Prepared for

City of Eugene

ODOT

Eugene

SOUTH WILLAMETTE
Street Improvement Plan

May 2014

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Acknowledgements

The South Willamette Street Improvement Plan was a collaborative process among various public agencies, key stakeholders and the community. Input, assistance, and outreach by the following people helped make the Improvement Plan possible:

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Executive Summary

Introduction

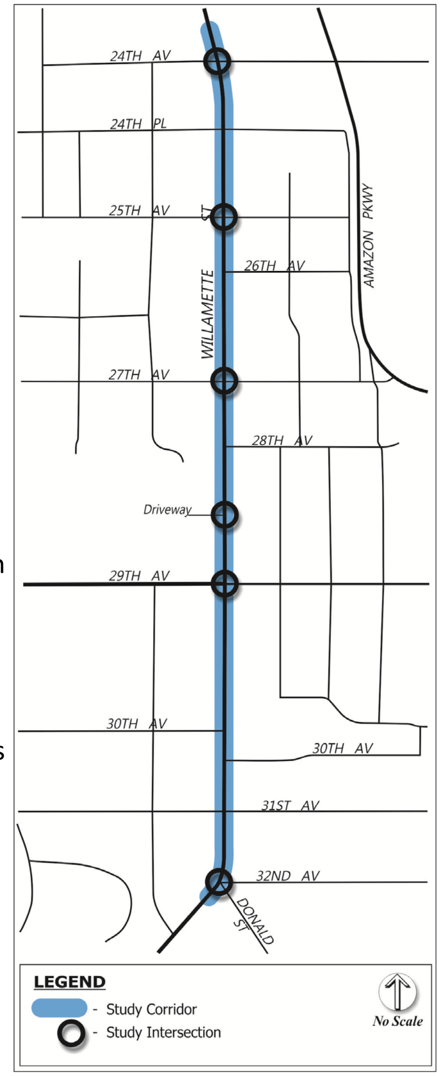
The South Willamette Street Improvement Plan ("Plan") identifies options for people to easily and safely walk, bike, take transit, or drive in an eight-block section of South Willamette Street located between 24th Avenue and 32nd Avenue in Eugene, Oregon.

The goal of the Plan is to help South Willamette Street become a vibrant urban corridor accessible by bicycle, foot, car, and bus. The Plan aims to support the area's businesses, encourage the district's vitality, create a balanced multi-modal transportation system, and foster well-informed community support for the project.

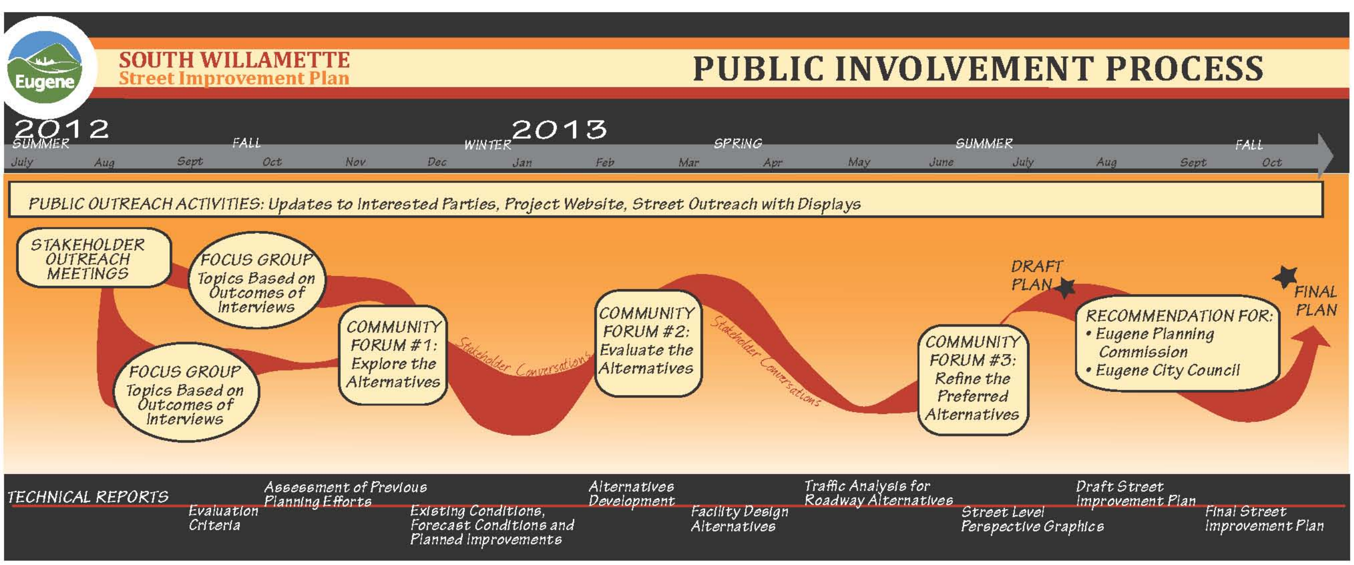
The Plan was developed through a collaborative process among various public agencies, key stakeholders and community members. The regional context was considered through a review of previous planning efforts for the area and the plan was developed in coordination with the Draft South Willamette Concept Plan ("Draft Concept Plan"). A broad level of public involvement was vital to the Plan development.

Throughout this project, the project team took time to understand multiple points of view, obtain fresh ideas and resource materials, and encourage participation from the community. The project team received public input through letters, phone calls, emails, and in-person at stakeholder outreach meetings and focus groups. Three community forums were held at key stages of the project and regular meetings were held with decision makers including City of Eugene Planning Commission and work sessions with the Eugene City Council.

In weighing all the considerations identified in this Plan, the community feedback and technical analysis, the consultant project team finds that **Alternative 3 (3-lanes with bike lanes) represents the best solution for South Willamette Street.**



Project Study Corridor



Existing Conditions

Existing transportation facilities and travel conditions on South Willamette Street were evaluated to establish a baseline for assessing potential design alternatives and improvements to the corridor.

Existing Transportation Facilities

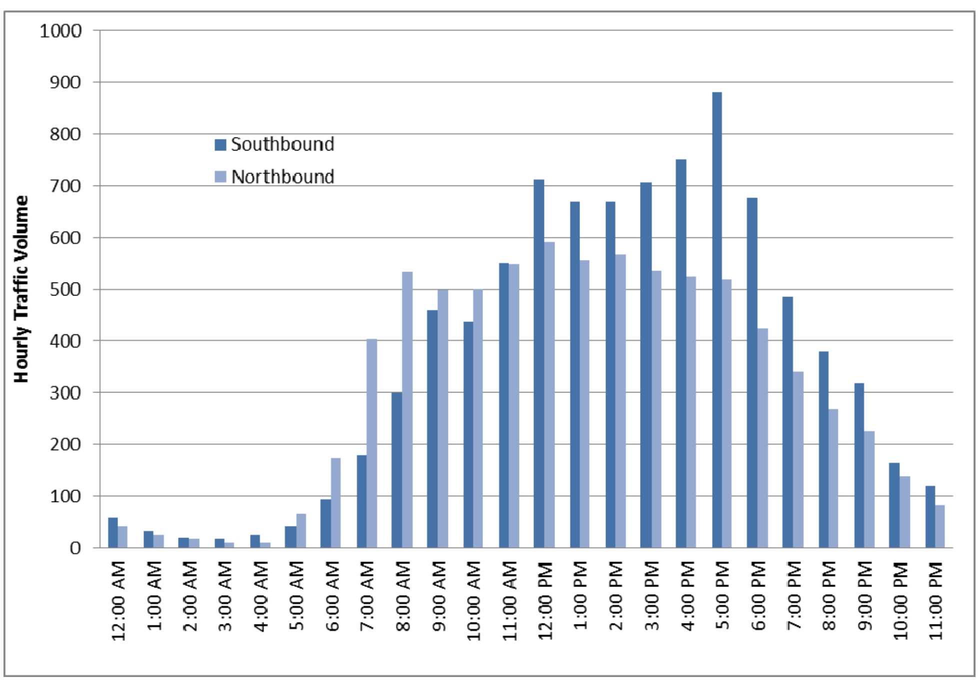
The existing transportation facilities vary within the study area between 24th Avenue and 32nd Avenue. The facilities are summarized below:

- **Roadway configuration:** includes a 4-lane section north of 29th Avenue, a 5-lane section near the 29th Avenue intersection, and a 3-lane section south of 29th Avenue.
- **Right-of-way:** width ranges from approximately 60 to 75 feet, with the widest section near the 29th Avenue intersection.
- **Number of driveways:** over 70 on the 0.8 mile corridor of Willamette Street.
- **Sidewalks:** present on both sides of Willamette Street for the full length of the study corridor, varying in width from approximately 5 feet to 9 feet. Most of the sidewalks in the study area are located curbside, with utility poles and other objects creating obstacles that impact accessibility.
- **Marked pedestrian crossings:** located at the five signalized intersections (at 24th Avenue, 25th Avenue, 27th Avenue, 29th Avenue, and 32nd Avenue).
- **Bike lanes:** exist approximately 250' south of 29th Avenue and continue south through 32nd Avenue. There are currently no bicycle facilities to the north of 29th Avenue.
- **Transit**: service consists of two bus routes operated by Lane Transit District through the corridor, with several bus stops located along Willamette Street.
- **Posted speed limit:** 25 mph

Existing Travel Conditions

A wide variety of measures were used to evaluate existing travel conditions including traffic patterns, collision data, intersection operations and quality of travel for active modes and transit.

Traffic volumes vary by time of day and follow a typical directional pattern. The peak morning flow is heavier toward the downtown business district (northbound) and the peak afternoon traffic primarily moves away from downtown (southbound). Travel time on the corridor depends on the traffic volume and resulting delays that may occur.

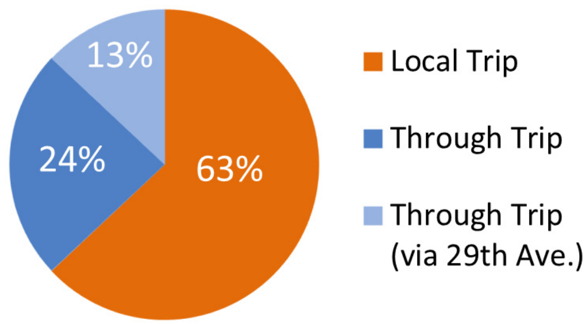


24-Hour Traffic Volumes (Willamette Street south of 27th Ave.)

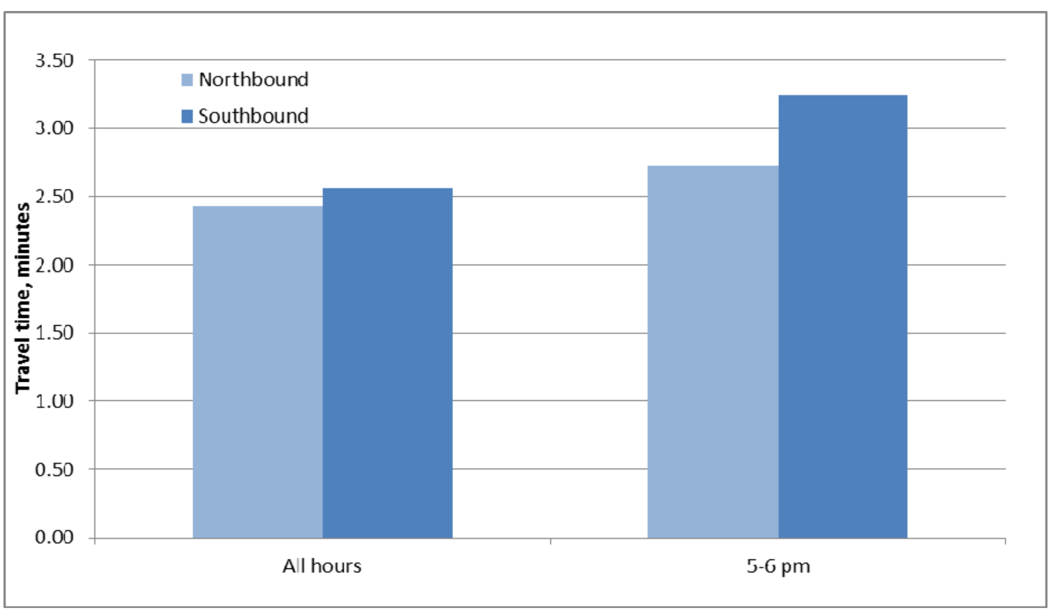
Auto, pedestrian, bicycle and transit operations along Willamette Street were evaluated using multi-modal level of service (MMLOS) methodologies that measure user comfort along roadway segments. Motor vehicle traffic operations at study intersections were evaluated for a.m. and p.m. peak hours based on turn movement traffic counts.

Travel Conditions Highlights:

- **16,500** daily traffic volume.
- **2.5** minutes daily average for end-to-end travel time on the corridor, increasing to approximately three minutes during the p.m. peak hour.
- More than **15%** of motor vehicles travel over 30 mph, exceeding the posted speed limit (25 mph) by 5 mph or more.
- **5.2** collisions per million vehicle-miles traveled is nearly double the statewide average (2.9) for urban city minor arterial streets.
- **100%** of study intersections meet the City of Eugene minimum operational performance standard (LOS D).
- **2%** of traffic is heavy vehicles.
- **63%** of Willamette Street travelers are "local" traffic - making a stop on Willamette Street or turning onto a local street. The remaining 37% are "through" travelers – those who do not stop and go directly north/south on Willamette Street between 24th Avenue and 32nd Avenue (24%), or make a turn at 29th Avenue (13%).



Traveler Characteristics on Willamette Street (between 24th Ave. and 32nd Ave.)

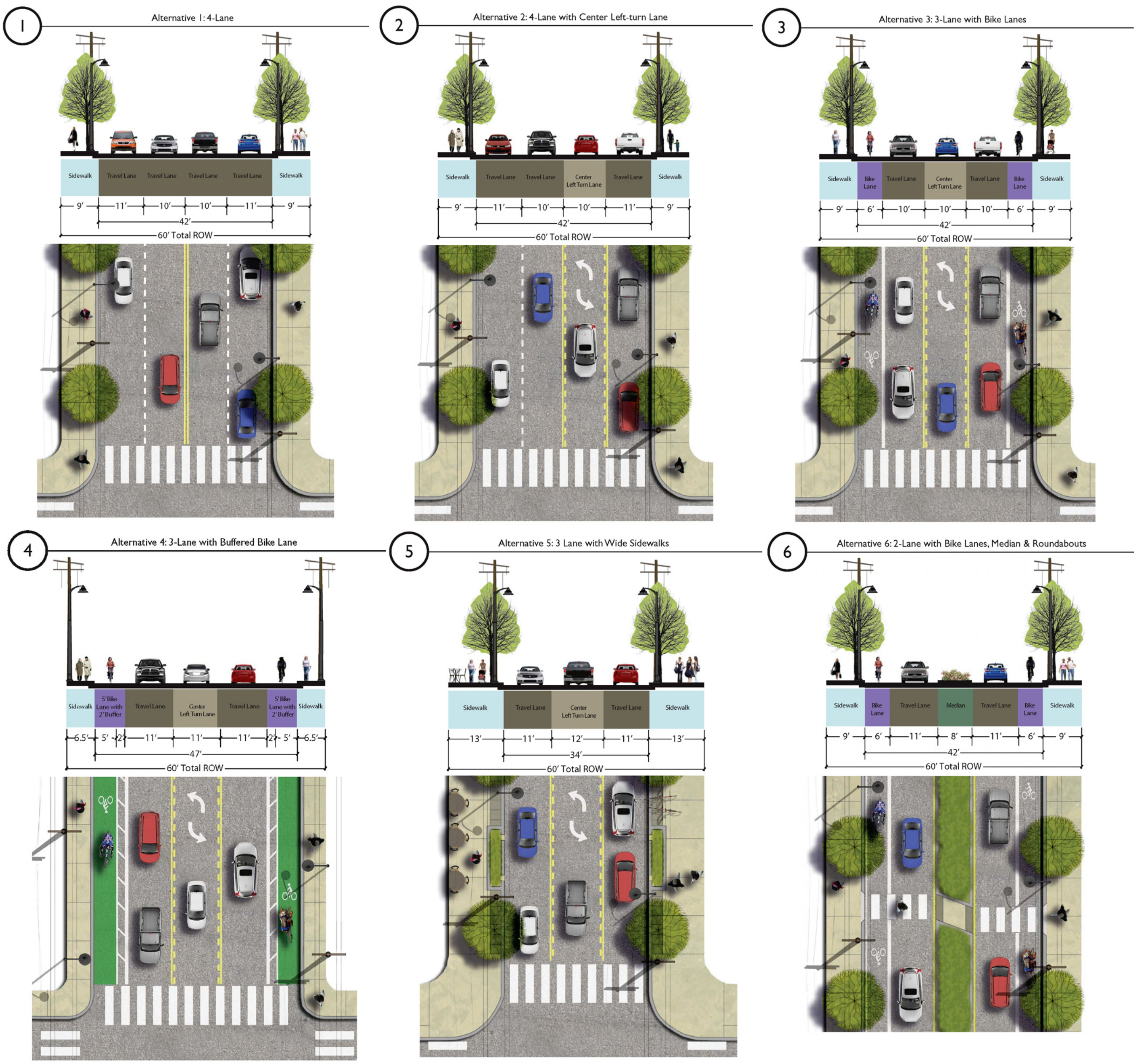


Average Travel Times (Willamette Street, between 24th Ave. and 32nd Ave.)

Alternative Concepts

Six conceptual roadway alternatives were proposed for consideration for the South Willamette Street Improvement Plan. The proposed alternatives were identified to support a long-term corridor vision, but also to facilitate development of a design plan that can be adopted and implemented in the short-term. The existing right-of-way was maintained in all alternatives to minimize cost.

The alternatives defined cross-section concepts that reflect a variety of community benefits and trade-offs for the corridor. Community Forum #1 (Explore The Alternatives), held in November of 2012, was critical in developing the range of options that were considered to meet community needs. Community Forum #2 (Evaluate the Alternatives), held in February of 2013, provided an opportunity to receive community feedback on which of the six proposed alternatives should be advanced.



Conceptual Alternatives (Tier 1)

Screening Evaluation

The six alternative concepts were refined to three based on both a technical review (Tier 1 screening) and public input received from the community and stakeholders. The Eugene City Manager has endorsed a triple-bottom-line approach to sustainability and analysis for City projects and programs providing for consideration of people, the planet, and prosperity (or equity, environment, and economy). In development of the Draft Eugene Transportation System Plan (Draft TSP), the Transportation Community Resource Group (TCRG) extensively vetted a sustainability rating system based on a triple-bottom-line analysis. The South Willamette Street Improvement Plan adapted the TCRG sustainability work to develop the Tier 1 screening criteria for qualitative assessment of the roadway alternatives.

The table to the right provides the assessment results, which show that Alternatives 3, 5, and 6 scored highest in the evaluation, though no alternative was clearly superior in all ways. In addition, based on public outreach, Alternative 3, 4, and 5 received the strongest community support.

Although the 4-lane alternatives (Alternative 1 and 2) scored the lowest on the evaluation criteria and received the least favorable public feedback, overall public input indicated the need for further analysis and discussion before reductions to motor vehicle capacity should be further considered. Therefore, the following three alternatives were selected for further refinement and more detailed analysis:

- 4-lane (Alternative 1)
- 3-lane with bike lanes (Alternative 3)
- 3-lane with wide sidewalks (Alternative 5)

Evaluation Criteria Scoring of Alternatives

Alternative		#1 4-Lane	#2 4-Lane with Center Left-turn Lane	#3 3-Lane with Bike Lanes	#4 3-Lane with Buffered Bike Lanes	#5 3-Lane with Wide Sidewalks	#6 2-Lane with Bike Lanes, Median & Roundabouts
Access & Mobility	Reliability (For All Modes)	0	0	0	0	0	0
	Neighborhood Connectivity	0	0	1	1	0	1
	Motor Vehicle Travel Time	0	0	-1	-1	-1	-1
	Active Mode Travel Time	0	0	1	1	0	1
Safety & Health	Safety	0	0	1	1	1	1
	Security	0	0	1	1	1	1
	Emergency Response	0	0	-1	-1	-1	-1
Social Equity	Equity	0	0	1	1	1	1
	Economic Access	0	0	1	1	1	1
Economic Benefit	Freight Mobility	0	0	-1	-1	-1	-1
	Walkable/Bikeable Business District	0	0	1	1	1	1
	Business Vitality	0	1	0	0	0	-1
Cost Effective-ness	Fundability	1	0	0	-1	-1	-1
	Asset Management	1	1	1	1	1	1
	Project Benefits	1	1	1	1	1	1
Climate & Energy	Reduce Vehicle Miles Traveled	0	0	0	0	0	0
	Pedestrian Facilities	0	0	0	-1	1	0
	Bicycle Facilities	0	0	1	1	0	1
	Transit Facilities	0	0	0	0	1	0
Ecological Function	Stormwater Design	0	0	0	0	0	0
	Landscape Design	0	0	0	0	0	0
Community Context	Community Vision and Land Use	0	0	0	-1	1	0
	Transportation Planning Compatibility	0	0	0	0	0	0
TOTAL		3	3	7	4	6	5

Alternatives Refinement

Additional roadway design details and options for corridor implementation were developed for each of the three alternative concepts advanced. These refinements included segment cross sections, intersection configurations, bicycle and pedestrian connections to the corridor, and other design considerations. Cost estimates were also prepared for each alternative.

In addition, some planned improvements are desired throughout the corridor and will be assumed for each alternative. These improvements include new pavement, improved drainage, wider sidewalks, and enhancements to pedestrian and bicycle access around Willamette Streets. Other improvements may vary depending on the location and alternative configuration.

