard dimensions may be modified from the dimensions shown in Table 7 and Figures 5 through 11 and/or elements (such as the center turn lane or bike lanes) may be removed with the approval of the Planning Commission. Modifications to the standard cross-sections should be applied when outside constraints prevent the feasibility of the standard cross-section.

⁷ Highway Design Manual, ODOT, 2012. https://www.oregon.gov/ODOT/HWY/ENGSERVICES/Pages/hwy_manuals.aspx.

Table 7: Typical Roadway Cross-section Standards

Functional Classification/ Special Design	Alley (one-way)	Cul de Sac	Neighborhood Local	Local	Minor Collector	Major Collector	Minor Arterial (2-lane)	Minor Arterial (3-lane)
Previous Functional Classification	Local	Local	Local	Local	Collector	Collector	Arterial	Arterial
Projected ADT	-	200	-	1200	7000	12000	32000	32000
Min ROW (ft)	20'	47'	47'	55'	66'	80'	58'	86'
Surface Width	12'	20'	28'	36'	47'	61'	33'	61'
Lane Widths	12'	2@10'	1@12'	2@10'	2@10'	2@11'	2@11'	2@11'
Center Turn Lane	No	No	No	No	No	12'	No	12'
Bike Lanes & Gutter	-	-	-	-	5' 6"	5' 6"	5' 6"	5' 6"
Parking	-	-	2@8'	2@8'	2@8'	2@8'	-	2@8'
Planter Strip	-	-	4'	4'	4'	4'	6'	6'
Sidewalk & Curb	-	5' 6"	5' 6"	5' 6"	5' 6"	5' 6"	6' 6"	6' 6"
Shoulder	4' gravel	Curb & Gutter	Curb & Gutter	Curb & Gutter	Curb & Gutter	Curb & Gutter	Curb & Gutter	Curb & Gutter
Surface Material	Asphalt	Asphalt	Asphalt	Asphalt	Asphalt	Asphalt	Asphalt	Asphalt
Example Structure	2" AC over 2" Leveling over 8" Rock	2" AC over 2" Leveling over 8" Rock	2" AC over 2" Leveling over 8" Rock	2" AC over 2" Leveling over 8" Rock	2" AC over 2" Leveling over 8" Rock	4" AC over 2" Leveling over 8" Rock	4" AC over 2" Leveling over 8" Rock	4" AC over 2" Leveling over 8" Rock
Max Grade	21%	-	12%	12%	10%	10%	6%	6%
Min Curve Radius	100'	45'	100'	100'	200'	200'	300'	300'
Design Speed	-	-	25 mph	25 mph	30 mph	30 mph	45 mph	50 mph