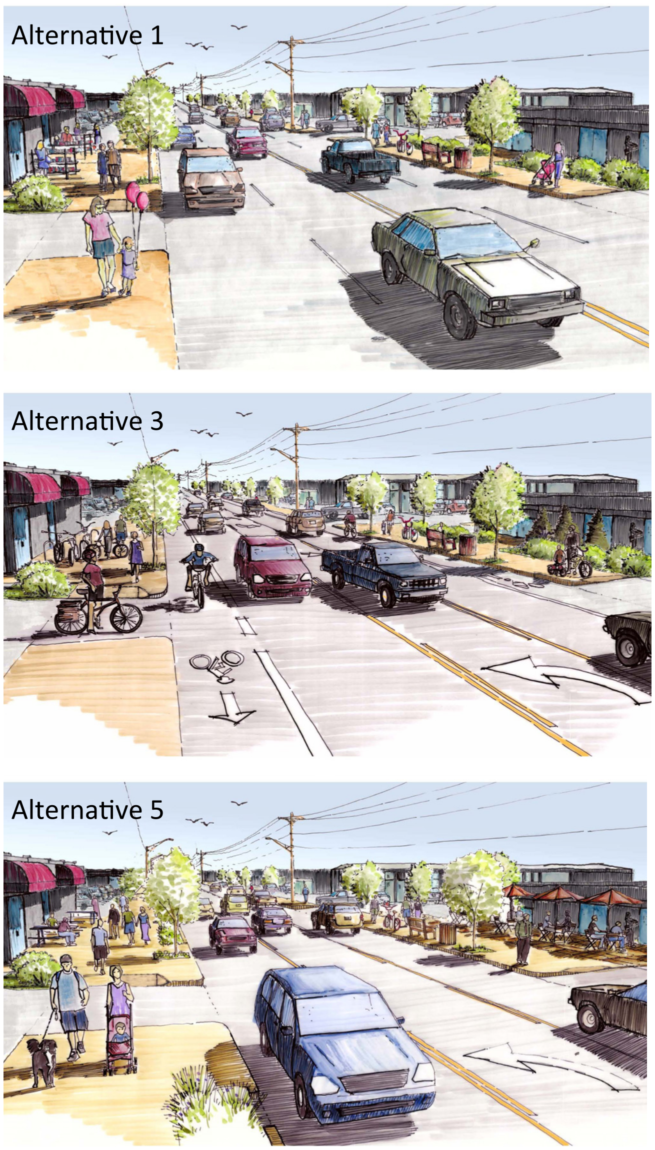
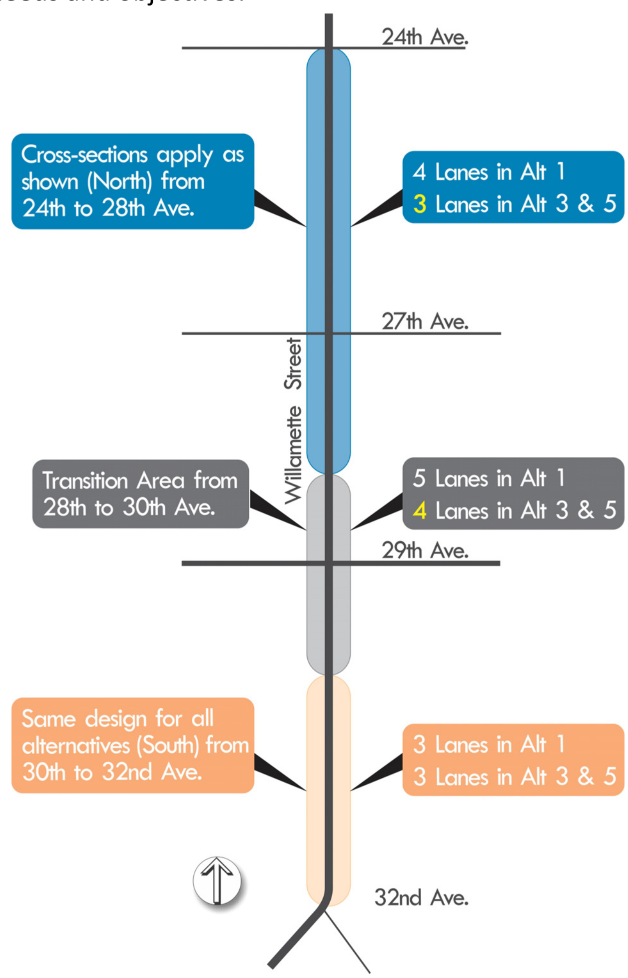


Illustration of Conceptual Alternatives (Tier 2)

Potential Changes by Segment

The alternative cross section concepts previously illustrated apply on the north segment of Willamette Street, from 24th Avenue to near 28th Avenue. In the south segment of the study corridor, no differences are proposed for any alternative. Around 29th Avenue, a "transition area" will provide continuity between the corridor segments to the north and south, while best meeting the corridor's identified needs and objectives.

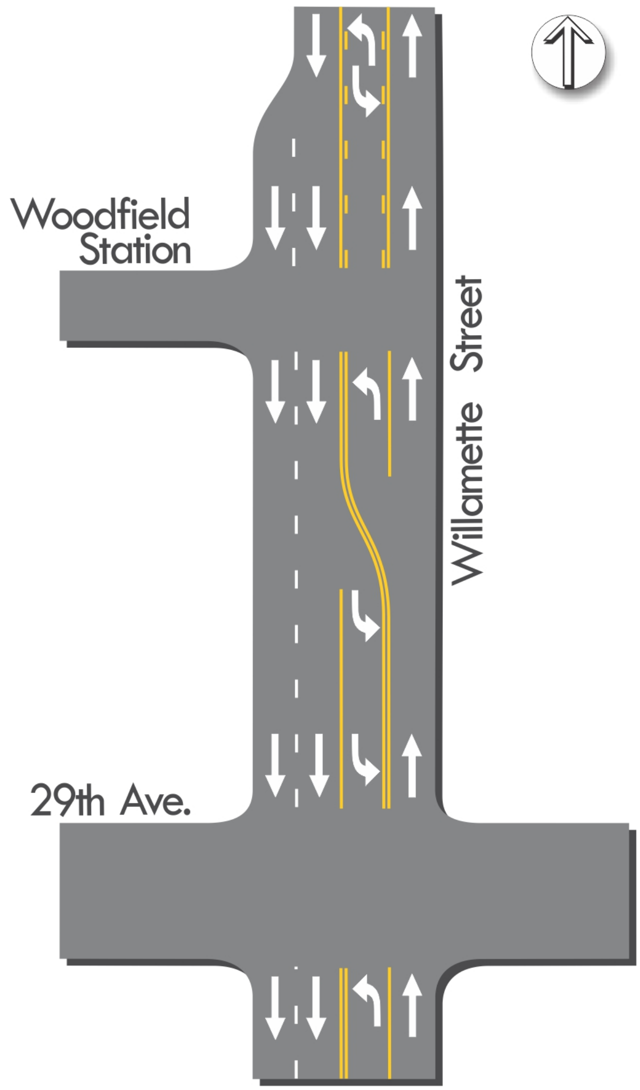


Potential Cross-Section Changes by Segment

Potential Changes at Intersections

Woodfield Station Driveway Intersection: It is recommended that a traffic signal at this intersection be considered as a design option in all alternatives. A traffic signal would provide better access for turning vehicles and an additional pedestrian crossing opportunity. Driveway modifications would likely be necessary on the east side of Willamette Street, across from the Woodfield Station Driveway.

29th Avenue Intersection: For Alternative 3 and 5, a proposed design option would include a 4-lane cross-section at 29th Avenue including a single northbound travel lane while retaining two southbound through travel lanes (and a left-turn lane.). Removing one of the two existing northbound travel lanes may be considered to accommodate bike lanes or wider sidewalks, respectively. Without reducing the number of vehicle lanes, additional right-of-way would be required to provide bike lanes or wider sidewalks. The two southbound lanes are needed to adequately serve the peak direction traffic demand at the intersection. The two southbound lanes would extend to beyond the Woodfield Station Driveway to provide additional vehicle storage space and capacity.



Conceptual Lane Configurations at Woodfield Station and 29th Ave. Intersections

Other Potential Refinements

- **Roundabouts** can improve traffic flow and safety when they are installed and are less expensive to operate and maintain compared to traffic signals. However, heavy vehicle operators may be opposed to roundabouts and significant property acquisition costs may be necessary to provide the right-of-way needed to construct appropriately-sized roundabouts. Traffic analysis results indicate that single lane roundabouts may not comfortably accommodate peak hour traffic demand at several intersections. Roundabouts are not explicitly included in the facility design of any alternative but may be considered further as potential design refinements.
- **Access Management** on public and private approaches will be considered to reduce the numerous conflict points for motor vehicles, pedestrians and bicyclists along the corridor. Access management strategies may include consolidating driveways, sharing access points between adjacent property owners, implementing turn lanes at driveways and parking circulation enhancements. Reducing conflict points is likely to result in fewer

crashes and increased capacity along the corridor. Managing access points along the corridor requires finding an appropriate balance between safety, mobility, and access. Preliminary consideration of access management strategies for the corridor indicates that recommended strategies will not be significantly different for any alternative compared to another.

- **Bus Pullouts** would remove stopped vehicles from travel lanes, but would likely require right-of-way acquisition and buses in the pullouts would need to merge back into the traffic stream. No bus pullouts are recommended for the corridor given the frequency of bus uses (five per hour south of 29th Avenue and two per hour north of 29th Avenue), right-of-way impacts, transit agency preference, and increased delay for merging.
- **Enhanced Bicycle Connections** could be provided with potential bicycle facility improvements nearby, connecting to, and crossing Willamette Street. These improvements may be combined with bike lanes on Willamette Street or considered independently. The bicycle improvements proposed for consideration include treatments for nearby bike routes and crossing improvements at the 24th Avenue and 29th Place intersections.
- **Enhanced Pedestrian Crossings** could support the wider sidewalks included in each alternative by improving opportunities to cross along Willamette Street. A variety of design treatments can be implemented to enhance the pedestrian crossings, including mid-block crossings, median pedestrian crossing refuges, leading pedestrian intervals, and modified pavement surfaces. The traffic signal proposed at the Woodfield Station Driveway and the bicycle crossing improvement proposed at 29th Place would also provide new pedestrian crossings along the largest existing gaps between signalized crossings.
- **On-Street Parking** would likely have a very favorable benefit to the pedestrian environment, however, given the constrained right-of-way and community priorities, on-street parking is not considered in any of the three design alternatives. On-street parking may be reconsidered as part of long-term enhancements to the corridor.

Alternative Cost Estimates

Planning-level cost estimates were developed for each alternative, with the facility designs specified in this memorandum. All costs shown are planning-level estimates in 2013 dollars and are subject to change. The most significant difference between alternative costs are due to reconstruction of sidewalks. The planning-level estimated costs for utility relocation ($2.6 Million) are not included in the estimates shown below.

Planning-Level Cost Estimates (Million Dollars, in 2013 Dollars)

Alternative	Pavement Project	24th to 29th Ave	29th to 32nd Ave	Total
1	$2.1	$2.0	$0.5	**$4.6**
3	$2.1	$2.3	$0.5	**$4.9**
5	$2.1	$3.0	$0.5	**$5.6**

Pavement Project – City of Eugene project is planned to include paving, ADA accessibility, and stormwater improvements from 24th to 29th Avenue
24th to 29th Avenue – Additional costs vary by alternative
29th to 32nd Avenue – Additional costs same for all alternatives
*All costs are planning-level estimates subject to change

Streetscape Design Options

The elements of a unified streetscape that should be considered in conjunction with the roadway facility design alternatives include sidewalk space, utilities, and stormwater treatment. The design concepts are intended to balance comfort, safety, and appeal for all users and may be incorporated into all plan alternatives to varying degrees.

- **Sidewalk Widening** will provide a more comfortable pedestrian environment that is accessible to more users and offers support for the success of future businesses as the area redevelops. Wider sidewalks may provide opportunities for landscaping, vegetation, storm water/drainage elements (e.g., bioswales), café seating, overhead signing, decorative lighting, bike parking, etc. It is assumed that sidewalks will be widened to construct the maximum allowable width within the existing right-of-way in each of the alternatives. Wider sidewalks, extending beyond the existing right-of-way, may be constructed incrementally as properties redevelop.
- **Utility Relocation** to underground would improve the sidewalk environment by removing some barriers to pedestrian access and increase the available sidewalk space. Utilities (poles, hydrants, pedestals, etc.) currently located along the sidewalks result in an inconsistent and obstructed pedestrian environment.
- **Green Streets** are facilities that treat and manage stormwater within the right-of-way. Those facilities create an ecological function for our streets, in addition to the traditional mobility and access functions. Examples of green street facilities include flow-through planters, basins, sidewalk silva cells, filterras, and permeable paving. The choice of techniques will be affected by the width of the sidewalk corridor in a preferred alternative and will require detailed engineering analysis and consistency with existing City of Eugene stormwater standards.

The summary matrix below shows how easily some of the typical amenities of a streetscape can be accommodated within the sidewalk corridors depicted in the alternatives.

Willamette Street Amenities Matrix

	Alt. 1	Alt. 3	Alt. 5
Bus Stop Amenities			
Enhanced Bus Shelters	⊗	⊗	●
Sidewalk Character			
Wide Sidewalks (10’ or greater)	⊗	⊗	●
Paved furnishing zone	●	●	●
Planter strip	●	●	●
Outdoor seating/retail focus	⊗	⊗	●
Textured Crosswalk	●	●	●
Sidewalk Furnishings			
Bike Racks	⊗	⊗	●
Benches	⊗	⊗	●
Trash receptacles	●	●	●
Lighting			
Pedestrian scale (18’ tall or shorter)	●	●	●
Landscaping			
Deciduous tree canopy	⊗	⊗	●
Street corner planting	⊗	⊗	●
Landscaped tree wells	●	●	●
Stormwater facilities	⊗	⊗	●

Key	
Comfortably Accommodated	●
Constrained	⊗

Streetscape Design Amenities Matrix

Transportation Impacts

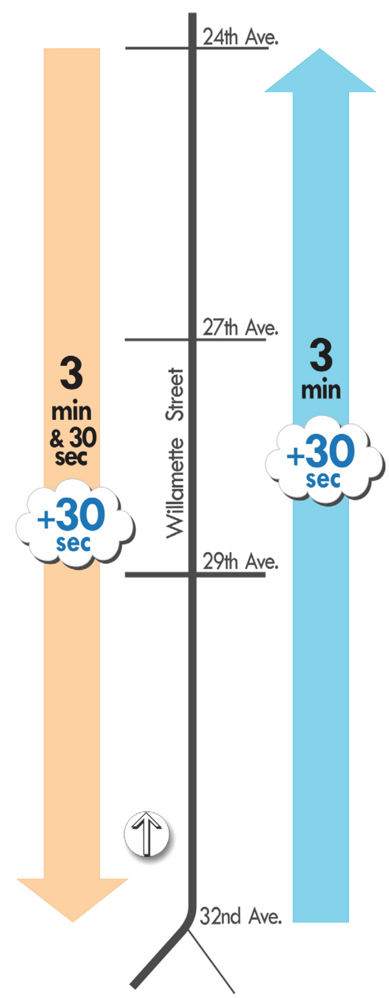
Traffic analysis comparisons of the three alternatives advanced for the South Willamette Street Improvement Plan were performed for the year 2018. Results include estimates of intersection operations, delay, vehicle queuing, travel time, neighborhood traffic shift and multi-modal system performance for bicyclists, pedestrians and transit.

Travel volume forecasts for 2018 were developed using growth identified in the regional travel demand model developed by the Lane Council of Governments (LCOG). More delay is anticipated in 2018 as a result of expected growth in motor vehicle traffic volumes. Alternatives 3 and 5 are considered to be approximately equivalent for motor vehicle operations.

Transportation Impacts Summary for Alternatives 3 and 5 (as compared to Alternative 1)

- More motor vehicle delay is anticipated due to the reduction of travel lanes for motor vehicles.
- Traffic speeds will likely be reduced for through-moving vehicles, as a passing lane will be unavailable in some locations.
- Average travel times between 24th Avenue and 32nd Avenue are expected to increase by 30 seconds during the 2018 p.m. peak hour.
- Travel time reliability through the corridor may decrease.
- Intersection operations at Willamette Street and 29th Avenue may fall below the adopted minimum performance standard (LOS D) during the a.m. and p.m. peak (reaching LOS E). All other intersections operate within the performance standards for all time periods evaluated for 2018.
- Vehicle queues at the locations where motor vehicle lanes are reduced for through travel may expect to see queues approximately double in length.
- Up to 500 vehicles per day (3% of daily traffic) may reroute to other roadways, with approximately two-thirds of the traffic shifting east to Hilyard Street and/or Amazon Parkway.
- Bicyclist and pedestrian comfort (MMLOS) would improve significantly in Alternatives 3 and 5, respectively.

Case studies in Seattle and Vancouver, WA as well as Orlando, FL demonstrated successful examples of previous corridor conversions from four vehicle lanes



Change in Estimated Average Travel Times (2018 p.m. peak hour) for Alternatives 3 & 5

to three. The corridors were generally similar to Willamette Street, with before/after comparisons indicating that vehicle speeds were reduced, the number of crashes was reduced, and pedestrian and bicycle access was improved. No significant problems were identified for motor vehicle traffic operations.

CONCLUSIONS

The public involvement process has identified a variety of needs and preferences for the range of users who travel, live, work, and shop on South Willamette Street. Each proposed alternative provides relative positive and negative impacts that may be perceived differently by individuals. Within the limited right-of-way available in the developed mixed-use Willamette Street corridor, trade-offs must be carefully considered. Ultimately the alternative selected should reflect a balanced approach that best meets the transportation needs of the users of Willamette Street and best reflects the goals and objectives of the community.

In weighing all the considerations identified in this Plan, the community feedback and technical analysis, the consultant project team finds that **Alternative 3 (3-lanes with bike lanes) represents the best solution for South Willamette Street.** Alternative 3 ranked highest in the screening evaluation, based on criteria reflecting community values adapted from a sustainability process vetted by the Transportation Community Resource Group in development of the Draft Eugene Transportation System Plan. These make clear that considerations of safety, health, energy, equity, economic vitality, and access are at least as important to the Eugene community as mobility.

Alternative 3 was also the most favorably ranked configuration based on responses received at the Community Forum #3 (Refine the Alternatives),

DRAFT TRANSPORTATION GOALS

Eugene's Draft Transportation System Plan (TSP) identifies four goals describing the desires of the community with regards to its transportation system:

- **Goal 1:** Create an integrated multimodal transportation system that is safe and efficient; supports local land use and economic development plans; reduces reliance on single occupancy automobiles; and enhances community livability.
- **Goal 2:** Advance regional sustainability by providing a transportation system that improves economic vitality, environmental health, social equity, and well-being.
- **Goal 3:** Strengthen community resilience to changes in climate, increases in fossil fuel prices, and economic fluctuations through adaptations to the transportation networks.
- **Goal 4:** Distribute the benefits and impacts of transportation decisions fairly and address the transportation needs and safety of all users, including youth, the elderly, people with disabilities, and people of all races, ethnicities and incomes.

The Draft TSP also identifies objectives that are grouped into the eight Sustainable Transportation Access Rating System (STARS) categories:

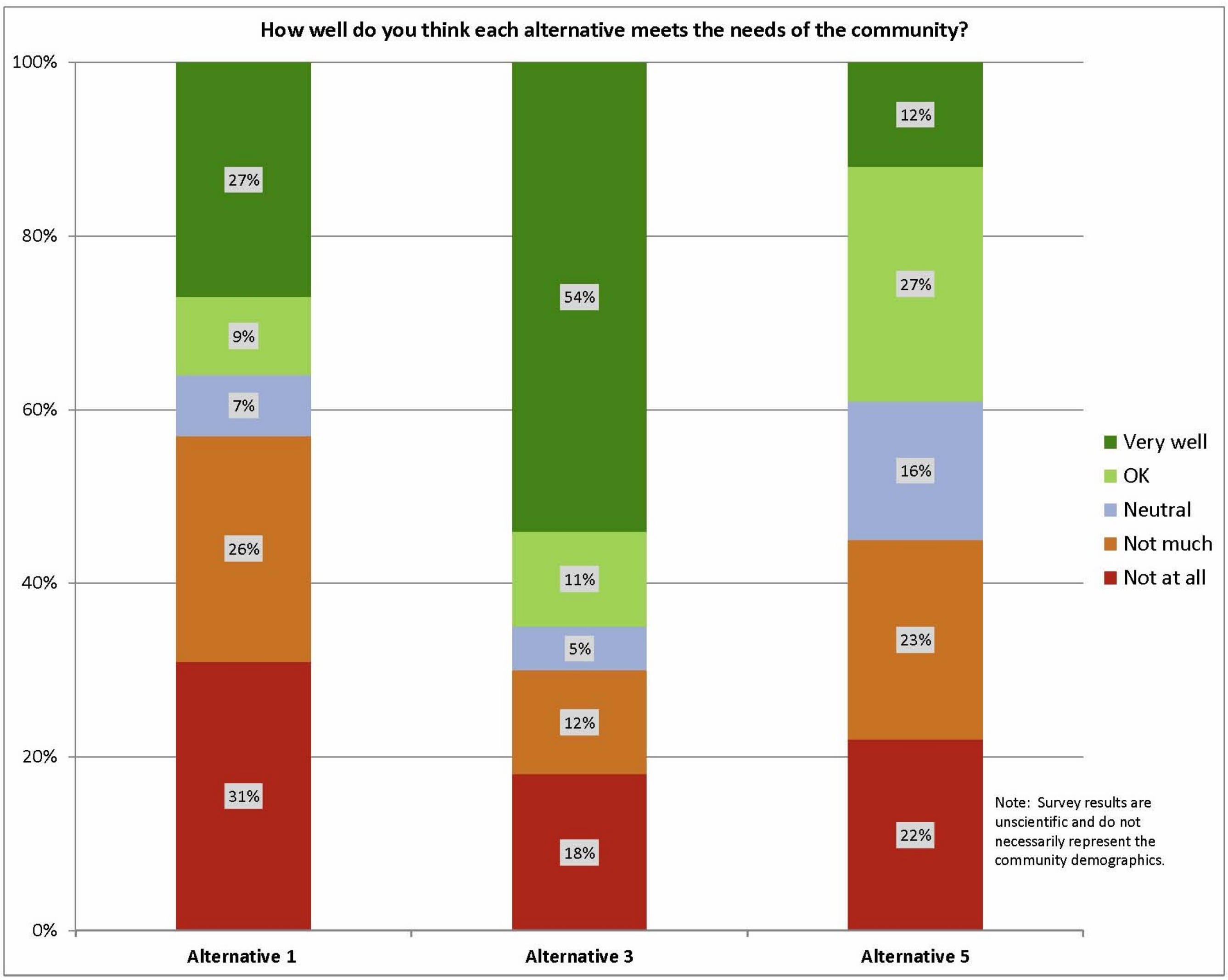
- Safety and Health
- Social Equity
- Access and Mobility for All Modes
- Community Context
- Economic Benefit
- Cost Effectiveness
- Climate and Energy
- Ecological Function

The Draft TSP goals and objectives cover a wide range of community needs and provided the foundation for evaluating the improvement alternatives identified in the South Willamette Street Improvement Plan.

held in June 2013, and via online survey. These outreach efforts indicated a clear preference from participants and respondents for improved access and safety.

Potential motor vehicle impacts include peak hour travel time increases that most respondents considered to be acceptable. The transportation analysis findings for Alternative 3 also identify potential benefits such as reduced speeding, improved safety, and more comfortable left-turn movements. With the refinements recommended, most notably keeping two through travel lanes southbound at 29th Avenue, a considerable effort has been made to minimize the potential negative impacts to motor vehicle mobility.

Alternative 3 enhances pedestrian and bicyclist comfort and safety, drawing people to the corridor who previously avoided it. Because the majority of Willamette Street travelers are turning at driveways or local streets, not simply passing through the corridor as quickly as possible, the potential benefits of improved safety and ease of access may also outweigh concerns about travel time. Reviews of roadway conversions in similar circumstances show the potential for implementation of Alternative 3 to result in successful outcomes across all methods of travel.



Online Public Survey Response

1. Introduction

View of Willamette Street looking south.

The South Willamette Street Improvement Plan ("Plan") identifies options for people to easily and safely walk, bike, take transit, or drive in an eight-block section of South Willamette Street located between 24th Avenue and 32nd Avenue in Eugene, Oregon. South Willamette Street is an important corridor that functions as a commercial destination and as a key route for connecting residents of southern Eugene to the rest of the city. The goal of the Plan is to help South Willamette Street become a vibrant urban corridor accessible by bicycle, foot, car, and bus. The Plan aims to support the area's businesses, encourage the district's vitality, create a balanced multimodal transportation system, and foster well-informed community support for the project.

Six conceptual roadway alternatives were identified and considered for the Tier 1 screening evaluation. The alternative facility designs reflect a variety of community benefits and trade-offs for the corridor. The six alternative concepts were refined to three based on direction from City of Eugene staff after receiving community input and feedback from the project Technical Advisory Committee on the results of the Tier 1 Screening. The three alternative configurations advanced to the Tier 2 screening phase were a 4-lane (Alternative 1), 3-lane with bike lanes (Alternative 3), and 3-lane with wide sidewalks (Alternative 5.) The Tier 2 screening provides a more detailed description and rigorous analysis of the facility design needed to progress toward a selected corridor design.

This Plan identifies the study corridor, provides a summary of the existing transportation facilities, and summarizes the existing travel conditions for all users. The Plan describes the development and analysis of alternatives and discusses benefits and tradeoffs associated with each alternative. Transportation analysis for a future 2018 horizon year is included to inform decision-makers and the community on how South Willamette Street will function after a preferred design is selected and built.

Study Corridor

The study corridor is a 0.8 mile segment of Willamette Street between 24th Avenue and 32nd Avenue. This section of Willamette Street is a minor arterial that carries approximately 16,500 vehicles per day[(1)] and has five signalized and several unsignalized intersections. All five signalized intersections and one unsignalized intersection (as listed below) were analyzed as part of this Plan. These intersections are also shown in Figure 1.

- Willamette Street/24th Avenue
- Willamette Street/25th Avenue
- Willamette Street/27th Avenue
- Willamette Street/Woodfield Station Driveway (unsignalized)
- Willamette Street/29th Avenue
- Willamette Street/32nd Avenue

Background and Context

This section describes how South Willamette Street fits into the regional context based on review of previous planning efforts for the area. Key elements from the plans are highlighted below that reflect a range of considerations and objectives for South Willamette Street. Key facility design standards are also summarized.

The following documents have been reviewed and included in the summary:

- South Willamette Area Draft Concept Plan
- Eugene Arterial and Collector Street Plan (ACSP)
- TransPlan: The Eugene-Springfield Transportation System Plan
- Draft Eugene Pedestrian and Bicycle Master Plan
- Walkable Community Workshops
- Willamette Street Traffic Analysis Report

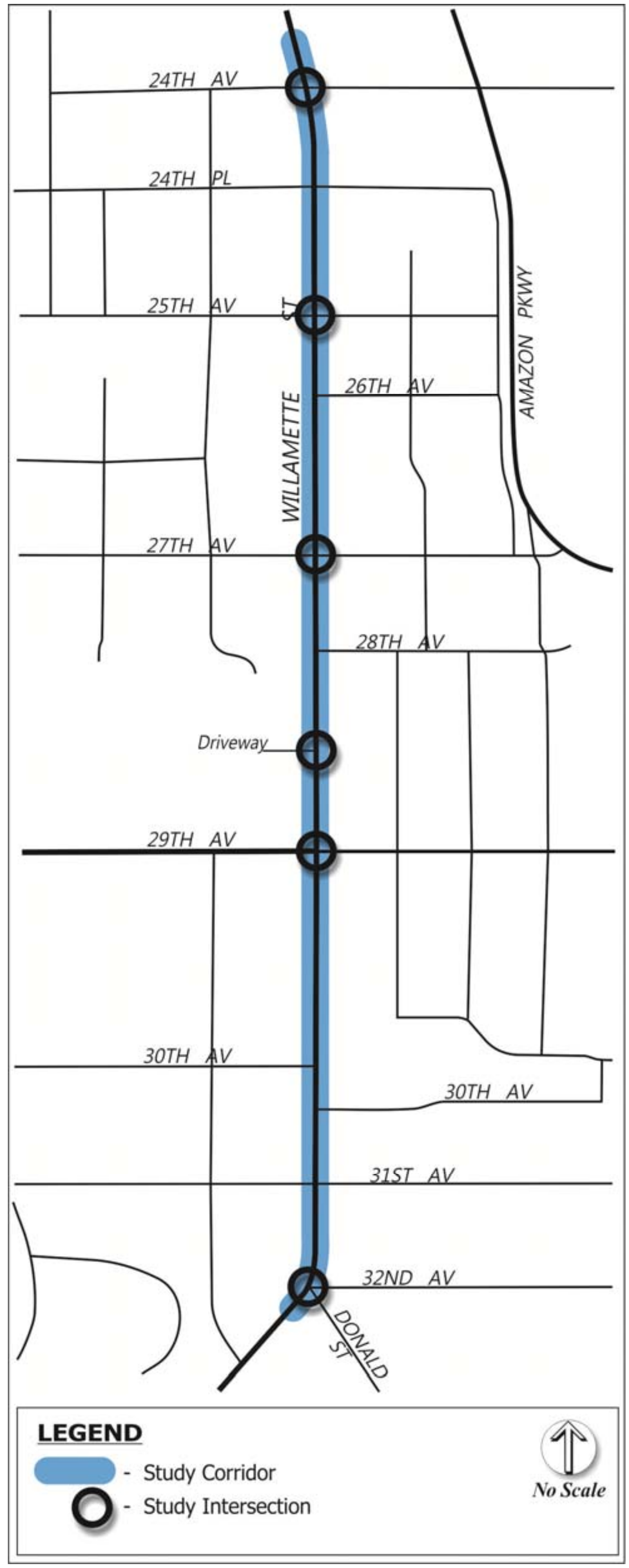


Figure 1: Study Corridor

South Willamette Area Draft Concept Plan

The South Willamette Draft Concept Plan ("Draft Concept Plan") provides high-level guidance and vision on how development in the area should progress. The Draft Concept Plan concentrates on residential and shopping areas surrounding Willamette Street between 24th Avenue and 32nd Avenue, from Portland Street to the west to Amazon Parkway to the east. The Draft Concept Plan is focused on promoting business success in an urban district while supporting walking, biking, and driving.

A key concept identified in the Draft Concept Plan is developing the "Heart of the Walkable Business District," which is characterized by a "Safe, Attractive Pedestrian Experience for Business, Shopping and Entertainment." The portion of Willamette Street extending from 24th Place to 27th Avenue is identified as part of this district along with other nearby roadways.

The Draft Concept Plan identifies the potential for a pedestrian walkway across Willamette Street located between 27th Avenue and 29th Avenue. It also identifies gateways into the district located at the Willamette Street intersections at 23rd Avenue and 31st Avenue. The Draft Concept Plan also recommends the establishment of shared parking facilities to support the commercial district.

Eugene Arterial and Collector Street Plan (ACSP)

The Eugene ACSP was adopted as findings in support of the ordinance adopting the 1999 Street Classification Map and 1999 Street Right-of-Way Map (Ordinance No. 20181). Included in the Eugene ACSP, and adopted separately in 1999 by Resolution No. 4608, are the Design Standards and Guidelines for Eugene Street, Sidewalks, Bikeways and Accessways. The ACSP includes priorities to help guide decision making related to street improvements. Table 1 provides a summary of the priorities for improvement or regulation relevant to Willamette Street (minor arterial).

Table 1: Priority of Improvement or Regulation for Minor Arterials

Improvement Type	Priority
Regulate Access	High
Traffic Calming	Medium
Adding Sidewalks	High
Adding Bike Lanes	High
Upgrade Urban Standards	High
Major Corridor Improvements	Medium
New Street Mileage	Low

As shown, the highest priorities are identified to be regulating access, adding sidewalks and bike lanes, and upgrading urban standards. Regarding access management, the ACSP goes on to say "attempts should be made, wherever possible, to consolidate multiple driveways on arterial streets into a single access point." The City has also adopted access management standards within the Eugene Code (EC 7.408) that are intended to:

- Balance the need for a safe and efficient roadway system against the need to provide ingress and egress to developed land adjacent to the street.
- Reduce conflict points in the transportation system by managing the number, spacing, location and design of access connections.
- Preserve intersection influence areas to allow drivers to focus on operational tasks, weaving, speed changes, traffic signals, etc.
- Reduce interference with through movement, caused by slower vehicles exiting, entering or turning across the roadway, by providing turning lanes or tapers and restricting certain movements.

The Eugene Code also provides direction on access spacing standards that are dependent upon the roadway classification and influence to adjacent intersections.

The November 1999 Street Classification Map designates Willamette Street as a minor arterial. The Design Standards and Guidelines for Eugene Streets, Sidewalks, Bikeways and Accessways identify the following standards that apply to newly constructed minor arterials and major reconstruction or widening of existing arterials :

- Right-of-way (ROW) widths from 65’ to 100’
- Minimum 11’ travel lanes
- Continuous sidewalks on both sides of street and set back from curb.
- Minimum sidewalk widths of 10’ for curbside sidewalks, and 5’ for setback sidewalks
- Bicycle lanes should be striped 6’ (standard) or 5’ (in constrained situations) and free from drainage grates and utility covers

TransPlan: The Eugene-Springfield Transportation System Plan

TransPlan, the Eugene-Springfield Transportation System Plan,(2) specifies a minimum performance of Level of Service (LOS) “D” for signalized intersections in this area. TransPlan also identifies a project on Willamette Street to stripe bike lanes (Project 296).

Draft Eugene Pedestrian and Bicycle Master Plan

The Draft Eugene Pedestrian and Bicycle Master Plan identifies existing conditions and needed improvements to bicycle and pedestrian facilities.

The desired improvement along the Willamette Street corridor is to provide wider sidewalks and 6’ bike lanes (5’ minimum), resulting in standard width pedestrian/bicycle facilities. However, this would require significant road widening, potential impacts to properties and structures, and high potential cost.

The recommended reconfiguration to meet design standards between 24th and 32nd Avenues was:

- From 32nd Avenue to approaching the 29th Avenue intersection the width would be 65’ including three 11’ lanes (1 northbound, 2 southbound), two 6’ bike lanes, and 10’ sidewalks on each side.
- Approaching 29th Avenue from the south and leaving 29th Avenue north the roadway would be 87’ including five 11’ lanes (1 Center left-turn lane each direction), 6’ bike lanes, and 10’ sidewalks.
- Leaving 29th Avenue to 24th Avenue the width would be 76’ including four 11’ lanes, 6’ bike lanes, and 10’ sidewalks.

Walkable Community Workshops

In 2004, a series of interactive workshops were held with community members to identify and propose solutions to concerns about walkability.(4) One workshop focused on Willamette Street between 24th Avenue and 29th Avenue and the surrounding neighborhood. Four small groups discussed potential solutions after walking around the area. Many ideas were documented and a few identified by multiple groups are summarized here:

- Convert Willamette Street from its existing four-lane configuration to a three-lane configuration with a Center left-turn lane, bike lanes, and pedestrian refuge medians.
- Create bus pullouts at all stops to prevent buses from blocking traffic.
- Reduce the number of curb cuts and driveways wherever possible.
- Make pedestrian crossing of Willamette Street easier with refuge medians.
- Add landscaped medians for improved aesthetics.
- Move utilities underground or to alleyways for improved aesthetics and pedestrian circulation.

The summary report contains many additional ideas generated by the small groups. It also identified improved access management and a comprehensive look at traffic circulation in a broader area around

Willamette Street as necessary steps to be taken before enhancements can be implemented.

Willamette Street Traffic Analysis

A traffic analysis[(5)] was conducted in 2001 to evaluate alternative designs for the section of Willamette Street between 24th and 29th Avenues. It was directed at improving pedestrian access while maintaining traffic capacity and safety.

The recommended alternative involved re-striping Willamette Street to a three-lane section with a center left-turn lane, bicycle lanes, and pedestrian refuges at strategic points. The analysis also evaluated a variable three/four-lane section with pedestrian refuges, as well as traffic signal options (full signal vs. mid-block pedestrian signal) at the Willamette Street/25th Avenue intersection. A full traffic signal was added at the 25th Avenue intersection as a result of the analysis.

Public Process

The South Willamette Street Improvement Plan was a collaborative process among various public agencies, key stakeholders and the community. A broad level of public involvement was vital to the Plan development. Public input was received through letters, phone calls, emails, and in-person at stakeholder outreach meetings and focus groups. The Plan's public involvement guiding principles and goals are summarized in the call-out box at right.

Throughout this project, the project team took time to understand multiple points of view, obtain fresh ideas and resource materials, and encourage participation from the community. Project staff conversed informally with members of the community, conducted individual interviews, and hosted small focus group meetings with key stakeholders representing business and property owners, local residents, and corridor users for all modes. Regular meetings were held with decision makers including the City of Eugene Planning Commission and work sessions with the Eugene City Council.

At key stages, project staff also held three public workshops (or community forums) that gave residents an opportunity to learn about the study and contribute their concerns on how Willamette Street might be improved. The three community forums included the following:

- #1 Community Forum: Explore the Alternatives (November 2012)
- #2 Community Forum: Evaluate the Alternatives (February 2013)
- #3 Community Forum: Refine the Preferred Alternative (June 2013)

Public Involvement Guiding Principles and Goals

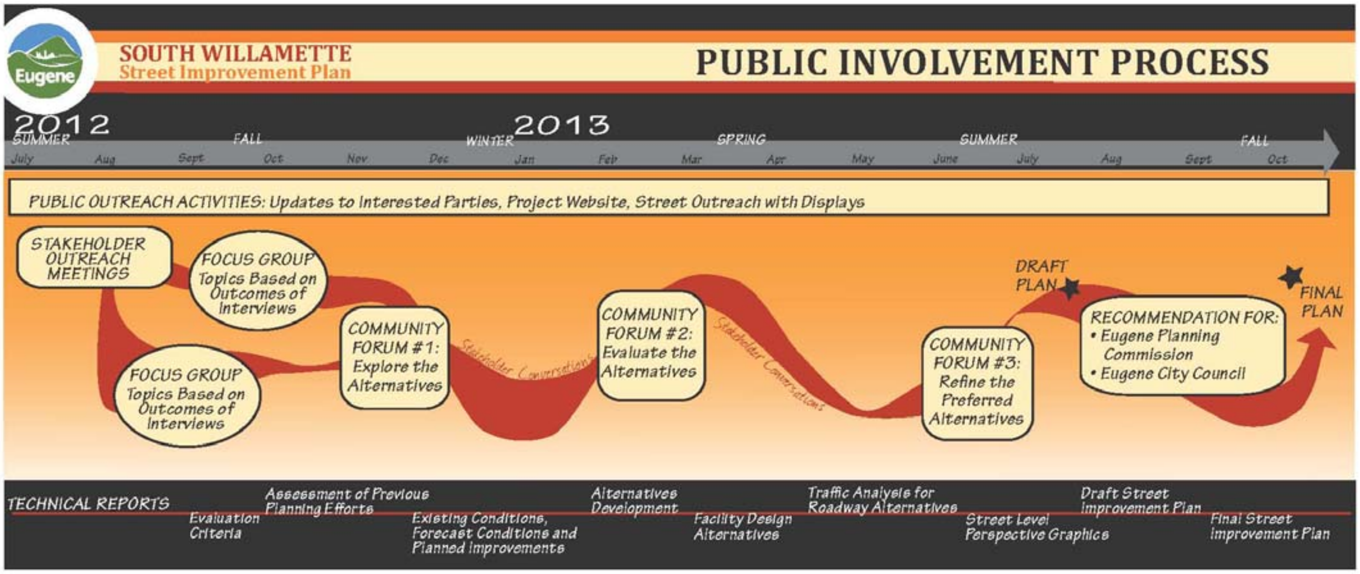
The South Willamette Street Improvement Plan included significant public involvement based on the following guiding principles and goals:

Guiding Principles

- Respect the intelligence of the public
- Seek out and facilitate the involvement of those potentially affected
- Identify issues and concerns early and throughout the process
- Widely disseminate complete information in a timely manner
- Include the public's contribution in decisions
- Report how input was considered & reasons for decisions in each phase
- Encourage open and honest communication

Public Involvement Goals

- Broad participation
- Timely, authentic & useful public input
- Thoughtful responses to individual comments, concerns, questions
- Public information on city policies, such as the 20-minute neighborhood



Additional details related to the community forums are provided in call-out boxes on pages 18, 32, and 67-69 to provide context for the decisions made throughout the alternatives screening process.

Community interest in the project was very high. The interested parties list exceeded 1,000. Total attendance at the public meetings exceeded 1,000. Over 600 surveys were completed and over 300 public comment emails were submitted to the city.

Evaluation Criteria

A variety of evaluation criteria were established to assess the potential of alternatives to best meet the transportation needs of the users of Willamette Street. The Eugene City Manager has endorsed a triple-bottom -line approach to sustainability and analysis for City projects and programs providing for consideration of people, the planet, and prosperity (or equity, environment, and economy).

In planning for the development of the Draft Eugene Transportation System Plan (Draft TSP), the Transportation Community Resource Group (TCRG) extensively vetted a sustainability rating system based on a triple-bottom-line analysis. The South Willamette Street Improvement Plan adapted the TCRG sustainability work to develop the Tier 1 screening criteria for qualitative assessment of roadway alternatives.

The TCRG work has been incorporated into Draft TSP goals, which provide broad statements that describe the desires of the Eugene community. The Draft TSP Goals, Objectives and Policies identify a list of objectives which are divided into eight goal categories:

- Access and Mobility (for all modes)
- Safety and Health
- Social Equity
- Economic Benefit
- Cost Effectiveness
- Climate and Energy
- Ecological Function
- Community Context

Under these eight goal categories, 23 individual evaluation criteria were developed for the South Willamette Street Improvement Plan. The criteria reflect community values adapted from a sustainability process vetted by the TCRG, with refinements made based on a review of planning documents more specific to the project area, including the South Willamette Draft Concept Plan. The evaluation criteria are detailed in Technical Memorandum #1 (South Willamette Street Improvement Plan – Evaluation Criteria).

South Willamette Street is a multimodal corridor with a mixture of facilities to serve automobile, bicycle, pedestrian, transit, and freight users. The challenge of providing mobility and accessibility to all users is managing the various conflicts that arise, such as bikes and automobiles at driveways (foreground) and turning trucks blocking travel lanes (background).

Existing conditions were evaluated for South Willamette Street. This section documents the existing transportation facilities, adjacent land uses, and corridor travel conditions.

Existing Transportation Facilities

Key characteristics of the corridor's transportation facilities are documented for the roadway network, bicycle and pedestrian facilities, and transit facilities.

Roadway Network

The transportation characteristics of Willamette Street north and south of 29th Avenue are summarized in Table 2 and include approximate street width, number of travel lanes, posted speeds, and the presence of sidewalks and/or bike lanes. The classification of Willamette Street (Minor Arterial) specifies the purpose of the roadway and defines the applicable cross-section and access spacing standards.

At the north end of the study corridor, 24th Avenue provides an important connection to the east and provides a high number of vehicle connections to and from Willamette Street. Near the center of the study area, 29th Avenue is a minor arterial that carries approximately 12,000 to 15,700 vehicles [6] per day. The remaining cross streets primarily provide local access to businesses and residential areas.