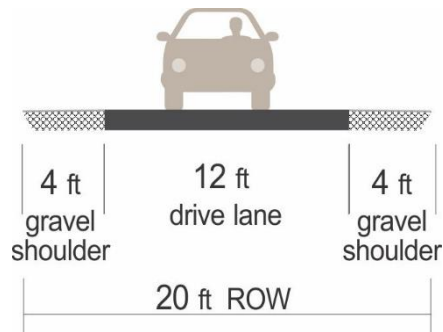


Figure 5: Alley Standard Cross-Section

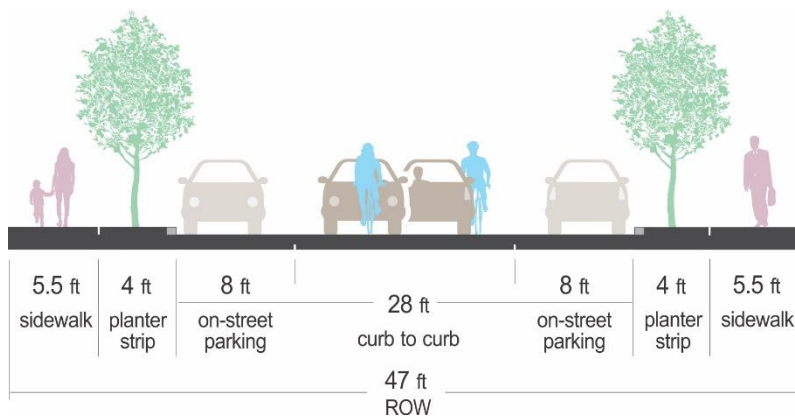


Figure 6: Neighborhood Local Street Standard Cross-Section

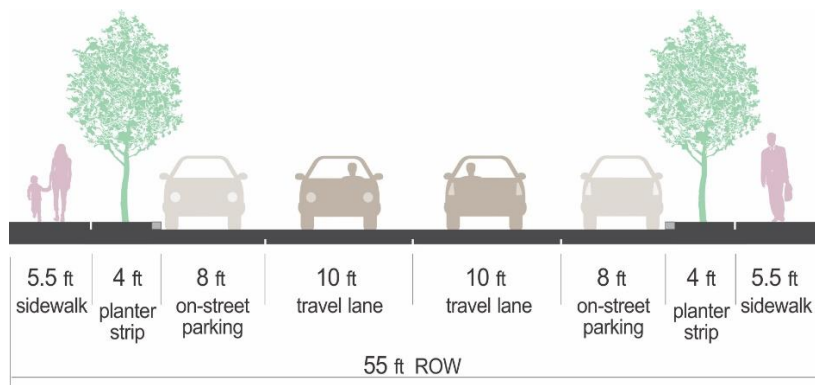


Figure 7: Local Street Standard Cross-Section

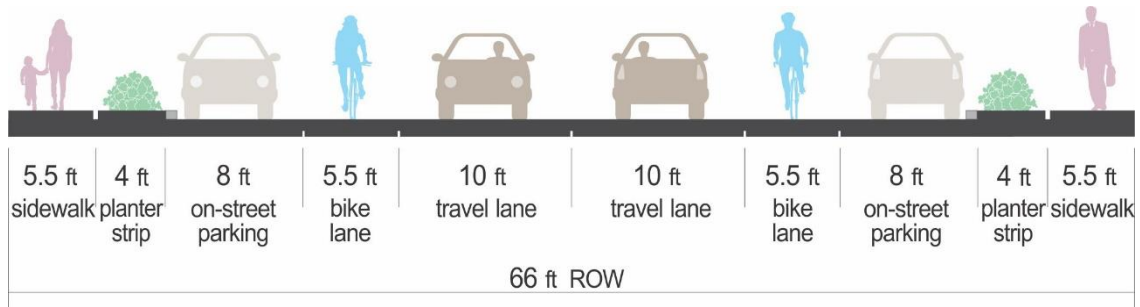


Figure 8: Minor Collector Standard Cross-Section

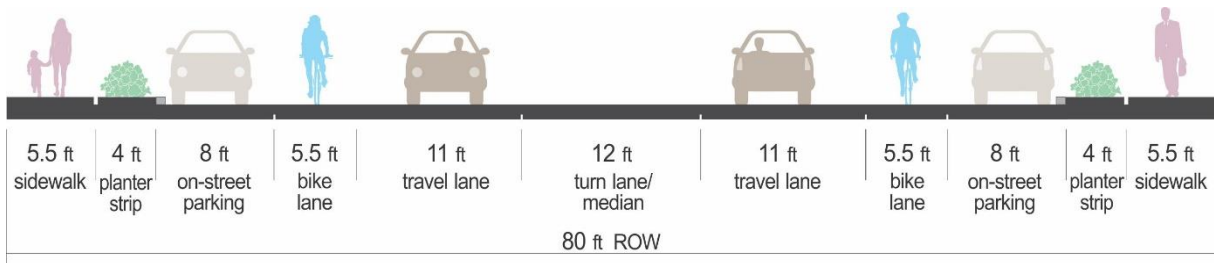


Figure 9: Major Collector Standard Cross-Section

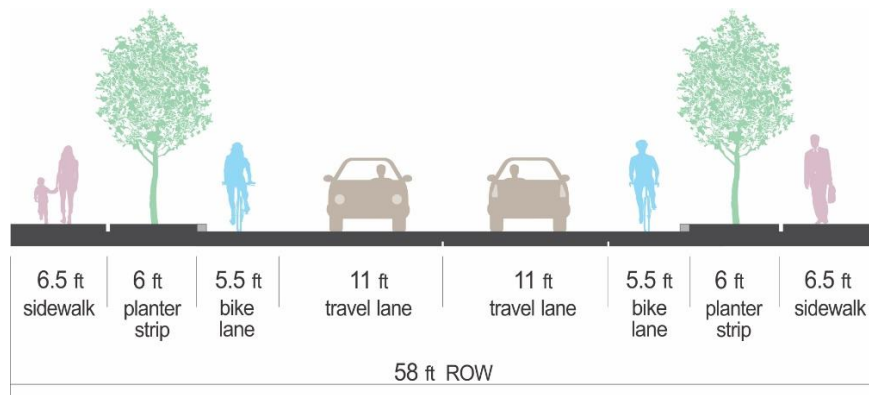


Figure 10: 2-lane Minor Arterial Standard Cross-Section

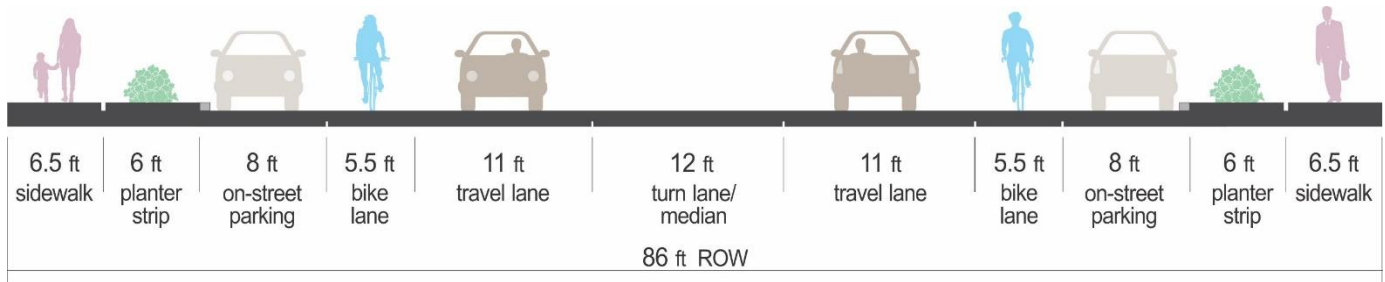


Figure 11: 3-lane Minor Arterial Standard Cross-Section

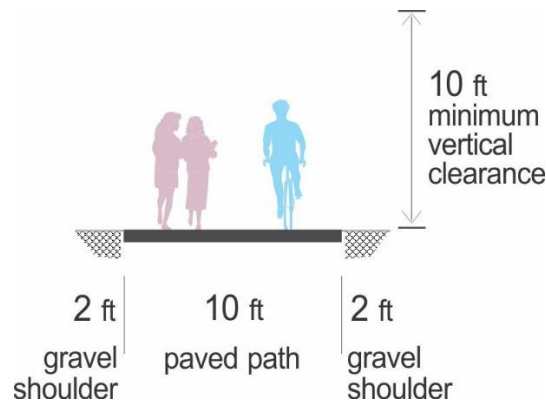


Figure 12: Shared-use Path Standard Cross-Section

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 for 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.

Minimum public roadway intersection and private access spacing standards for City-owned roadways are identified in Table 9 below. New roadways or redeveloping properties must comply with these standards to the extent practical, as determined by City staff. Modifications to these standards may be allowed if approved by the Planning Commission. As the opportunity arises through redevelopment, existing 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 9: Minimum Roadway and Access Spacing Standards

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

Access spacing standards for OR 99W 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, Adair Village 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. They are the basis for requiring improvements needed to sustain the transportation system as growth and development occur.