The roadway configuration for Willamette Street within the study area can be separated into three segments. From 24th Avenue to near 29th Avenue, Willamette Street has a 60 foot right-of-way consisting of four travel lanes and no dedicated

Table 2: Roadway Characteristics

Roadway	Street Width	Travel Lanes	Posted Speed	Sidewalks	Bike Lanes
Willamette St (North of 29th Ave)	42 feet	4 lanes (2 SB, 2 NB)	25 mph	Yes	No
Willamette St (South of 29th Ave)	41 feet	3 lanes (2 SB, 1 NB)	25 mph	Yes	Yes

Figure 2a: 4-Lane Cross Section (North of 29th Avenue)

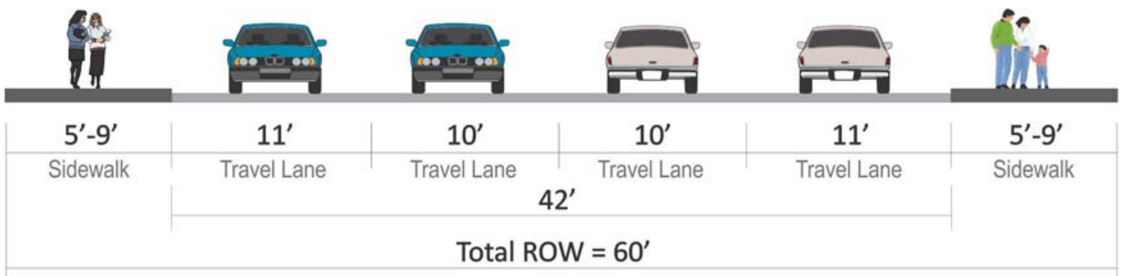


Figure 2b: 5-Lane Cross Section (at 29th Avenue)

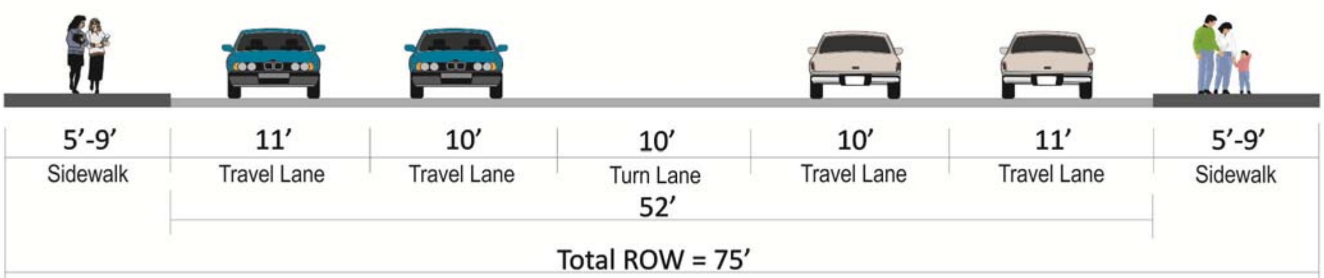
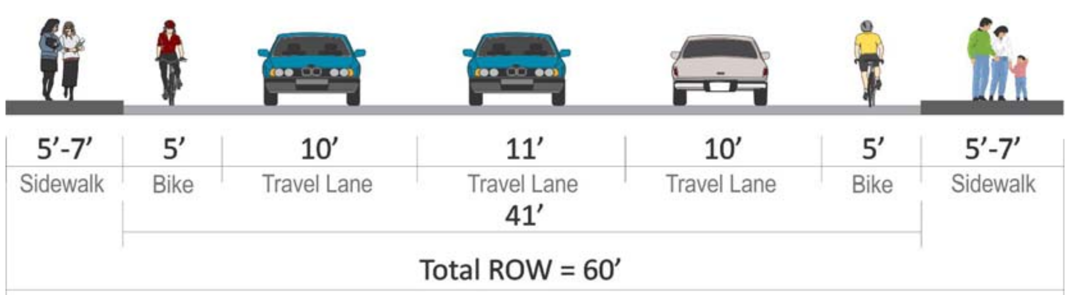


Figure 2c: 3-Lane Cross Section (South of 29th Avenue)



bike lanes (shown in Figure 2a). There is a short segment near 29th Avenue where a "transition zone" exists, with the right-of-way widening to 75 feet. This segment has five travel lanes to accommodate left-turn lanes at the 29th Avenue intersection, and no dedicated bike lanes (shown in Figure 2b).

Roughly 500 feet south of 29th Avenue, the right-of-way returns to approximately 60 feet, with three travel lanes (two southbound and one northbound) and bike lanes available in both directions south of 29th Place. Figures 2a, 2b, and 2c illustrate the existing cross-sections for the three segments of Willamette Street.

Bicycle and Pedestrian Facilities

Sidewalks are present on both sides of Willamette Street for the full length of the study corridor varying in width from approximately 5 feet to 9 feet. Most of the study area has curbside sidewalks with the exception of small sections of landscaping near the north and south limits of the study area. Utility poles and other objects create obstacles and impact accessibility. There are marked pedestrian crossings at the five signalized intersections. No other marked crosswalks currently exist within the study area.

Bike lanes exist from approximately 250' south of 29th Avenue and continue south through 32nd Avenue. There are currently no bicycle facilities to the north of 29th Avenue. Bike lanes are present on the cross streets of 24th Avenue and 29th Avenue; however the lack of bike lanes on Willamette Street hinders connectivity to these facilities. Portland Street (one block to the west) and Oak Street (one block to the east) provide potential alternate bike routes to Willamette Street but these roadways include connectivity gaps in the network.

Obstacles on the sidewalk—such as utility poles, fire hydrants, and driveway slopes—impact the accessibility and travel experience for pedestrians and bicyclists.

Figure 3: Existing Bicycle Facilities

Figure 4: Existing Pedestrian Facilities

Figure 3 shows the location of existing bike lanes, while Figure 4 shows existing sidewalks. Both figures show paths, which can be used by both bicyclists and pedestrians.

Driveways and Access Points

There are over 70 driveways on the 0.8 mile corridor of Willamette Street. The Arterial and Collector Street Plan (ACSP) indicates that for a typical minor arterial, emphasis should be given to mobility rather than accessibility and that access regulation is of high priority for roadways with this classification. However, the commercial nature of Willamette Street encourages a balanced approach to maintaining access and supporting mobility.

Transit Facilities

Lane Transit District (LTD) provides public transit service to the Eugene-Springfield areas. The following two routes provide service to the study area.

- Route 24 (Donald) – Route 24 runs both directions over the length of the study corridor. On weekdays, it operates from roughly 6:15 am to 11:00 pm with 30-minute headways (2 buses per hour). After 7:00 pm, it operates with one-hour headways. On Saturdays, this route operates very similar to weekdays, and on Sundays it operates on one-hour headways from 8:00 am to 8:00 pm.
- Route 73 (UO/Willamette) – Route 73 runs both directions on Willamette Street from 29th Avenue to 40th Avenue. At 29th Avenue, the route heads east to Hilyard Street. On weekdays, this route operates from about 7:00 am to 7:00 pm with headways ranging from 20 minutes to two hours, and there is no service on weekends.

Bus shelters at key transit stops along the South Willamette Street corridor provide a more comfortable waiting experience for riders.

Figure 5 shows the locations of marked bus stops located within the study area as well as the available transit routes through the study corridor.

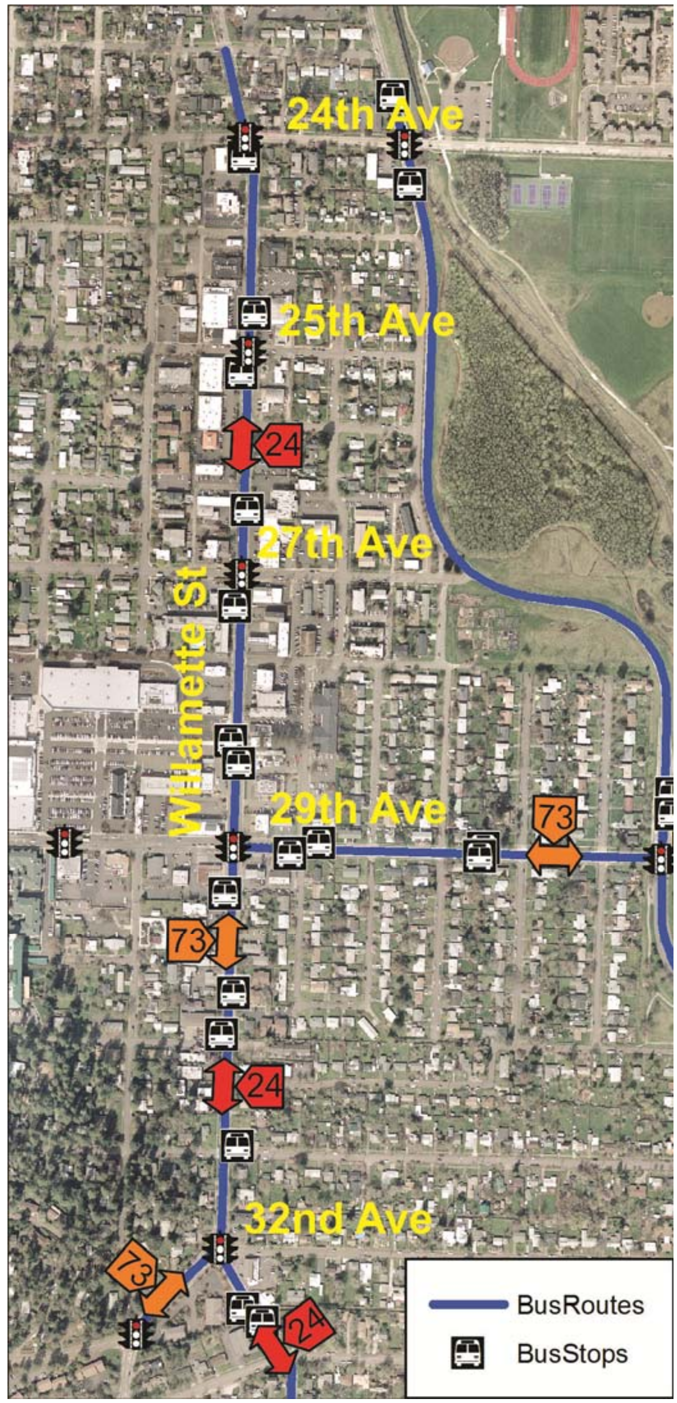


Figure 5: Transit Stops and Routes

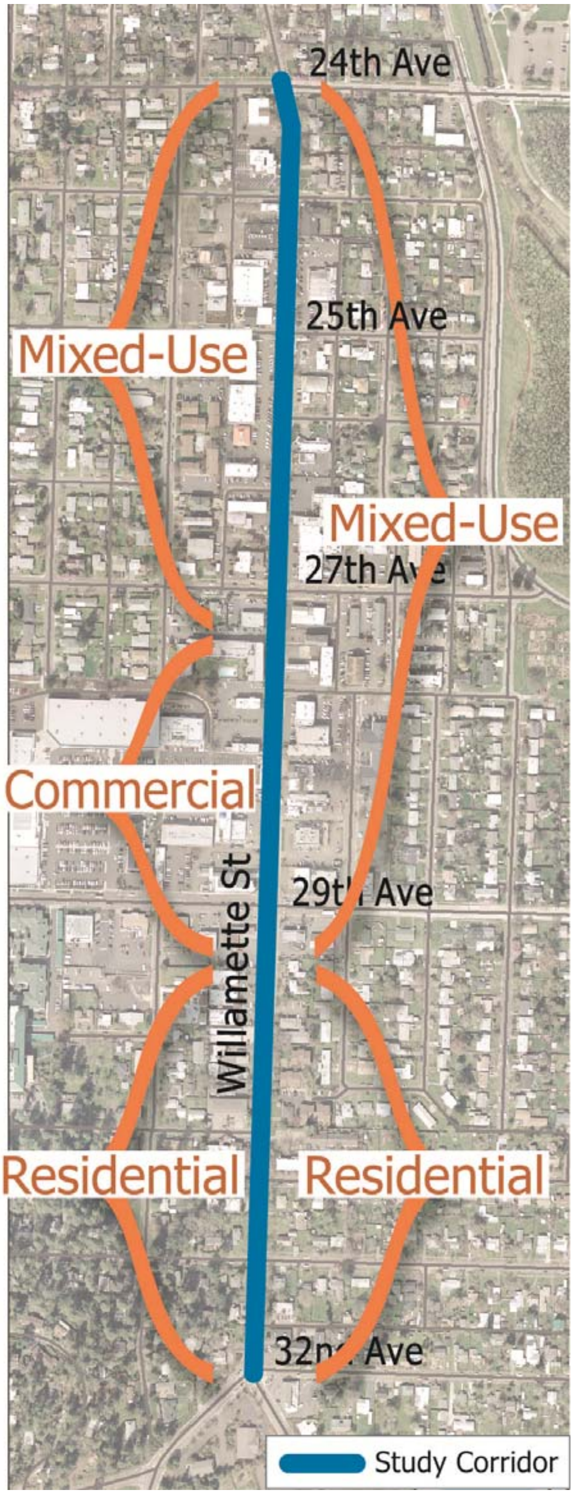


Figure 6: Adjacent Land Use

ADJACENT LAND USES

Figure 6 identifies the land uses adjacent to the study corridor. From 24th Avenue to 29th Avenue, the adjacent land use is a combination of a few single family homes, apartment buildings, and retail stores. Woodfield Station is located between 28th Avenue and 29th Avenue on the west side of Willamette Street. Adjacent land use south of 29th Avenue consists mostly of apartment buildings and single family residential units.

TRAVEL CONDITIONS

Existing travel conditions were also evaluated for the South Willamette Street corridor. A wide variety of information and measures are presented including traveler characteristics, traffic patterns (i.e., volume, speed, and classification), travel times, intersection operations, multimodal operations (i.e., for active modes and transit), and collision history.

Traveler Characteristics

Data collected on Willamette Street between 24th Avenue and 32nd Avenue[7] indicate that the majority of traffic on Willamette Street has a local origin or destination. As shown in Figure 7, approximately 63% of trips either begin, end, or stop on Willamette Street or use local streets for access. Approximately one quarter (24%) of Willamette Street traffic is traveling through from one end of the corridor to the other (between 24th Avenue and 32nd Avenue) without stopping or turning onto another street. Another 13% are traveling through the corridor using 29th Avenue to connect to or from Willamette Street, without making a local stop.

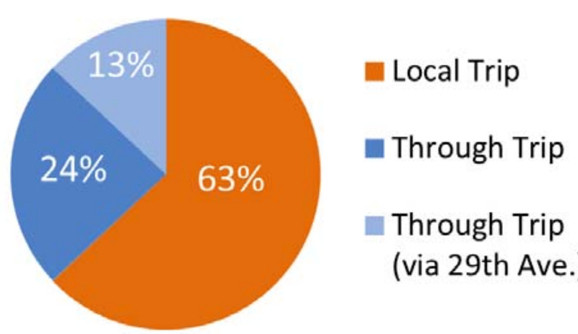


Figure 7: Traveler Characteristics on Willamette Street (24th Ave to 32nd Ave)

Traffic Patterns (Volumes, Speed, and Classification)

Table 3 presents traffic data collected south of the Willamette Street/27th Avenue intersection[8] including volume, speed, and heavy vehicle percentages[9]. As shown, the daily traffic volume is approximately 16,400 along the study corridor. The 85th percentile speeds (meaning 85% of vehicles travel at this speed or slower) along Willamette Street are approximately 5 mph higher than the posted speed of 25 mph and the heavy vehicle percentages are around 2%.

To further understand the use of this roadway over the course of a 24-hour period, Figure 8 shows vehicle movements throughout the day. This graph shows that the highest northbound traffic volume occurs during the lunch hour and the highest southbound volumes occur during the p.m. peak hours. The northbound direction is used more heavily during the a.m. hours and the southbound direction tends to have higher volumes during the p.m. hours. This directional traffic pattern is typical for commuting trips, with the a.m. flow towards the downtown business district and the p.m. traffic moving away from the downtown core.

Table 3: Willamette Street ADT, Speed, and Classification

Characteristic	Northbound	Southbound	Total
Average Daily Traffic	7,610 (47%)	8,750 (53%)	16,360
85th Percentile Speed	31.7 mph	29.8 mph	30.7 mph
Heavy Vehicle Percentage	2%	2%	2%

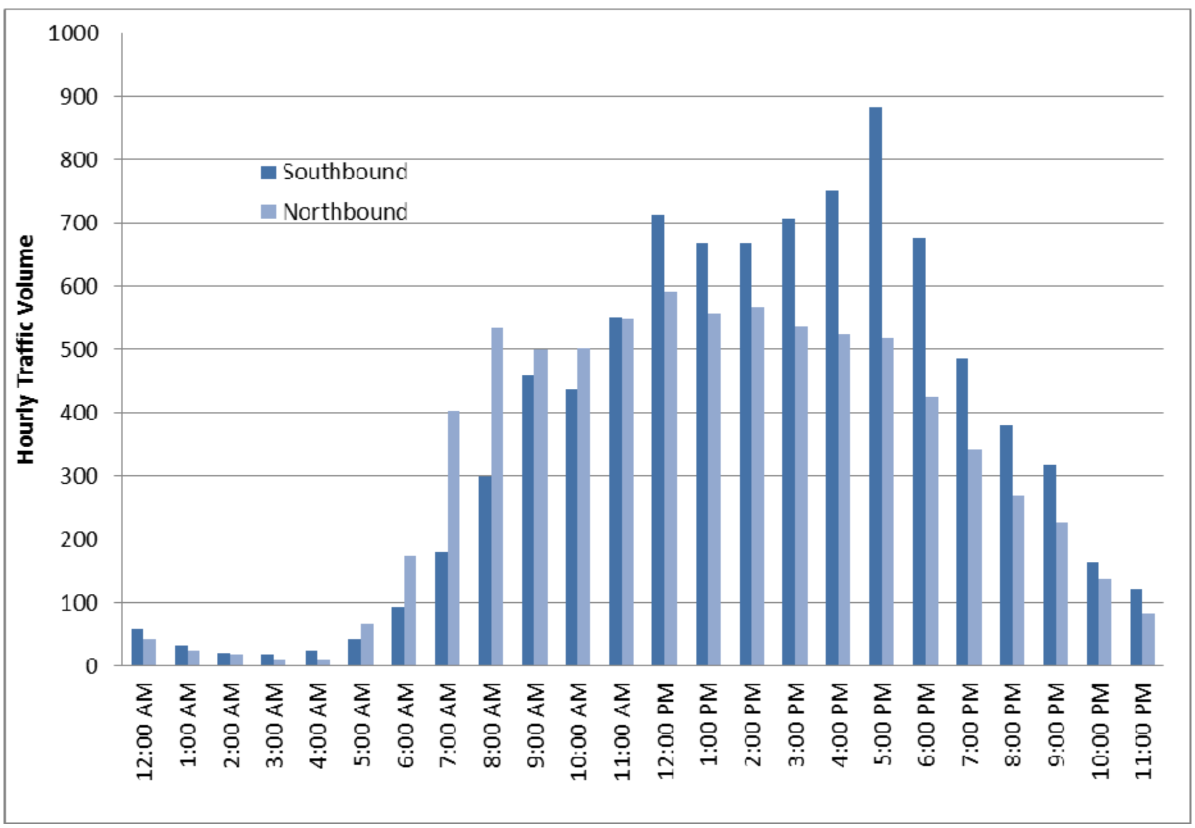


Figure 8: 24-Hour Bi-Directional Volume (Willamette Street south of 27th Avenue)

Travel Times

Data collected on Willamette Street between 24th Avenue and 32nd Avenue[10] indicates that travel times vary by time of day. The length of time needed to travel from one end of the study corridor to the other depends on the traffic volume and resulting delay that may occur. The study corridor is approximately three quarter miles in length.

Figure 9 shows the average travel times collected for all hours of the day compared to the p.m. peak hour, by direction. It takes approximately two and a half minutes (150 seconds) to travel through the corridor, on average over all hours of the day. The travel time is approximately equivalent for southbound and northbound travel. However, during the p.m. peak hour, when traffic volumes are highest, the travel time increases by approximately 20 seconds in the northbound direction and 40 seconds in the southbound direction.

Intersection Operations

The City of Eugene specifies a minimum performance of level of service (LOS) "D" at signalized and unsignalized intersections. Exceptions exists to the City's mobility standard within the Central Area Transportation Study Area (primarily downtown and near the University of Oregon), where the City allows LOS "E" for signalized intersection operations and within the Eugene Downtown Traffic Impact Analysis Exempt Area, where the City allows LOS "F". However, these do not apply to the study corridor.

The existing traffic operations at the study intersections were determined for the a.m. and p.m. peak hours based on turn movement volumes collected during the a.m. (7:00 a.m. to 10:00 a.m.) and the p.m. (4:00 p.m. to 7:00 p.m.) peak periods.[11] All of the study intersections currently meet operating standards. The Willamette Street/29th Avenue intersection experiences the greatest delay. The estimated average delay, level of service (LOS), and volume to capacity (v/c) ratio of each study intersection were determined, as shown in Table 4. Traffic volumes and operations analysis are detailed in Technical Memorandum #2. The intersection traffic counts also included bicycle and pedestrian volumes at each intersection.

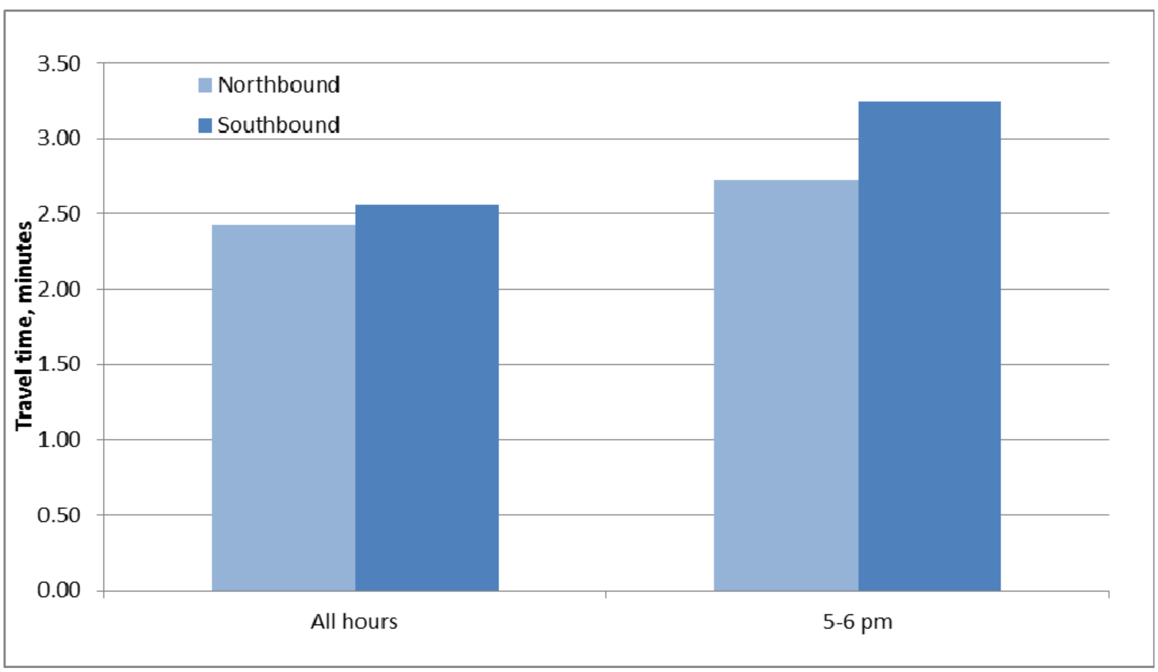


Figure 9: Study Corridor Travel Times

Table 4: Existing Intersection Operations

Intersection	Operating Standard	Existing A.M. Peak Hour			Existing P.M. Peak Hour		
		Delay	*LOS*	*V/C*	*Delay*	*LOS*	*V/C*
Signalized							
Willamette Street/24th Avenue	LOS D	9.5	A	0.52 (0.53)	13.9	B	0.61 (0.74)
Willamette Street/25th Avenue	LOS D	4.0	A	0.34 (0.36)	9.3	A	0.39 (0.49)
Willamette Street/27th Avenue	LOS D	7.7	A	0.34 (0.39)	8.4	A	0.45 (0.46)
Willamette Street/29th Avenue	LOS D	29.9	C	0.82 (0.82)	41.3	D	0.83 (0.85)
Willamette Street/32nd Avenue	LOS D	26.4	C	0.97 (0.97)	10.5	B	0.67 (0.73)
Unsignalized							
Willamette Street/Woodfield Station Driveway	LOS D	0.7	A/B	0.29	3.4	A/C	0.44

Signalized Intersections:
LOS = Level of Service of Intersection
V/C = Volume-to-Capacity Ratio of Intersection (Critical Movement)

Unsignalized Intersections:
LOS = Level of Service of Major Street/Minor Street
V/C = Volume-to-Capacity Ratio of Worst Movement

Field observations were performed during the p.m. peak conditions at the study intersections. Extensive queuing was observed on the southbound approach to the Willamette Street/29th Avenue intersection which resulted in vehicles having to wait more than a full traffic signal cycle to move through the intersection. It was also observed that the northbound left-turn movement experienced long queues that did not clear during each cycle. Traffic volume and congestion levels were observed to vary from day to day.

Multimodal LOS

Auto, pedestrian, bicycle and transit operations along Willamette Street were evaluated using multimodal level of service (MMLOS) methodologies.(12) The MMLOS evaluation assesses how well a facility meets the needs of the traveling community by reporting a LOS grade (A-F) for each mode of transportation. This evaluation is performed for roadway segments and focuses on the users' perceived comfort level as they travel along the corridor.

Using signalized intersections as break points, Willamette Street was divided into four segments for analysis. Analysis was performed based on p.m. peak hour conditions when the higher traffic volumes would result in the worst case level of service for each mode of transportation. The methodology does not account for intersection operations, which were addressed previously.

Pedestrian LOS is influenced by traffic volumes, vehicle speeds, sidewalk width, and presence of a buffer. Bicycle LOS is influenced by bike lane width, pavement quality, on-street parking, and heavy vehicle percentage. Transit LOS is influenced by service frequency, bus reliability, average passenger load, and transit stop amenities.

The limitations of the MMLOS analysis should be noted. For example, the existing bicycle facilities on Willamette Street were evaluated as LOS "D" MMLOS operations, a better than expected rating. Based on stakeholder interviews, most bicycle users are not comfortable biking on Willamette Street without bike lanes. Therefore, it is clear that the comfort level of motorists driving on a roadway with LOS “D” conditions is not a suitable comparison to bicyclists travelling on a facility with LOS “D” conditions. Despite the limitations, the MMLOS evaluation provides value as an objective comparison that considers multiple modes.

The existing MMLOS operations for Willamette Street are shown in Figure 10. The auto, pedestrian, and bicycle LOS range from “B” to “D”. The LOS for transit ranges from “C” to “E” based on the current bus service frequency. One transit route currently serves the Willamette Street segment from 24th Avenue to 29th Avenue which results in LOS “D/E”. Two transit routes serve the corridor from 29th Avenue to 32nd Avenue, which is reflected in the LOS “C” operations for that segment.

Collision Analysis

Collision analysis was performed for the study corridor and study intersections to identify collision trends and potentially hazardous locations in need of safety improvements.[13] As shown in Table 5, the collision rate for Willamette Street was calculated to be 5.2 collisions per million vehicle-miles traveled (VMT), nearly double the statewide average of 2.9

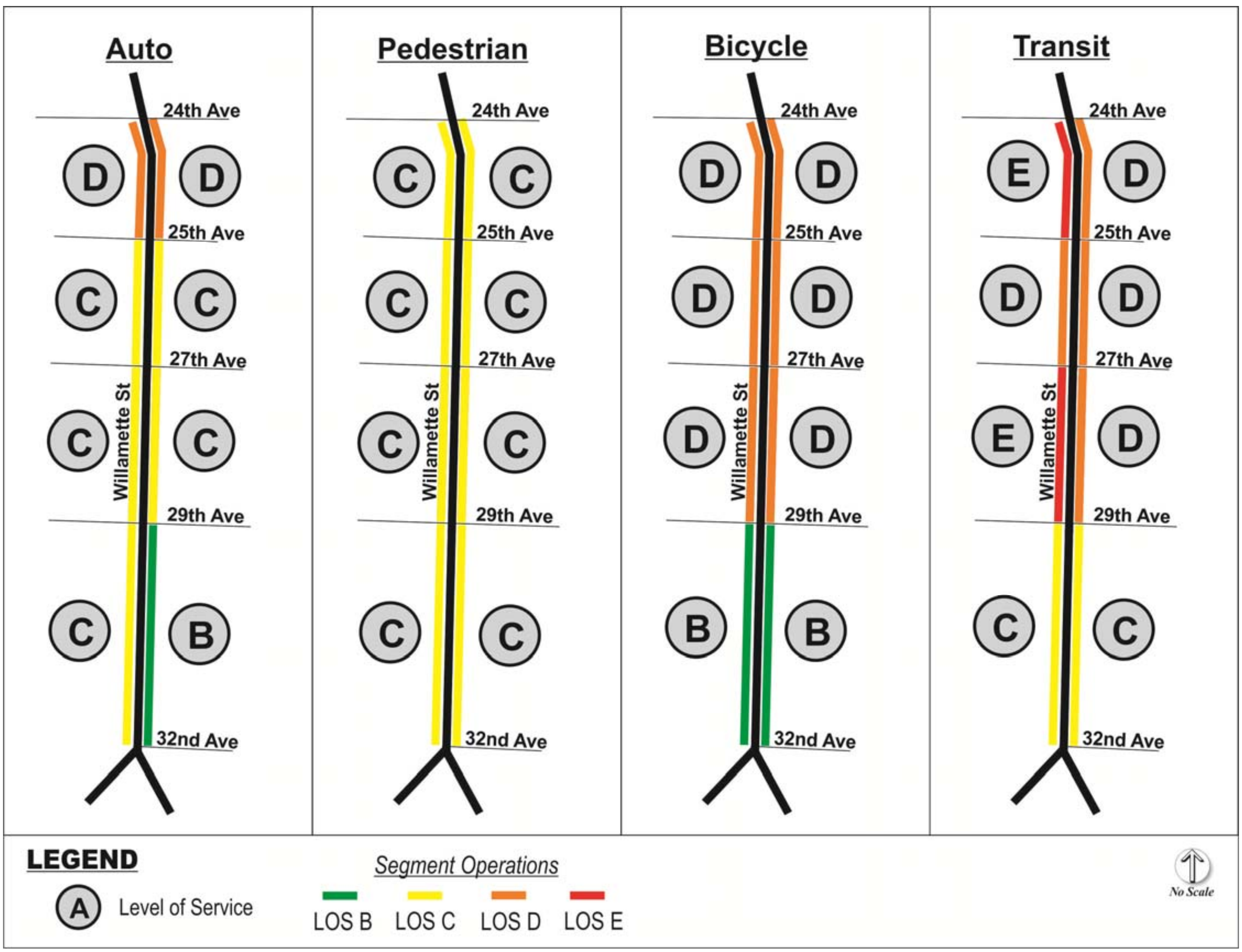


Figure 10: Existing PM Peak Hour Multimodal Level of Service (MMLOS)

Table 5: Segment Collision Summary (2008-2010)

Segment (Distance)	Severity		Type				Total	Collision Rate[b]
	Injury	*PDO[a]*	*Turn*	*Rear-End*	*Angle*	*Other*		
24th Ave thru 27th Ave (0.30 mi.)	14	10	7	10	6	1	24	-
27th Ave thru 29th Ave (0.20 mi.)	15	18	22	8	1	2	33	-
29th Ave thru 32nd Ave (0.28 mi.)	11	6	6	10	0	1	17	-
Entire Study Corridor (0.78 mi.)	**40**	**34**	**35**	**28**	**7**	**4**	**74**	**5.2**
% of Total	**54%**	**46%**	**47%**	**38%**	**10%**	**5%**	**100%**	-

[a] PDO = Property Damage Only
[b] Rate Calculation = Collision per year / (Average Daily Traffic x 365 days / 1 million vehicle-miles traveled)

collisions per million VMT for urban city minor arterial roadways for the same years.(14)

In total, the Willamette Street corridor between 24th Avenue and 32nd Avenue experienced 74 collisions during the three years evaluated (2008-2010). For the years evaluated, there were no collisions resulting in a fatality and roughly half of the collisions on the corridor (54%) resulted in an injury.

Collision analysis was also performed at the individual study intersections to pinpoint high collision locations. The six study intersections had a total of 53 collisions during the three years evaluated. Intersection collisions include those that occur along the intersecting cross street, as well as on Willamette Street, therefore the total number of intersection collisions differs from the total segment collisions.

Table 6 lists the number of collisions at each study intersection and categorizes them by severity, type, and collision rate. The majority of the collisions were related to turning movements, and roughly half of all intersection collisions resulted in an injury.

During the three years evaluated, there were four bicycle collisions and no pedestrian collisions. Three of the collisions involving bicycles were within 200 feet

Table 6: Intersection Collision Summary (2008-2010)

Intersection	Severity		Type				Total	Collision Rate[b]
	Injury	*PDO[a]*	*Turn*	*Rear-End*	*Angle*	*Other*		
Willamette St/24th Ave	2	2	0	1	3	0	4	0.21
Willamette St/25th Ave	5	1	2	3	1	0	6	0.34
Willamette St/27th Ave	5	4	4	2	2	1	9	0.44
Willamette St/ Willamette Plaza Driveway	3	5	8	0	0	0	8	0.45
Willamette St/29th Ave	8	14	12	7	2	1	22	0.76
Willamette St/32nd Ave	3	1	2	2	0	0	4	0.23
Total	**26**	**27**	**28**	**15**	**8**	**2**	**53**	-
% of Total	**49%**	**51%**	**53%**	**28%**	**15%**	**4%**	**100%**	-

[a] PDO = Property Damage Only
[b] Collisions per 1 million entering vehicles

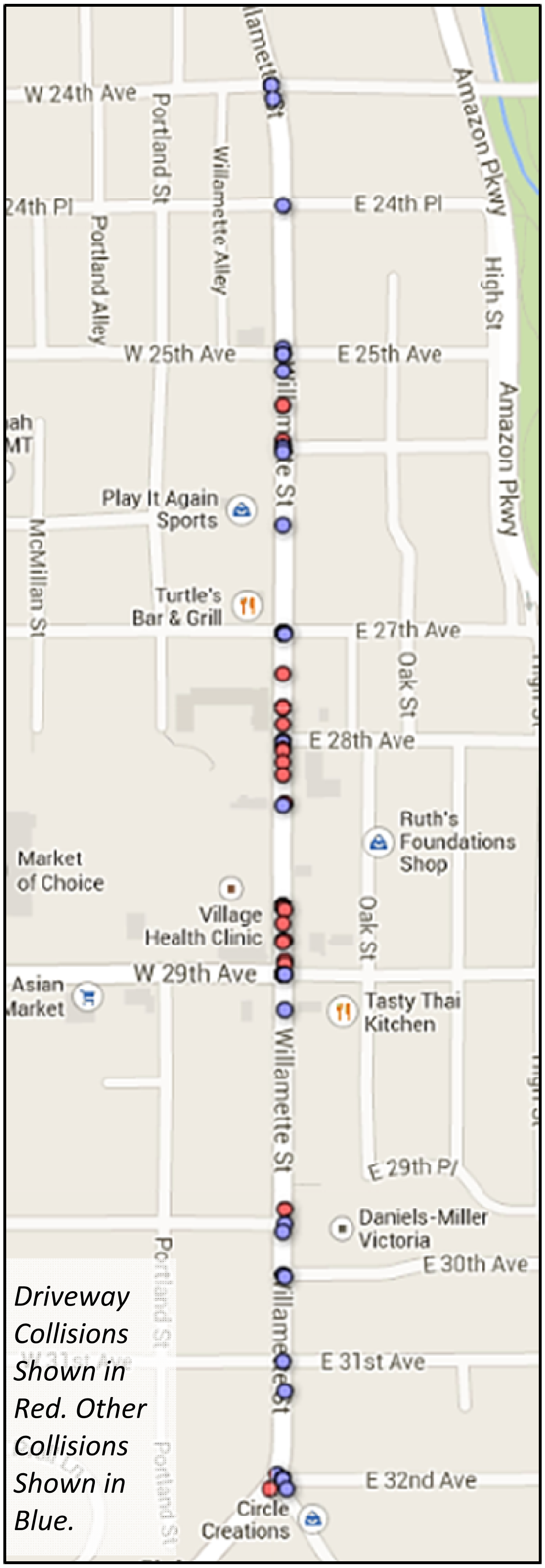


Figure 11: Willamette Street Collisions

of the Willamette Street/29th Avenue intersection and the fourth was at the intersection of 27th Avenue. Two of the bicycle collisions were related to vehicles making turning movements into and out of driveways.

In addition, of the 74 reported collisions, 26 (35%) were related to movements into or out of an alley or driveway. As shown in Figure 11, a majority of the driveway-related collisions were concentrated between 27th Avenue and 29th Avenue (collisions related to driveways are shown in red). When considering time of day, the number of collisions increased around the lunch hour and remained high until 6:00 pm.

Community Forum #1 – Explore the Alternatives

Community Forum 1 was held in November of 2012. The meeting introduced the project to the broader community and explained the process toward development of a preferred alternative design.

This forum was designed to solicit community input on key issues and priorities for travel on Willamette Street, as well as generate ideas for potential improvements.

Participants overwhelmingly agreed that Willamette Street is a stressful experience for all modes of travel. Adding bike lanes, improving pedestrian crossings, and enhancing sidewalks were key priorities for participants.

When participants were asked a specific question about improving bicycle facilities, bike lanes on Willamette Street was the preferred option of the majority. However, participants also questioned the impacts of reducing travel lanes in order to add bike lanes. Individuals who use the corridor to commute to work and school expressed a clear desire for the street to continue to move automobile traffic efficiently.

Merchants located on Willamette Street stressed that they need current traffic volumes to maintain their businesses. Additionally, there was near unanimous support for undergrounding utilities, careful landscaping to beautify and to improve stormwater problems, and consolidating some of the corridor's more than seventy driveways. The idea of slowing car traffic to the speed limit was acceptable to almost all attendees.

3. Alternative Concepts

Multiple improvement alternatives were considered for the South Willamette Street corridor. Conceptual graphics, such as this one, were prepared to help visualize the improvements.

Six alternative cross-section concepts were proposed for consideration for the South Willamette Street Improvement Plan. The six proposed alternatives are illustrated via conceptual cross-sections and overhead plan views (Figures 12 through 17). The following section identifies each of the proposed cross-section alternatives along with alternative-specific considerations for key elements of the facility design.

The proposed alternatives were focused on developing a design for short term improvements, while also supporting a long-term corridor vision. To facilitate development of a design plan that can be adopted and implemented in the short-term, an effort was made to minimize the costs related to right-of-way acquisition and curb reconstruction. Each of the conceptual cross-sections maintains existing right-of-way and only two of the six cross-sections would require curbs to be relocated for the majority of the corridor.

Although different segments of Willamette Street vary in existing design and surrounding land use characteristics, the alternative cross-section concepts attempt to create a foundation for a continuous and cohesive corridor while balancing needs and broad objectives. Differences may exist in roadway configurations for different segments but the design for the preferred alternative will be refined to be as consistent as possible while taking into consideration multimodal needs across the corridor.

Alternative 1: 4-Lane

Alternative 1 maintains the existing (curb-to-curb) roadway configuration north of 29th Avenue (see Figure 12). Sidewalks would be expanded to their maximum width (approximately nine feet) within the existing right-of-way. The cross-section illustration is not being considered south of 29th Avenue because it does not include any dedicated bicycle facilities and no parallel facilities are available near Willamette Street, south of 30th Avenue.

Alternative 1 Considerations	
Motor Vehicle Mobility	• Maintains existing four travel lanes • Left-turning vehicles block travel lanes
Walkability	• Consistent nine-foot sidewalks • Sidewalks narrower than ten-foot standard width (A) • Sidewalk width is not sufficient to support active commercial streetscape (B)
Bicycle Facilities	• No on-street bike lanes • Improved bike access would occur via parallel route improvements and crossing enhancements (see Figure 23) • Bike sharrows possible on curbside lanes
Transit Service	• Maintains eleven-foot outside travel lane for buses
Cost	• Relatively low cost to maintain current cross-section

(A) Minimum width defined for curbside sidewalks in pedestrian-oriented commercial areas. *Design Standards and Guidelines for Eugene Streets, Sidewalks, Bikeways and Accessways*, City of Eugene, November 1999

(B) A concept for the "Heart of the Walkable Business District" characterized by a "Safe, Attractive Pedestrian Experience for Business, Shopping and Entertainment" was identified in the *South Willamette Area Draft Concept Plan*, City of Eugene, October 2012.

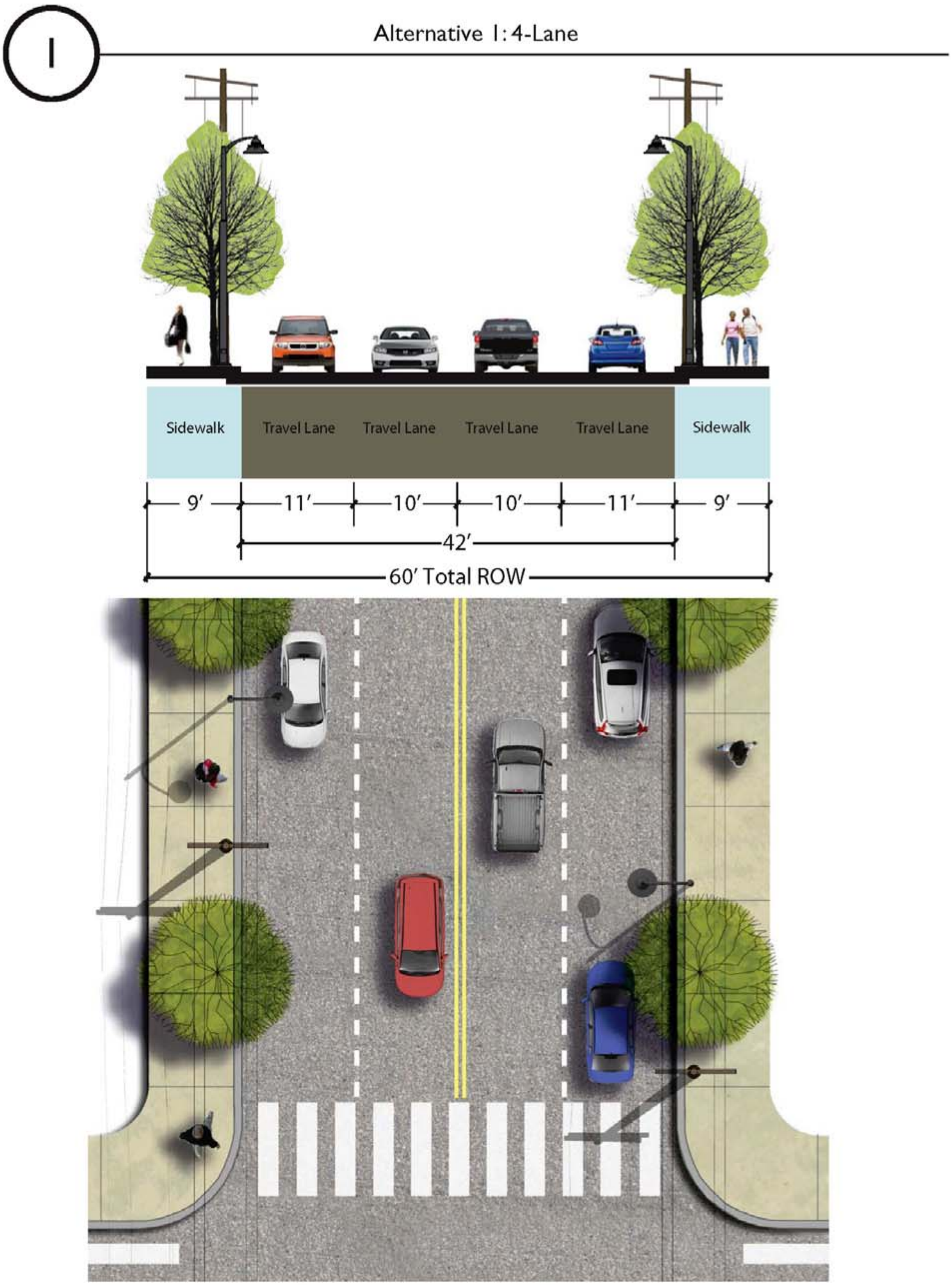


Figure 12: Alternative 1 Concept

Alternative 2: 4-Lane with Center Left-turn Lane

Alternative 2 maintains four travel lanes north of 29th Avenue, with one of the existing northbound lanes converted to a two-way center left-turn lane (see Figure 13). The roadway would include two southbound through lanes, one northbound through lane, and a two-way center left-turn lane.

Sidewalks would be expanded to their maximum width (approximately nine feet) within the existing right-of-way. The cross-section illustration is not being considered south of 29th Avenue because it does not include any dedicated bicycle facilities and no parallel facilities are available near Willamette Street, south of 30th Avenue.