The new Adair Village 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 Adair Village 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.⁸ All roadways and intersections owned by Benton County must operate at the required mobility targets presented in the 2018 Benton County TSP. Adair Village may apply City mobility standards to County facilities within the UGB as long as they do not allow for a lesser degree of mobility.

⁸ Oregon Highway Plan, ODOT, 1999, Last amended March 2018.

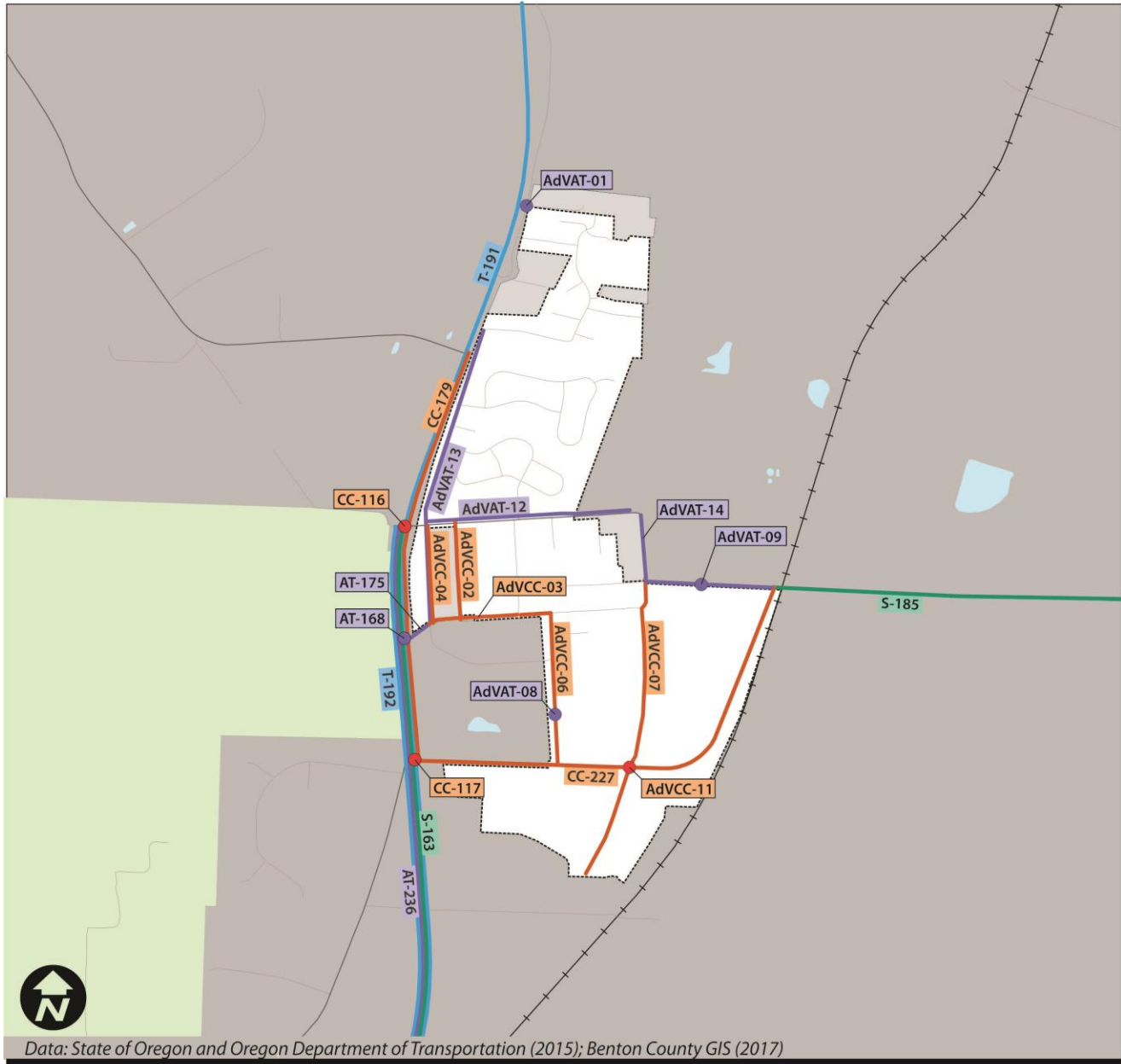
CHAPTER 5: PROJECTS

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 from the Benton County TSP (2018) along County or State facilities are also shown in the map and table below.

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

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

Figure 13: City of Adair Village Projects



Data: State of Oregon and Oregon Department of Transportation (2015); Benton County GIS (2017)

- Legend**
- S-00 - Safety Project
 - AT-00 - Active Transportation Project
 - CC-00 - Connectivity/Congestion Project
 - T-00 - Transit Project
 - AdVAT-00 - Adair Village Active Transportation Project
 - AdvCC-00 - Adair Village Connectivity/Congestion Project
 - - Principal Arterial
 - - Collector
 - - Local Roadway
 - ++ - Railroad
 - - River
 - - Park
 - - Airport
 - - Urban Growth Boundary
 - - City Limits



Table 10: Adair Village Project List

Project ID	Project Name	Cost (2018 dollars)	From	To	Primary Funding Source