Alternative 2 Considerations	
Motor Vehicle Mobility	• Four total travel lanes maintained (2 Southbound, 1 Northbound, and 1 Center left-turn lane) • Provides center left-turn lane • Southbound capacity increased • Northbound capacity reduced • Northbound buses stopped in a single through lane will have impact on northbound travel
Walkability	• Consistent nine-foot sidewalks • Sidewalks narrower than ten-foot standard width (A) • Sidewalk width is not sufficient to support active commercial streetscape (B)
Bicycle Facilities	• No on-street bike lanes • Improved bike access would occur via parallel route improvements and crossing enhancements (see Figure 23) • Bike sharrows possible on curbside lanes
Transit Service	• Maintains eleven-foot outside travel lane for buses
Business Accessibility	• Improves motor vehicle access during PM period, when commercial traffic is highest • Center left-turn lane improves access for turning vehicles • Does not significantly change accessibility for transit and bicycle modes
Cost	• Relatively low cost to convert lane direction north of 29th Avenue • Intersections and traffic signals would need to be reconfigured north of 29th Avenue

(A) Minimum width defined for curbside sidewalks in pedestrian-oriented commercial areas. *Design Standards and Guidelines for Eugene Streets, Sidewalks, Bikeways and Accessways*, City of Eugene, November 1999.

(B) A concept for the “Heart of the Walkable Business District” characterized by a “Safe, Attractive Pedestrian Experience for Business, Shopping and Entertainment” was identified in the *South Willamette Area Draft Concept Plan*, City of Eugene, October 2012.

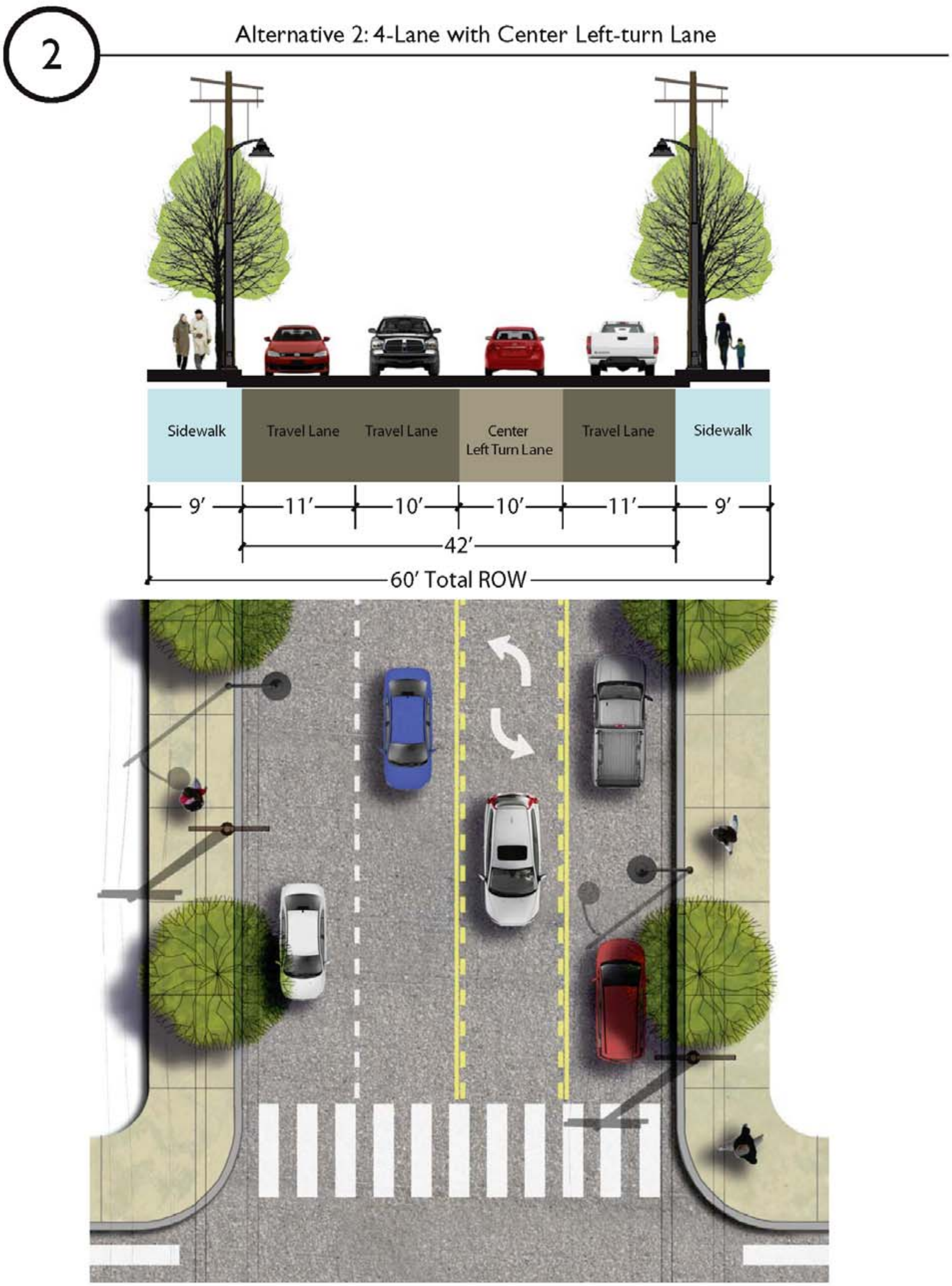


Figure 13: Alternative 2 Concept

Alternative 3: 3-Lane with Bike Lanes

Alternative 3 would provide one northbound through lane, one southbound through lane, a two-way center left-turn lane, and a bike lane in each direction (see Figure 14). This configuration would convert most of the segment north of 29th Avenue from four motor vehicle lanes to three, while adding two bike lanes. Three travel lanes would be maintained south of 29th Avenue.

Sidewalks would be expanded to the maximum available width within the remaining right-of-way. Sidewalk and lane widths may vary across the corridor depending on the existing curb-to-curb width.

Alternative 3 Considerations	
Motor Vehicle Mobility	• Reduces number of travel lanes from four to three, north of 28th Avenue • Capacity reduced and travel time increased for through-traveling vehicles • Ten-foot travel lanes are narrow for trucks and less than the eleven-foot standard width (A)
Walkability	• Consistent nine-foot sidewalks • Sidewalks narrower than ten-foot standard width (B) • Bike lanes provide separation from motor vehicle lanes • Sidewalk width is not sufficient to support active commercial streetscape (C)
Bicycle Facilities	• Includes six-foot bike lanes
Transit Service	• Ten-foot travel lanes are narrow for buses • Potential conflicts with bike lanes
Business Accessibility	• Center left-turn lane improves access for turning vehicles • Improved bicycle access
Cost	• Moderate cost to provide center left-turn lane and bike lanes • Intersections and traffic signals would need to be reconfigured
Other	• Center left-turn lane offers opportunities for design elements including median treatments (e.g., landscaping, pedestrian refuge, access management)

(A) Minimum travel lane width on Minor Arterials is 11 feet. *Design Standards and Guidelines for Eugene Streets, Sidewalks, Bikeways and Accessways*, City of Eugene, November 1999

(B) Minimum width defined for curbside sidewalks in pedestrian-oriented commercial areas. *Design Standards and Guidelines for Eugene Streets, Sidewalks, Bikeways and Accessways*, City of Eugene, November 1999.

(C) A concept for the "Heart of the Walkable Business District" characterized by a "Safe, Attractive Pedestrian Experience for Business, Shopping and Entertainment" was identified in the *South Willamette Area Draft Concept Plan*, City of Eugene, October 2012.

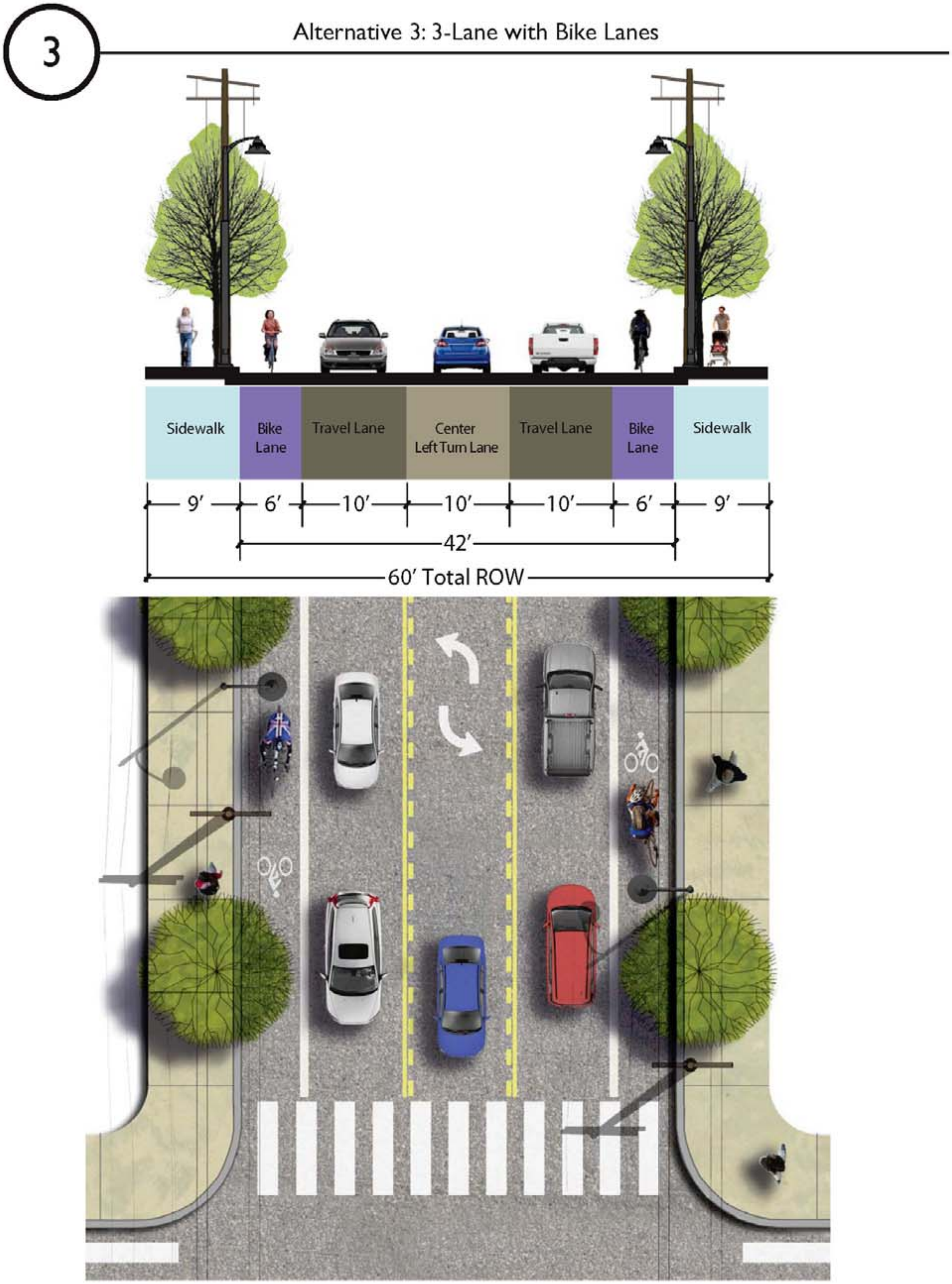


Figure 14: Alternative 3 Concept

Alternative 4: 3-Lane with Buffered Bike Lanes

Alternative 4 would include one northbound through lane, one southbound through lane, a two-way center left-turn lane, and a buffered bike lane in each direction (see Figure 15). The roadway would need to be reconstructed to expand curb-to-curb width to 47 feet. The alternative may apply to the north and south of 29th Avenue.

Sidewalks would be expanded to the maximum available width within the remaining right-of-way. However, with the 47 foot curb-to-curb width, sidewalk width would be limited to approximately six and one-half feet on both sides of the street, unless additional right-of-way is acquired.

Alternative 4 Considerations	
Motor Vehicle Mobility	• Reduces number of travel lanes from four to three, north of 29th Avenue • Capacity reduced and travel time increased for through-traveling vehicles • Maintains eleven-foot outside travel lanes
Walkability	• Sidewalks only 6.5 foot in width • Curbside sidewalks far narrower than ten-foot standard width (A) • Buffered Bike lanes provide separation from motor vehicle lanes • Sidewalk width is not sufficient to support active commercial streetscape (B)
Bicycle Facilities	• Includes five-foot bike lanes with two-foot buffers • Bike lanes painted green to distinguish from motor vehicle lanes
Transit Service	• Maintains eleven-foot travel lanes for buses • Potential conflicts with bike lanes
Business Accessibility	• Center left-turn lane improves access for turning vehicles • Improved bicycle access
Cost	• Higher cost for reconstruction to expand existing curb-to-curb width • With reconstruction, utilities should be relocated for ADA compliance • Intersections and traffic signals would need to be reconfigured
Other	• Center left-turn lane offers opportunities for design elements including raised median treatments (e.g., landscaping, pedestrian refuge, access management) • Sidewalk and right-of-way width may be widened with redevelopment (i.e., as a condition of development approval) • Narrow width limits sidewalk design treatments (e.g., landscaping, lighting)

(A) Minimum width defined for curbside sidewalks in pedestrian-oriented commercial areas. *Design Standards and Guidelines for Eugene Streets, Sidewalks, Bikeways and Accessways*, City of Eugene, November 1999.

(B) A concept for the "Heart of the Walkable Business District" characterized by a "Safe, Attractive Pedestrian Experience for Business, Shopping and Entertainment" was identified in the *South Willamette Area Draft Concept Plan*, City of Eugene, October 2012.

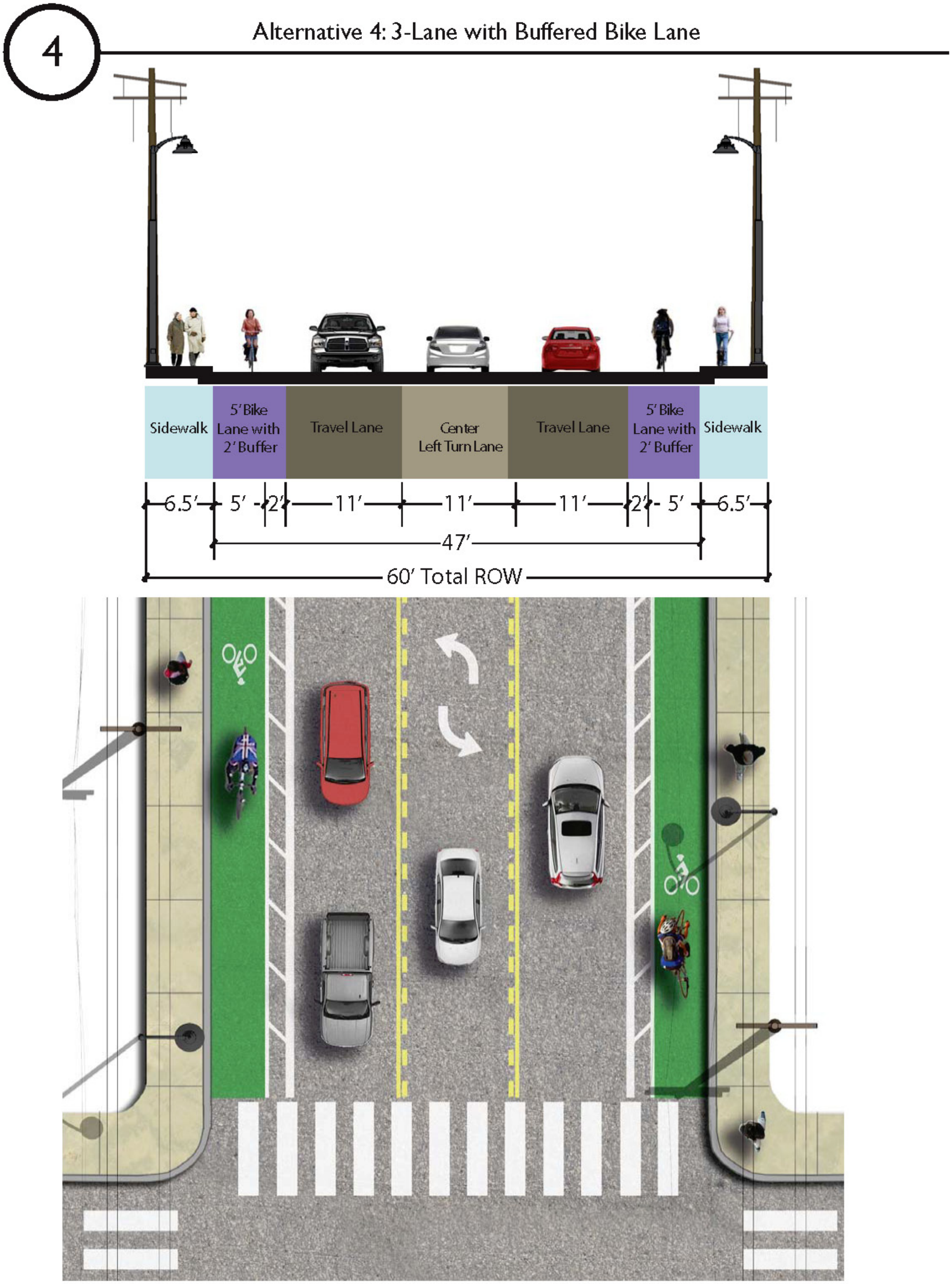


Figure 15: Alternative 4 Concept

Alternative 5: 3-Lane with Wide Sidewalks

Alternative 5 would convert most of the roadway segment north of 29th Avenue from four motor vehicle lanes to three (see Figure 16). The roadway would be reconstructed to expand sidewalks, resulting in a narrower curb-to-curb width (34 feet instead of the current 41 to 42 foot width.) No new bike lanes would be included on Willamette Street.

Sidewalks would be expanded to the maximum available width within the remaining right-of-way. With the 34-foot curb-to-curb width, sidewalks could be extended up to 13-feet. The cross-section illustration is not being considered south of 29th Avenue because it does not include any dedicated bicycle facilities and no parallel facilities are available near Willamette Street, south of 30th Avenue.

Alternative 5 Considerations	
Motor Vehicle Mobility	• Reduces number of travel lanes from four to three, north of 29th Avenue • Capacity reduced and travel time increased for through-traveling vehicles • Maintains eleven-foot outside travel lanes
Walkability	• Provides wide (13-foot) sidewalks to facilitate a transformative pedestrian environment including design treatments (e.g., storefront displays, café seating, landscaping)
Bicycle Facilities	• No on-street bike lanes • Improved bike access would occur via parallel route improvements and crossing enhancements (see Figure 23) • Bike sharrows possible on curbside lanes • Potential to provide raised bike facility if additional right-of-way acquired for sidewalk widening and reconstruction
Transit Service	• Maintains eleven-foot travel lanes for buses
Business Accessibility	• Center left-turn lane improves access for turning vehicles • Wide sidewalks provide opportunities for design treatments to support commercial development, aesthetic treatments, and walkability
Cost	• Higher cost to reconstruct curbs to expand/reconstruct sidewalks • Intersections and traffic signals would need to be reconfigured
Other	• Center left-turn lane offers opportunities for design elements including raised median treatments (e.g., landscaping, pedestrian refuge, access management) • Wide sidewalks support "Green Street" design treatments

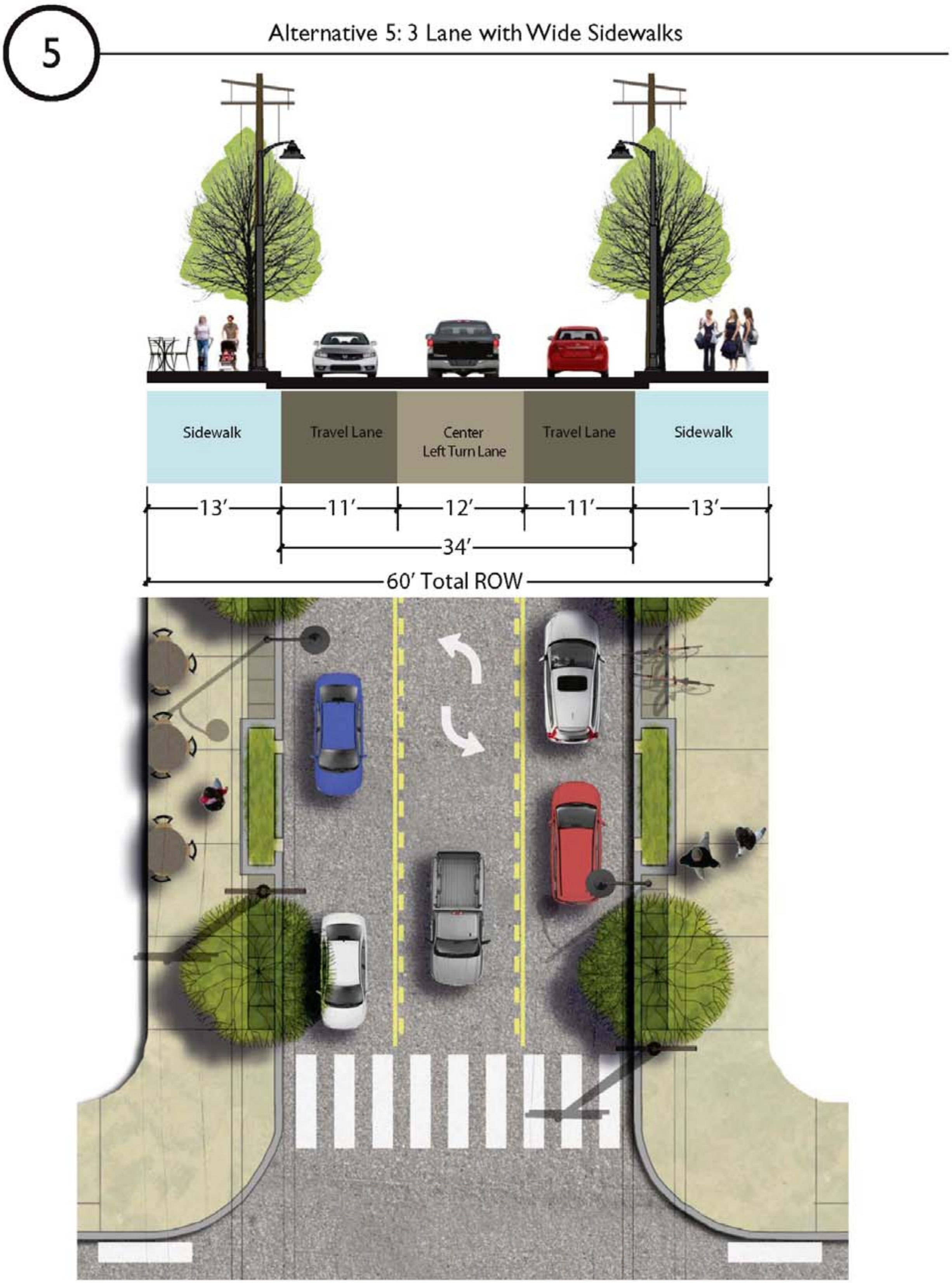


Figure 16: Alternative 5 Concept

Alternative 6: 2-Lane with Bike Lanes, Median & Roundabouts

Alternative 6 would convert the corridor to two motor vehicle lanes with bike lanes in each direction (see Figure 17). A median would be constructed in the middle of the roadway, with roundabouts at intersections. The curb-to-curb roadway width would not need to be modified outside of intersections. Sidewalks would be expanded to the maximum available width within the remaining right-of-way. Sidewalk and lane widths may vary across the corridor depending on the existing curb-to-curb width.

Alternative 6 Considerations	
Motor Vehicle Mobility	• Reduces number of travel lanes from four (or three) to two • Capacity reduced and travel time increased for through-traveling vehicles • Median would restrict turns at many driveways to right-in-right-out • Intersections with roundabouts would provide opportunities for U-turns • Maintains eleven-foot outside travel lanes • Medians and roundabouts would greatly improve corridor safety
Walkability	• Consistent nine-foot sidewalks • Sidewalks narrower than ten-foot standard width (A) • Bike lanes provide separation from motor vehicle lanes • Wide median provides opportunities for pedestrian crossing refuges • Sidewalk width is not sufficient to support active commercial streetscape (B)
Bicycle Facilities	• Includes six-foot bike lanes
Transit Service	• Maintains eleven-foot travel lanes for buses • Potential conflicts with bike lanes
Business Accessibility	• Right-in-right-out limits motor vehicle access to driveways • Improved bicycle access
Cost	• Very high cost to construct medians and roundabouts • Property acquisition needed to construct appropriately-sized roundabouts
Other	• Raised median offers opportunities for streetscape design elements (e.g., landscaping, pedestrian refuge, access management) • Impact on properties near intersections due to constructing roundabouts • More consistent cross-section throughout the corridor

(A) Minimum width defined for curbside sidewalks in pedestrian-oriented commercial areas. *Design Standards and Guidelines for Eugene Streets, Sidewalks, Bikeways and Accessways*, City of Eugene, November 1999.

(B) A concept for the "Heart of the Walkable Business District" characterized by a "Safe, Attractive Pedestrian Experience for Business, Shopping and Entertainment" was identified in the *South Willamette Area Draft Concept Plan*, City of Eugene, October 2012.

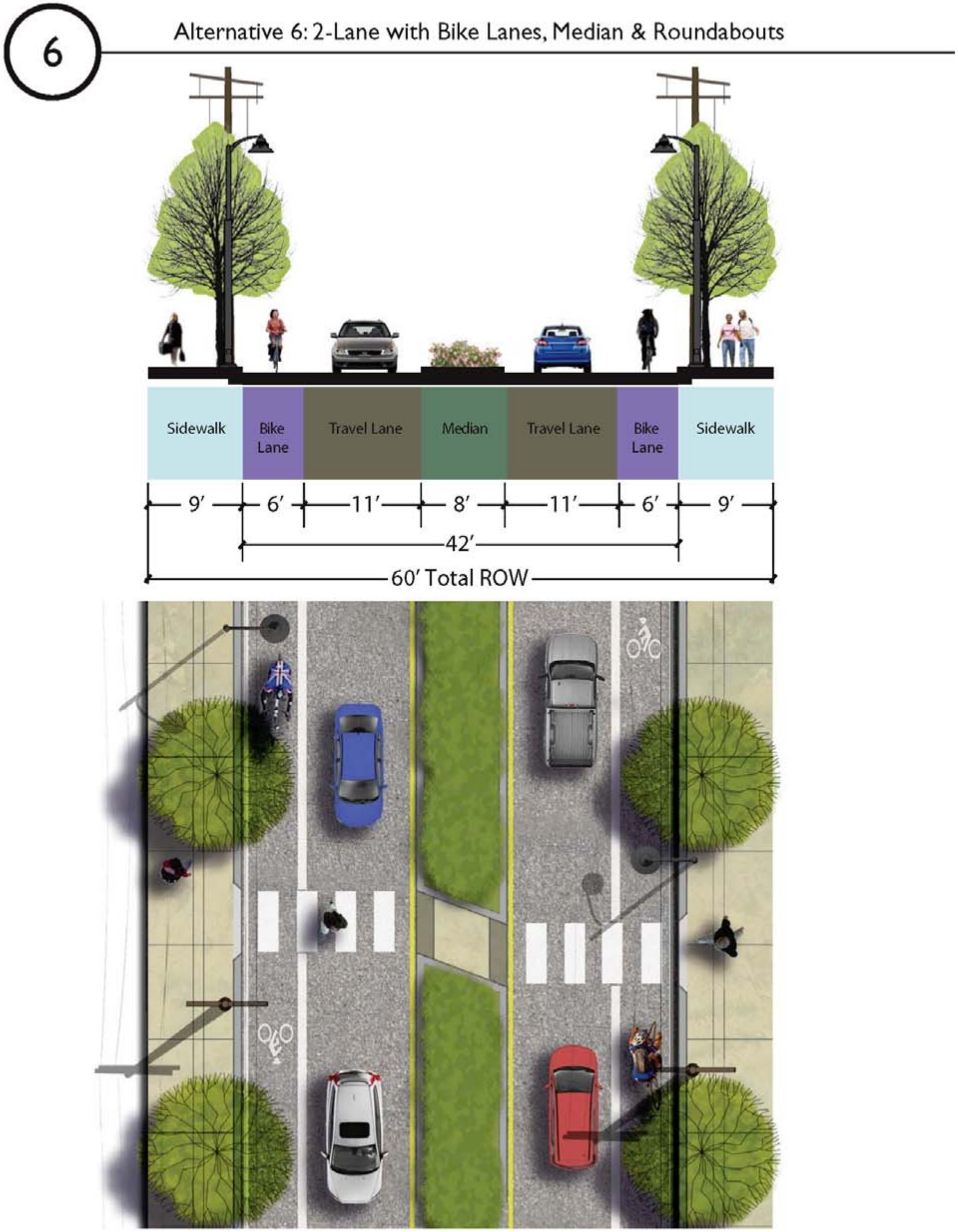


Figure 17: Alternative 6 Concept

Community Forum #2 – Evaluate the Alternatives

Community Forum 2 was held in February of 2013. The meeting allowed the project team to present the alternatives concepts that had been developed and describe how well they met evaluation criteria. This event was designed to help narrow down to three alternatives to advance to Tier 2 screening.

The meeting participants listened carefully to the alternatives and were respectful and thoughtful in asking questions and sharing a wide range of opinions. After meeting in small groups to discuss the alternatives, participants completed Input Forms to indicate which three alternatives they prefer to forward for further study. The results of the meeting input forms are shown below.

- **Alternative 3:** 3-Lane with bike lanes (**208** preferences)
- **Alternative 4:** 3-Lane with buffered bike lanes (**142** preferences)
- **Alternative 5:** 3-Lane with wide sidewalks (**139** preferences)
- **Alternative 6**: 2-Lane with bike lanes, median & roundabout (**113** preferences)
- **Alternative 1**: 4-Lane (**97** preferences)
- **Alternative 2**: 4-Lane with center left-turn lane (**83** preferences)

Public input was gathered in multiple ways throughout the project, including at displays along the corridor. The input received played a key role in the alternatives screening process.

From the six alternatives initially identified, three were selected by the City of Eugene for further refinement and more detailed analysis. The three alternatives provide the community and decision makers a range of options for the South Willamette Street Improvement Plan. This decision was based on both technical review and public input received. The three alternative configurations advanced to the Tier 2 screening phase were a 4-lane (Alternative 1), 3-lane with bike lanes (Alternative 3) and 3-lane with wide sidewalks (Alternative 5).

The Tier 1 screening evaluated community priorities and identified broad level tradeoffs that exist within a constrained right-of-way. The screening provided a qualitative assessment for each alternative based on criteria and scoring methodology identified in Technical Memorandum #1 (South Willamette Street Improvement Plan – Evaluation Criteria). As previously described, the evaluation criteria were established to assess the potential of alternatives to best meet the transportation needs of the users of Willamette Street based on goals and objectives from other planning efforts.

The scoring evaluation results assisted the City of Eugene staff in selecting three alternatives to advance for further consideration. The evaluation was considered together with community and stakeholder input received through the public involvement process. Evaluation criteria scoring for each of the six proposed alternative cross-section concepts is summarized in Table 7. The screening criteria and scoring for each alternative are further detailed in the appendix.

Table 7: Evaluation Criteria Scoring of Alternatives

Alternative		#1 4-Lane	#2 4-Lane with Center Left-turn Lane	#3 3-Lane with Bike Lanes	#4 3-Lane with Buffered Bike Lanes	#5 3-Lane with Wide Sidewalks	#6 2-Lane with Bike Lanes, Median & Roundabouts
Access & Mobility	Reliability (For All Modes)	0	0	0	0	0	0
	Neighborhood Connectivity	0	0	1	1	0	1
	Motor Vehicle Travel Time	0	0	-1	-1	-1	-1
	Active Mode Travel Time	0	0	1	1	0	1
Safety & Health	Safety	0	0	1	1	1	1
	Security	0	0	1	1	1	1
	Emergency Response	0	0	-1	-1	-1	-1
Social Equity	Equity	0	0	1	1	1	1
	Economic Access	0	0	1	1	1	1
Economic Benefit	Freight Mobility	0	0	-1	-1	-1	-1
	Walkable/Bikeable Business District	0	0	1	1	1	1
	Business Vitality	0	1	0	0	0	-1
Cost Effective-ness	Fundability	1	0	0	-1	-1	-1
	Asset Management	1	1	1	1	1	1
	Project Benefits	1	1	1	1	1	1
Climate & Energy	Reduce Vehicle Miles Traveled	0	0	0	0	0	0
	Pedestrian Facilities	0	0	0	-1	1	0
	Bicycle Facilities	0	0	1	1	0	1
	Transit Facilities	0	0	0	0	1	0
Ecological Function	Stormwater Design	0	0	0	0	0	0
	Landscape Design	0	0	0	0	0	0
Community Context	Community Vision and Land Use	0	0	0	-1	1	0
	Transportation Planning Compatibility	0	0	0	0	0	0
TOTAL		3	3	7	4	6	5

The overall results of the scoring evaluation did not show an alternative that was clearly superior to others. The scoring differences between alternatives where relatively small. Total scores ranged from 3 to 7 resulting in a maximum difference of four across 23 scoring criteria.

Alternatives 3, 5, and 6 scored highest in the Tier 1 screening evaluation, while alternatives 1, 2, and 4 where lower scoring. Although the 4-lane alternatives (Alternative 1 and 2) scored the lowest on the evaluation criteria, the public input received indicated that further analysis and discussion was needed before reductions to motor vehicle capacity should be further considered. Therefore, Alternatives 1, 3, and 5 were selected by the City of Eugene for further evaluation.

Community involvement played a key role in the development of the Improvement Plan

Stakeholder Interviews/Focus Groups

Key project issues and potential solutions were discussed in advance of each Community Forum.

Community Forum #1 - Explore

"Explore the Alternatives" -- The community provided input on key considerations, priorities, and objectives for Willamette Street.

Community Forum #2 - Evaluate

"Evaluate the Alternatives" -- The community provided feedback on the project alternatives and facility design considerations.

Community Forum #3 - Refine

The community provided feedback on the first screening process and technical findings for the three alternatives advanced for consideration.

Improvement Plan

Three South Willamette Street corridor alternatives were selected for further refinement and more detailed analysis. Conceptual sketches were prepared to help visualize the alternatives.

This section describes additional roadway design details and options for corridor implementation of each of the three alternative concepts advanced for the South Willamette Street Improvement Plan. Discussion is presented for how roadway elements are applied on different segments of Willamette Street, intersection configurations, bicycle and pedestrian connections to the corridor, and other design considerations. Cost estimates for each alternative are also identified.

Some planned improvements are desired throughout the corridor and will be assumed for each alternative. These improvements include new pavement, improved drainage, wider sidewalks, and enhancements to pedestrian and bicycle access around Willamette Streets. Other improvements may vary depending on the location and alternative configuration.

Potential Segment Changes

The following section describes an overview of potential differences by roadway segment. The cross section concepts previously illustrated apply on the north segment of Willamette Street, from 24th Avenue to near 28th Avenue. In the south segment of the study corridor, no differences are proposed for any alternative. Around 29th Avenue, a transition area will provide continuity between the corridor segments while best meeting the needs and objectives identified for South Willamette Street.

The application of the alternative configurations through the corridor are further detailed and illustrated through overhead plan views that show configurations for travel lanes, bike lanes, sidewalks, and other roadway elements. Plan views for the entire corridor (from 24th Avenue to 32nd Avenue) are included in the appendix.

24th Avenue to near 28th Avenue Roadway Configuration: Alternative 1 maintains the existing 4-lane roadway between 24th Avenue and near 28th Avenue. Alternative 3 illustrates a 3-lane roadway (two travel lanes and a continuous Center left-turn lane) and continuous bike lanes. Alternative 5 is also a 3-lane alternative, but with widened sidewalks rather than continuous bike lanes.

24th Avenue to near 28th Avenue Sidewalk Configuration: All three alternatives attempt to maximize the sidewalk width within the existing right-of-way. For Alternative 1 and Alternative 3, the sidewalks would be reconstructed to approximately 9-feet wide. For Alternative 5, the sidewalk widths would expand to approximately 13 feet wide by replacing the bike lanes illustrated for Alternative 3 with additional sidewalk space.

Near 28th Avenue to near 30th Avenue Roadway Configuration: This section is a "transition area" from the proposed cross-sections identified for each conceptual alternative, through the 29th Avenue intersection to near 30th Avenue. Alternative 1 would maintain the existing roadway configuration, which widens from one northbound motor vehicle lane to two (and a left-turn pocket at 29th Avenue) and widens between the Woodfield Station Driveway and 29th Avenue to add a southbound left-turn pocket to the two existing southbound motor vehicle through lanes. The northbound bike lane would end at 29th Place and the southbound bike lane would begin south of 29th Avenue, as currently configured.

In Alternative 3, the existing bike lanes would be extended northward through the 29th Avenue intersection in order to provide continuous bike lanes between 32nd Avenue and 24th Avenue. Adding bike lanes would require either expanding the curb-to-curb width of the roadway or removing

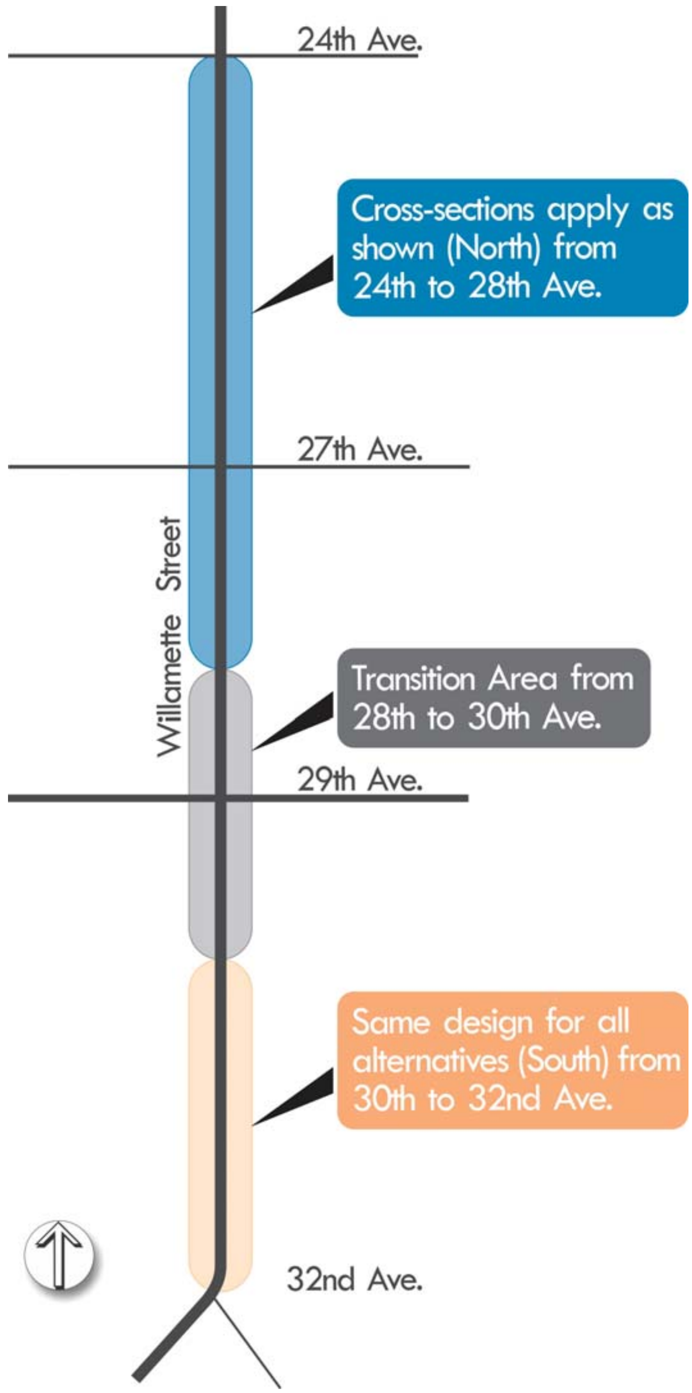


Figure 18: Potential Changes by Segment

a motor vehicle lane. Widening the curb-to-curb width would likely require narrower sidewalks or additional right-of-way near the 29th Avenue intersection. A proposed design modification presented for Alternative 3 (and Alternative 5) would add a second southbound travel lane just north of the Woodfield Station Driveway, but not include a second northbound through travel lane (included in Alternative 1).

The configuration of travel lanes for Alternative 5 would be similar to Alternative 1 for bike lanes and Alternative 3 for motor vehicle lanes. Bike lanes would begin (southbound) and end (northbound) south of the 29th Avenue intersection. A single northbound motor vehicle through lane would be included, instead of the two existing lanes. The additional space made available by potentially not including a second northbound travel lane in this section would accommodate wider sidewalk space rather than the bike lanes provided in Alternative 3.

Near 28th Avenue to near 30th Avenue Sidewalk Configuration: Sidewalk widths in this "transition area" could vary depending on the specific design of motor vehicle lanes, turn pocket lengths, bike lanes, etc. In general, Alternative 5 provides the narrowest curb-to-curb width and therefore the most space for sidewalks and pedestrian amenities within the existing right-of-way.

Near 30th Avenue to 32nd Avenue Roadway Configuration: No changes to the existing travel and bike lane configurations are proposed in any alternative between 32nd Avenue and near 29th Place (where the existing northbound bike lane ends).

Near 30th Avenue to 32nd Avenue Sidewalk Configuration: All three alternatives would expand sidewalk widths to approximately 8.5 feet, or the maximum available within the existing right-of-way.

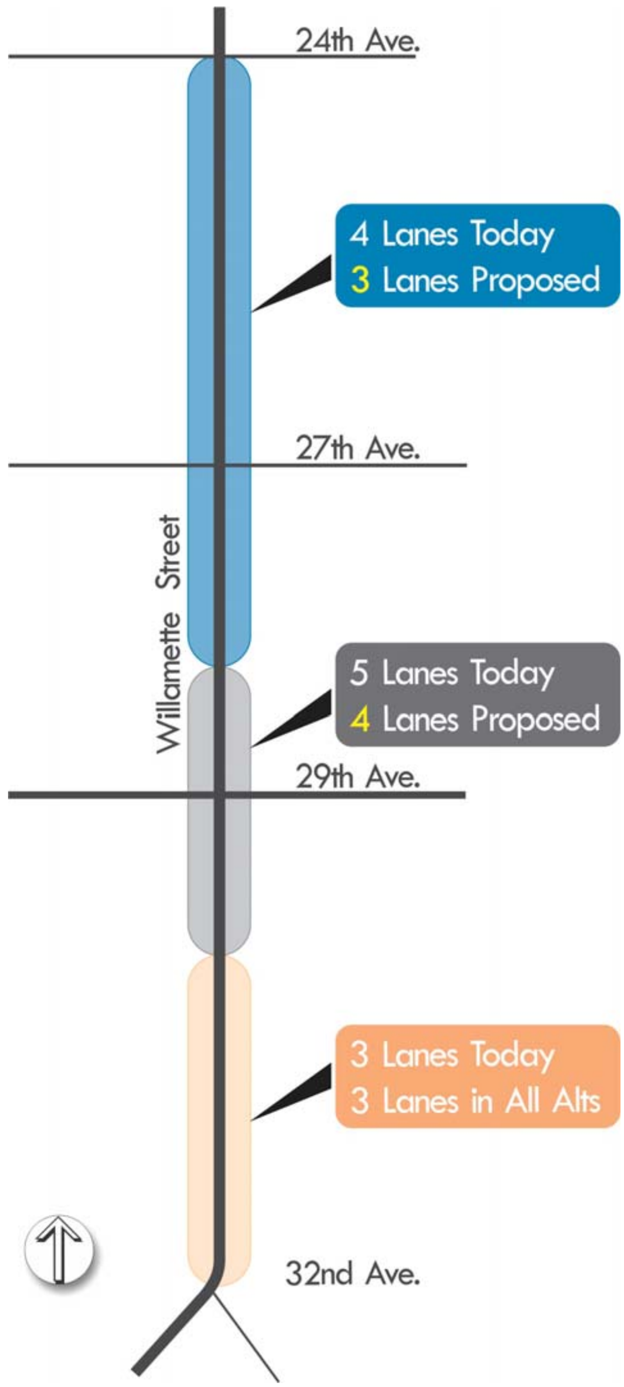


Figure 19: Potential Motor Vehicle Lane Changes by Segment for Alternatives 3 & 5

Potential Intersection Changes

The following section describes how each alternative would be accommodated at the study intersections. Plan views displaying intersection configurations for each alternative are included in the appendix.