AdvAT-01	Adair Frontage Road Active Transportation Corridor	\$100,000	-	-	Adair Village
Description: Prohibit motor vehicle access along Adair Frontage Road north of the UGB to create an active transportation path. Requires coordination with ODOT.					
AdvAT-12	Arnold Avenue - Adair County Park Shared-use Path	\$1,150,000	OR 99W	Adair County Park	Adair Village
Description: Construct shared-use path along the Arnold Avenue corridor from OR 99W to Adair County Park.					
AdvAT-08	Marcus Harris Extension Pedestrian Crossing	\$45,000	-	-	Adair Village
Description: Provide an enhanced pedestrian connection across the Marcus Harris Extension (AdvCC-06).					
AdvAT-09	Arnold Avenue Pedestrian Crossing	\$50,000	-	-	Adair Village
Description: Provide an enhanced pedestrian connection across Arnold Avenue between 5 th Street and Ryals Avenue to connect future development to Brian Unwin Field and Adair County Park.					
AT-168	Vandenberg Avenue/OR 99W Enhanced Pedestrian Crossing	\$250,000	-	-	ODOT
Description: Construct an enhanced pedestrian crossing on OR 99W at the Vandenberg Avenue intersection to improve access to Calloway Creek Trail. May be addressed as part of project CC-179. Project is subject to ODOT approval.					
AdvAT-13	William R Carr Avenue Modernization	\$950,000	Vandenberg Avenue	Barberry Drive	Adair Village
Description: Upgrade to cross-section standards including sidewalk on east and west sides.					

Project ID	Project Name	Cost (2018 dollars)	From	To	Primary Funding Source
AT-175	Vandenberg Avenue Modernization	\$150,000	OR 99W	Oregon Dept. of Fish and Wildlife west driveway	Adair Village
Description: Upgrade to cross-section standards including sidewalk on north and south sides.					
AdVAT-14	Arnold Avenue Modernization	\$500,000	Adair County Park	Ryals Avenue	Adair Village
Description: Upgrade to cross-section standards including sidewalks and bike lanes where needed.					
AT-236	Lewisburg-Adair Village Shared-use Path	\$3,450,000	Lewisburg Road	Arnold Avenue	ODOT
Description: Construct shared-use path within the OR 99W corridor (may use parallel facilities). Project should connect with Corvallis-Lewisburg shared-use path. Project is subject to ODOT approval.					
AdVCC-02	2 nd Street Modernization	\$750,000	Vandenberg Avenue	Arnold Avenue	Adair Village
Description: Improve 2 nd Street to Minor Collector cross-section standards.					
AdVCC-03	Vandenberg Ave Modernization	\$700,000	William R Carr Avenue	Marcus Harris Avenue	Adair Village
Description: Improve Vandenberg to cross-section standards. This project may require State Planning Goal exception due to alignment outside of the Urban Growth Boundary.					
AdVCC-04	William R Carr "Main Street" Project	\$400,000	Vandenberg Avenue	Arnold Avenue	Adair Village
Description: Streetscape improvements along William R Carr Avenue to create a Main Street.					
AdVCC-06	Marcus Harris Extension	\$1,100,000	Vandenberg Avenue	Ryals Avenue	Adair Village
Description: Extend Marcus Harris from Vandenberg Avenue to Ryals Avenue.					
AdVCC-07	5th Street Extension	\$2,050,000	Vandenberg Avenue	Southern UGB	Adair Village
Description: Extend 5th Street south as a Minor Collector from current terminus to southern UGB.					

Project ID	Project Name	Cost (2018 dollars)	From	To	Primary Funding Source
AdVCC-11	5th Street & Ryals Avenue Intersection Improvement	\$500,000	-	-	Adair Village
Description: Construct a roundabout or traffic signal, when warranted. Project may also include an enhanced pedestrian crossing.					
CC-116	OR 99W/Arnold Avenue Intersection Improvement	\$670,000	-	-	ODOT
Description: Project may install a traffic signal or roundabout, if feasible, when warranted. Project is subject to ODOT approval. May be addressed as part of project CC-179.					
CC-117	OR 99W/Ryals Avenue Intersection Improvement	\$670,000	-	-	ODOT
Description: Project may install a traffic signal or roundabout, if feasible, when warranted. Project is subject to ODOT approval. May be addressed as part of project CC-179.					
CC-179	OR 99W Streetscape Study	\$250,000	Ryals Avenue	Tampico Road	ODOT
Description: Streetscape Study to explore alternative highway designs and gateway treatments to slow traffic on OR 99W to enhance the safety and accessibility of Adair Village. May include intersection improvements and enhanced pedestrian crossings. Project is subject to ODOT approval.					
CC-227	Ryals Avenue Modernization	\$1,800,000	OR 99W	Arnold Avenue	County
Description: Improve Ryals Avenue to cross-section standards. Coordinate with planned development.					
S-163	OR 99W Widening	\$16,950,000	Elks Drive (Corvallis)	Arnold Avenue	ODOT
Description: Project may include widening shoulders to cross-section standard (8'). Project is subject to ODOT approval.					
S-185	Ryals Avenue Widening	\$2,700,000	Arnold Avenue	Independence Highway	County
Description: Widen to cross-section standard. This project provides east-west connectivity between Adair Village and North Albany and improves safety for drivers and active transportation users.					

Project ID	Project Name	Cost (2018 dollars)	From	To	Primary Funding Source
T-191	OR 99W North - Phase 1	\$100,000	Corvallis	Monmouth	County

Description: Based on results of the corridor evaluation and service development plan, implement regional public transit bus service on OR 99W between Corvallis and Monmouth. This may be a contracted service with regional transit providers or a private firm.

T-192	99 Express Expansion	\$85,000	Corvallis	Adair Village	County
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Description: Expanded evening and weekend 99 Express service to Adair Village to supplement service to a growing community.

T-193*	Demand Response Phase I	\$130,000	-	-	County
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Description: Expand demand response senior and disabled services to include additional AM, early evening, and expanded Sunday service, for a growing older adult population in the greater Corvallis area and to address current capacity needs.

*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 Adair Village 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, Adair Village is expected to have roughly \$1.4 million available for transportation system improvements through the planning horizon. Most of that funding comes from federal and State discretionary programs.⁹ 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. As a result, there are very few Adair Village-led solution projects on the Financially Constrained list, as shown in the table below.

⁹ Funding does not include new revenues provided by House Bill 2017

Table 11: Financially Constrained Project List

Project ID	Project Name	Cost
AdVAT-01	Adair Frontage Road Active Transportation Corridor	\$100,000
AdVAT-12	Arnold Avenue – Adair County Park Shared-use Path	\$1,150,000

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 the need to continue partnering with ODOT so that an alternative mobility target can be implemented at select intersections along OR 99W, 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.

Alternate Mobility Targets

Even with the proposed intersection improvement project at Ryals Avenue and OR 99W, the operations analysis indicates this intersection will still fail to meet mobility targets with increased vehicle volume in 2040. However, the vehicle volumes and volume to capacity ratio of this intersection do not exceed normal urban levels. The lower v/c mobility target (0.70) is applied because the Adair Village UGB does not extend to OR 99W and therefore is considered a rural intersection. The regulatory boundary of the UGB does not alter the need of Adair Village's residents to access important regional connections via the intersections at Arnold Avenue, Ryals Avenue, and Vandenburg Avenue at OR 99W. As future development occurs and the intersection traffic volumes approach the capacity during the peak hour, Adair Village will work with Benton County and ODOT to consider adopting an alternate mobility target at the intersection of OR 99W and the streets that access Adair Village.

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 Adair Village will be significantly improved and walking and biking connections will be established between significant destinations. As a result, more inviting recreational opportunities will be provided, access to existing and future transit services will be enhanced, and non-motorized travel options for trips to work, schools, and daily activities will be better supported. Key connections include:

- Adair Village to Corvallis: Connection along OR 99W shared-use path (AT-236) and OR 99W shoulder widening (S-163)
- Adair Village to North Albany: Connection through Arnold Avenue Modernization (AdVAT-14) and Ryals Avenue widening (S-185)

Public Transportation

Public Transportation in Adair Village 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 99W North service is envisioned as a deviated fixed-route bus offering four round trips daily between Corvallis and Monmouth, with a stop in Adair Village. This service would provide connections to Oregon State University and Western Oregon University. This route would expand the 99 Express service between Corvallis and Adair Village, offering four round trips daily, Monday through Friday.

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 Adair Village plans, designs, builds, and uses the transportation system. Below are some important definitions that provide the basis for the impacts, policies and action items discussed in the following sections.

Connected vehicles (CVs) will enable communications between vehicles, infrastructure, and other road users, see Figure 14. This means that our vehicles will be able to assist human drivers and prevent crashes while making our system operate more smoothly.



Figure 14: 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.

Impacts of Case Vehicles

Congestion and Road Capacity

There are several competing forces that will unfold as connected, automated, and shared vehicles are deployed. It is difficult to predict how these vehicles will influence congestion and road capacity. The following factors will transform how people use roadways:

- AVs will provide a more relaxing or productive ride experience and people will have less resistance to longer commutes.
- Shared AVs will likely cost significantly less on a per-mile basis which will increase demand for travel.
- CV technology will allow vehicles to operate safely with closer following distance, less unnecessary braking, and better coordinated traffic control. This will increase road capacity in the long run as CVs and AVs comprise increasing portions of the public and private fleet of vehicles.
- In the near term, as AVs still make up a fraction of the fleet of vehicles, road capacity could decrease as AVs will operate more slowly and cautiously than regular vehicles.
- A new class of traffic – zero-occupant vehicles – will increase traffic congestion.
- Roadways may need to be redesigned or better maintained to accommodate the needs of automated driving systems. For instance, stripping may need to be wider and more consistently maintained.

The following questions remain open and should be followed closely to understand the degree to which CASE vehicles will impact road capacity and congestion:

- How much will AVs cost for people to own them personally?
- How much will AVs cost if they are used as a shared fleet?

- How does cost and the improved ride experience of AVs influence travel behavior?
- How much more efficiently will AVs operate compared to regular human driven vehicles once they dominate the vehicle fleet?
- How will AVs impact road capacity in the near term as they are deployed in mixed traffic with human driven vehicles?
- What portion of traffic will be zero-occupant vehicles and what areas will likely generate the highest portion of zero-occupant vehicles looking for parking or waiting for their next passenger?

Transit

Transit is expected to remain the most efficient way to move high volumes of people through constricted urban environments. AVs will not eliminate congestion and, as discussed above, could exacerbate it – especially in the early phases of AV adoption. In addition, shared AVs may not serve all areas of a community and underserved communities still require access to transit to meet their daily needs.

Parking

Because AVs will be able to park themselves, travelers will elect to get dropped off at their destination while their vehicle goes to find parking or their next passenger. Shared AVs will have an even greater impact on parking because parking next to your destination will no longer be a priority for the traveling public. This means that parking may be over-supplied in many areas and new opportunities to reconfigure land use will emerge. Outstanding questions related to parking that should be closely followed include:

- How does vehicle ownership impact parking behavior?
- What portion of the AV fleet will be shared?

Package Delivery

AVs will also be used to deliver packages, food, and expand services. This may mean that delivery vehicles will need to be accommodated in new portions of the right of way. Package delivery by aerial drone could introduce new sets of challenges for Adair Village.

Electric Vehicle Charging Stations

The proportion of electric vehicles represented in the overall vehicle fleet is expected to continue to increase in the future. Providing convenient electric vehicle charging locations helps support this trend and is consistent with the TSP goals related to Health, Environment, and Mobility and Circulation. There are currently no electric vehicle charging locations in Adair Village.

Electric Scooters & Electric Bicycles

Fleets of dockless electric scooters have arrived in many cities across the nation. Electric bikes are also appearing as a subscription-based service like bike-sharing (in addition to privately owned electric bikes that have been around for several years). The scooters are activated with a smartphone app and have little to no parking restrictions at the destination of the trip. Their convenience and low cost (also true for e-bikes) make them an attractive option for many making shorter trips, potentially reducing the number of short trips made by motor vehicles. Innovative modes of transportation, like scooters, can change the transportation system in an instant and Adair Village will monitor new technologies so that the system can adapt to future travel options.

Policies and Action Items

Mobility Hubs

A mobility hub is a central location that serves as a multimodal connection point for transit, car share, bike share, and ride share stations, see Figure 15. This system can serve as a tool to encourage travelers to take seamless multimodal trips that are well timed and convenient. Mobility hubs can be integrated into transit centers, park-and-ride lots and other areas needing or with access to multimodal supportive infrastructure (e.g., protected bike lanes) to maximize connectivity for first-and last-mile solutions.



Figure 15: Mobility Hub

Road Planning and Capacity

It is difficult to plan for the impacts of CASE vehicles on road capacity at this point in their development. Because there is a high potential that ultimately road capacity will increase after CASE vehicles are widely adopted along with a corresponding increase in traffic demand, we can expect that congestion will continue to persist.

However, CASE vehicles provide a much greater opportunity for effective transportation demand management solutions because the expected congestion can be used to encourage use of transit, shared vehicles, and bike share. These modes could all be encouraged through pricing mechanisms that are vastly less expensive to implement than building more road capacity. A variety of pricing mechanisms and alternatives to the State gasoline tax are enabled with CASE technology because these vehicles will be tracked geographically, and by time of day. With time/location data, transportation system operators will be able to develop pricing mechanisms that reduce congestion at a lower cost than other roadway improvements. As opportunities arise, Benton County will coordinate with partnering local and regional agencies to explore options for implementation of such region-wide travel demand management strategies.

Transit

To avoid potential equity and congestion issues, transit agencies need to work together to integrate the use of automated vehicles and transit. Transit needs to adapt to new competition in the transportation marketplace as well as consider adopting CASE technologies to support transit operations, including mobility hubs.