24th Avenue Intersection: No changes to right-of-way or curb-to-curb width are proposed at the intersection in Alternatives 1 or 3. In Alternative 5, the south leg of Willamette Street would be reconstructed with curb-to-curb width narrowed to accommodate wider sidewalks. In Alternative 3 and Alternative 5, the south leg of Willamette Street would be reconfigured from four travel lanes to three lanes (one lane in each direction with a center left turn lane in the middle). The space gained from removing one of the four travel lanes would be used for either bicycle lanes (Alternative 3) or wider sidewalks (Alternative 5). The north leg of Willamette Street would convert from two through lanes to one through lane and a dedicated left turn lane. The traffic signal would also need to be modified in Alternatives 3 and 5. No changes to right-of-way are proposed at the intersection in any alternative.

25th Avenue Intersection & 27th Avenue Intersection: No changes to right-of-way or curb-to-curb width are proposed in Alternatives 1 or 3, while sidewalks are expanded in Alternative 5. Traffic signals would need to be reconfigured to accommodate the 3-lane configuration identified in Alternative 3 and Alternative 5. No changes are identified for 25th Avenue or 27th Avenue approaches at Willamette Street.

Woodfield Station Driveway Intersection: It is recommended that a traffic signal at this intersection be considered as a design option in all alternatives. A traffic signal would provide better access for turning vehicles and an additional pedestrian crossing opportunity. No changes to the existing lane configuration would be needed in Alternative 1. In Alternative 3 and Alternative 5, there would be a left turn lane on the northbound approach, and a single northbound through travel lane. Southbound, one travel lane would widen to two approximately 100 feet north of the intersection. Driveway modifications would likely be necessary on the east side of Willamette Street, across from the Woodfield Station Driveway. No right-of-way changes are anticipated in any of the alternatives. Sidewalks will be extended within the existing right-of-way.

29th Avenue Intersection: Compared to other study intersections, 29th Avenue has significantly higher traffic volumes (see Table 8). To adequately serve the

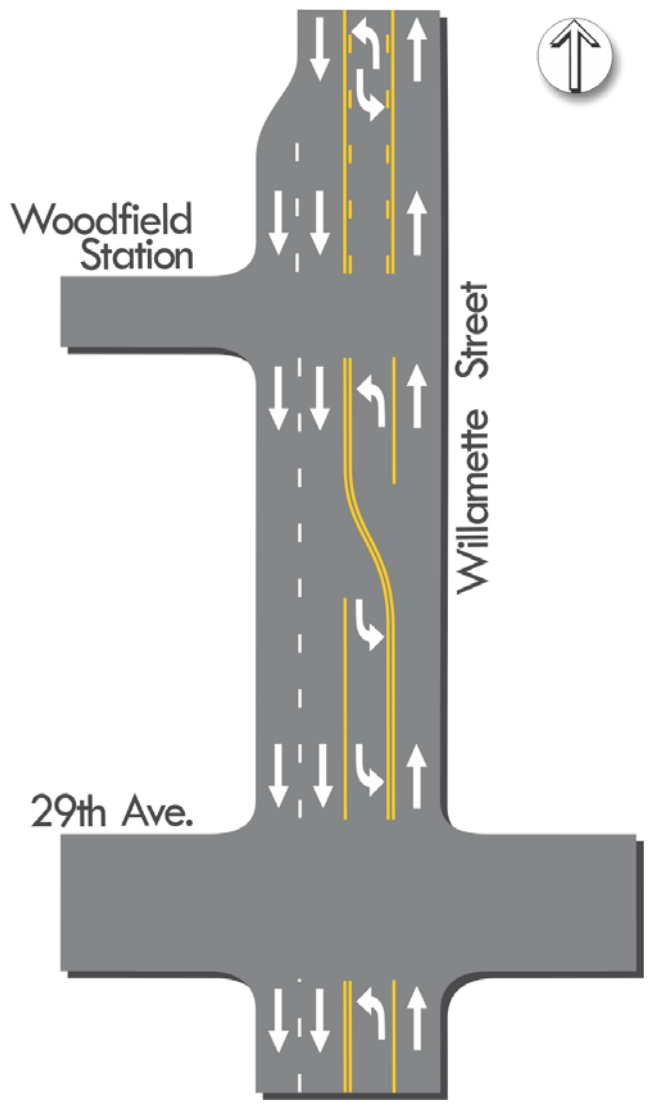


Figure 20: Conceptual Back-to-Back Turn Lanes at Woodfield Station and 29th Avenue Intersections

intersection traffic demand and meet City of Eugene traffic operations performance standards, the Willamette Street approaches require more than a single through lane on each approach. Alternative 1 includes a 5-lane cross-section at 29th Avenue, as exists currently. For Alternative 3 and 5, the proposed design option would include a 4-lane cross-section at 29th Avenue including a single northbound travel lane. Removing one of the two existing northbound travel lanes may be considered to accommodate bike lanes or wider sidewalks. Without reducing the number of vehicle lanes, additional right-of-way would be required to provide bike lanes or wider sidewalks.

32nd Avenue Intersection: No changes are proposed in any alternative to this intersection.

Roundabout Compatibility

Roundabouts can improve traffic flow and reduce overall delay at many roadway intersections. Roundabouts generally reduce the number of overall collisions and fatalities when they are installed and are less expensive to operate and maintain compared to traffic signals. However, emergency vehicle and truck operators may be opposed to roundabouts in some areas. Furthermore, there may be significant property acquisition costs to provide the right-of-way needed to construct appropriately-sized roundabouts.

Roundabouts would need to be constructed with multiple lanes to serve the four travel lanes included in Alternative 1. The three-lane configurations (Alternatives 3 and 5) could be constructed with single lane roundabouts; however, the traffic analysis results (shown in Technical Memorandum #8) indicate that single lane roundabouts may not comfortably accommodate peak hour traffic demand at several intersections. Multi-lane roundabouts could be considered but would require a larger intersection configuration.

Table 8: Intersection Volume (2012 PM Peak Hour)

Intersection	Total Entering Traffic Volume
Willamette Street/24th Avenue	1,834
Willamette Street/25th Avenue	1,668
Willamette Street/27th Avenue	1,914
Willamette Street/Woodfield Station Driveway	1,706
Willamette Street/29th Avenue	2,732
Willamette Street/32nd Avenue	1,613

These larger configurations would require property acquisition to provide the right-of-way needed to construct the appropriately sized roundabouts. Right-of-way acquisition can have significant costs and impacts to adjacent properties, particularly in a developed commercial area. The intersection of 29th Avenue and Willamette Street would likely require a multi-lane roundabout that would have significant impacts to adjacent properties and businesses.

While other intersections on Willamette Street could be configured with smaller layouts, the impacts and costs for the right-of-way acquisition and construction may be significant even if the 29th Avenue intersection remained as currently configured. Figure 21 illustrates a potential configuration for a single-lane roundabout at the 27th Avenue intersection. This roundabout configuration is typical for an urbanized area and has a 110 foot inscribed circle diameter (the distance from one curb to the other, directly through the center of the roundabout).

Roundabouts are not explicitly included in the facility design of any alternative but may be considered further as potential design refinements. Total costs for constructing roundabouts are estimated to be approximately $650,000 per intersection based on the single lane roundabout illustrated for Figure 21. This cost estimate includes right-of-way and would replace costs associated with traffic signal modifications, which are generally estimated to cost

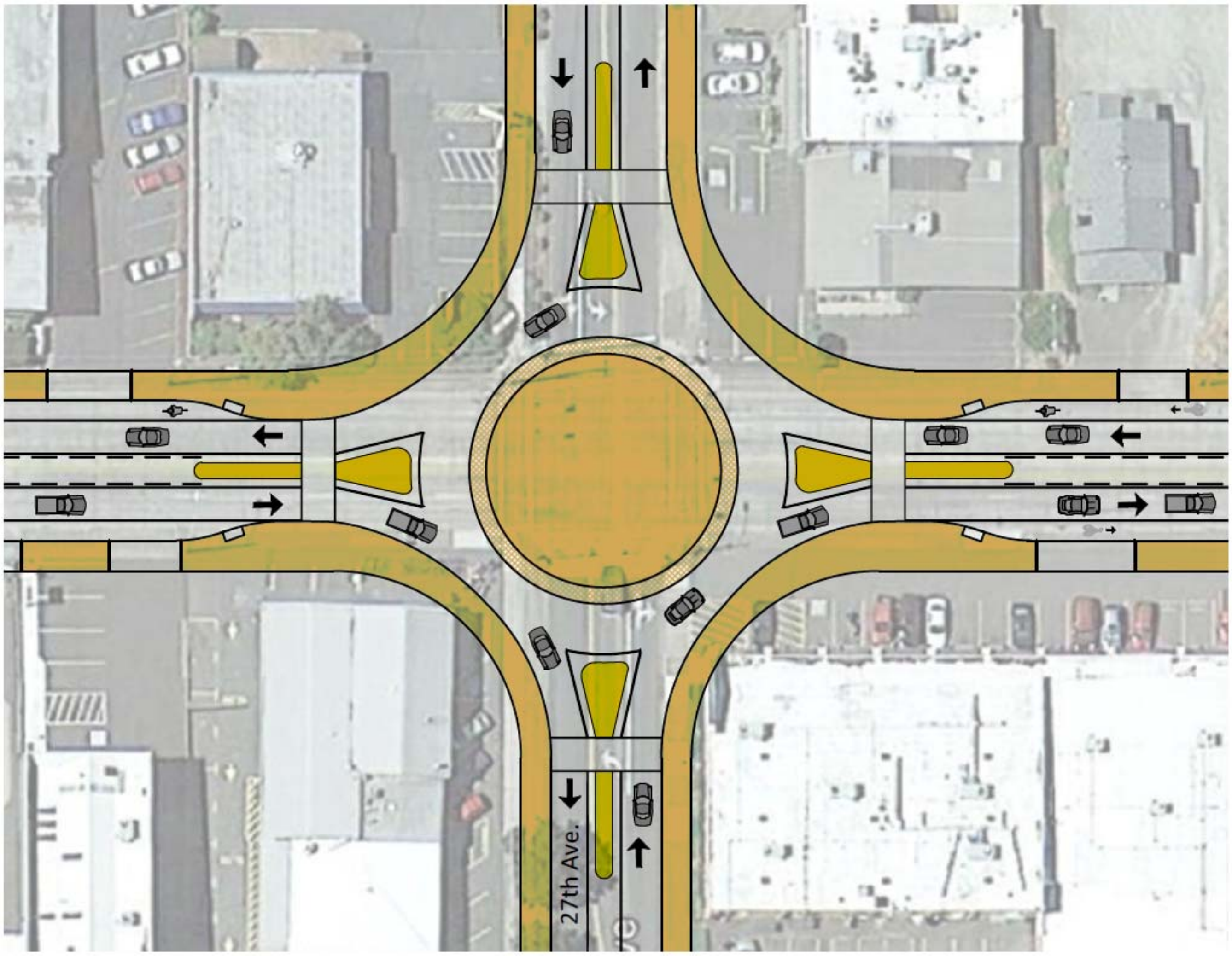


Figure 21: Potential Single-lane Roundabout Configuration at 27th Avenue and Willamette Street

$250,000 per intersection. Therefore, the estimated additional cost for roundabout construction would be approximately $400,000 per intersection. The cost differences are primarily due to right-of-way acquisition and the need to reconstruct the minor street (e.g., 27th Avenue) approaches leading to the roundabout.

Access Management on Public and Private Approaches

There are currently over 70 driveways on Willamette Street from 24th Avenue to 32nd Avenue. This creates numerous conflict points for motor vehicles, pedestrians and bicyclists. Reducing conflict points is likely to result in fewer crashes and increased capacity along the corridor. Managing access points along the corridor requires finding an appropriate balance between safety, mobility, and access. Consolidating driveway access points will be considered as part of each alternative, particularly where specific safety benefits would result.

Preliminary consideration of access management strategies for the corridor indicates that recommended strategies will not be significantly different for any alternative compared to another. The following strategies will be considered for the Willamette Street corridor:

- Removing and consolidating access points to existing businesses
- Sharing accesses between adjacent property owners
- Implementing turn lanes at driveways
- Parking circulation enhancements

Bus Stops and Pullouts

Lane Transit District (LTD) currently services two bus routes along Willamette Street. Buses stop on the street and block the curbside travel lane during passenger boarding and alighting. Constructing bus pullouts would remove stopped vehicles from travel lanes, but would likely require right-of-way acquisition and would also require buses in the pullouts to merge back into the traffic stream. Figure 22 illustrates the dimensions of a potential bus pullout along Willamette Street. The traffic impacts of bus pullouts are further discussed in Technical Memorandum 8.

No bus pullouts are recommended for the corridor given the frequency of bus uses (five per hour south of 29th Avenue and two per hour north of 29th Avenue), right-of-way impacts, and increased delay for transit vehicles.

Improving bicycle and pedestrian access to transit stops would support transit usage along the corridor. If sidewalks are expanded there may be space available for improved bus stop amenities such as covered benches (shelters), real-time arrival information, or other transit stop amenities. No additional transit stop amenities are suggested for the corridor. Ridership should be monitored to identify potential future improvements as the Willamette Street corridor is redesigned and the surrounding land uses change over time.

Enhanced Bicycle Connections

The following section describes potential bicycle facility improvements nearby, connecting to, and crossing Willamette Street. These improvements may be combined with bike lanes on Willamette Street or considered independently. The bicycle connections identified may apply for any alternative under consideration.

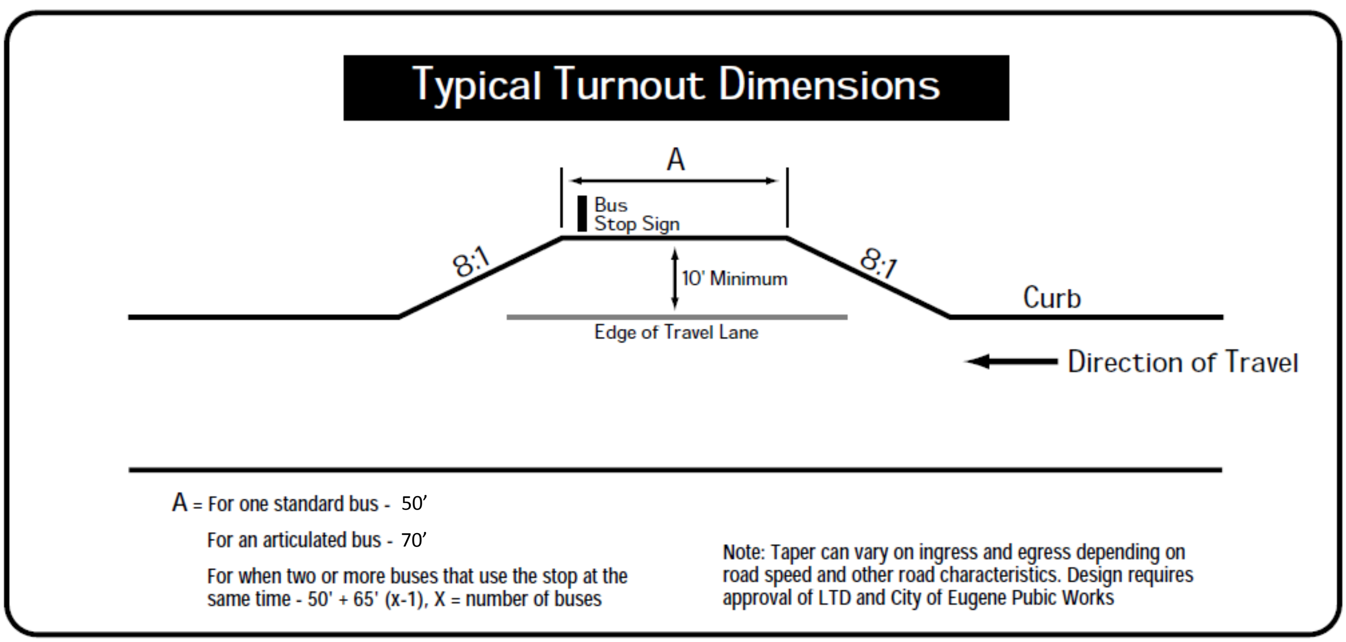


Figure 22: Bus Pullout Illustration

(Source: City of Eugene, revised per Lane Transit District guidance)

Nearby Bike Routes

Bicycle facility improvements could include improved bicycle access on local streets, with a variety of bike boulevard treatments applied. Figure 23 illustrates existing and proposed bike routes near the study corridor that would improve connections to Willamette Street and/or provide parallel routes of travel. Most of the routes identified were proposed in the Eugene Pedestrian and Bicycle Master Plan, which also provides design guidance on a variety of bicycle design options.

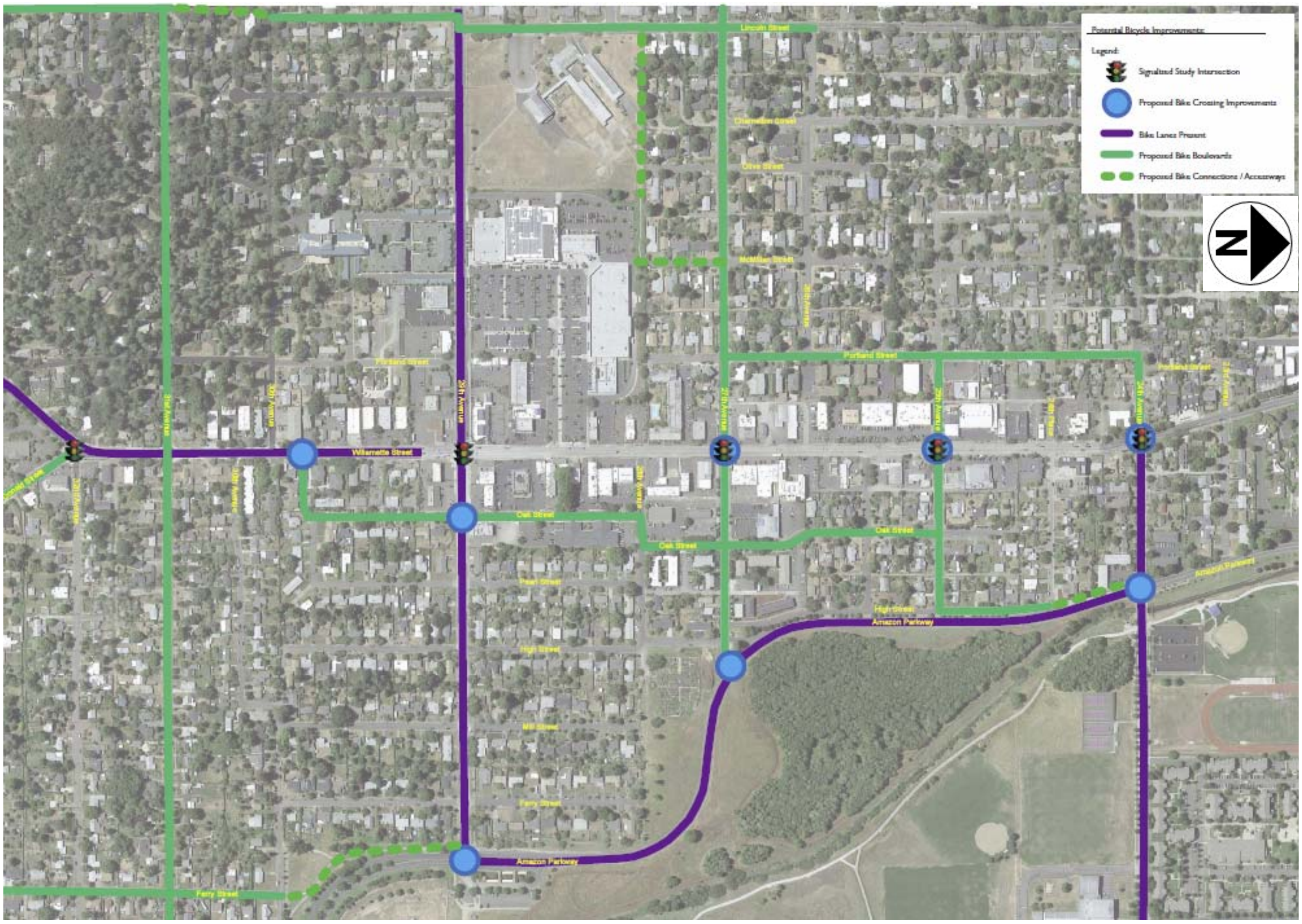


Figure 23: Bicycle Facility Improvements

Crossing Improvements for Bicycles

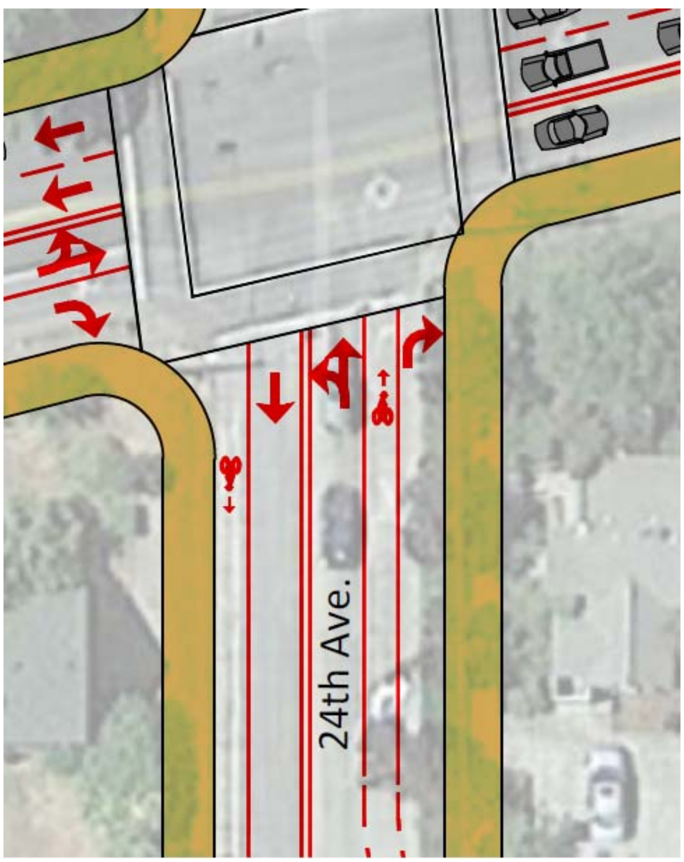
To support development of the surrounding bicycle network, crossing improvements could be provided such as intersection priority areas (i.e., "Green Boxes") or rider-activated push-button signals for crossing at intersections with traffic signals.

Two crossing improvement options are proposed on Willamette Street for the alternatives:

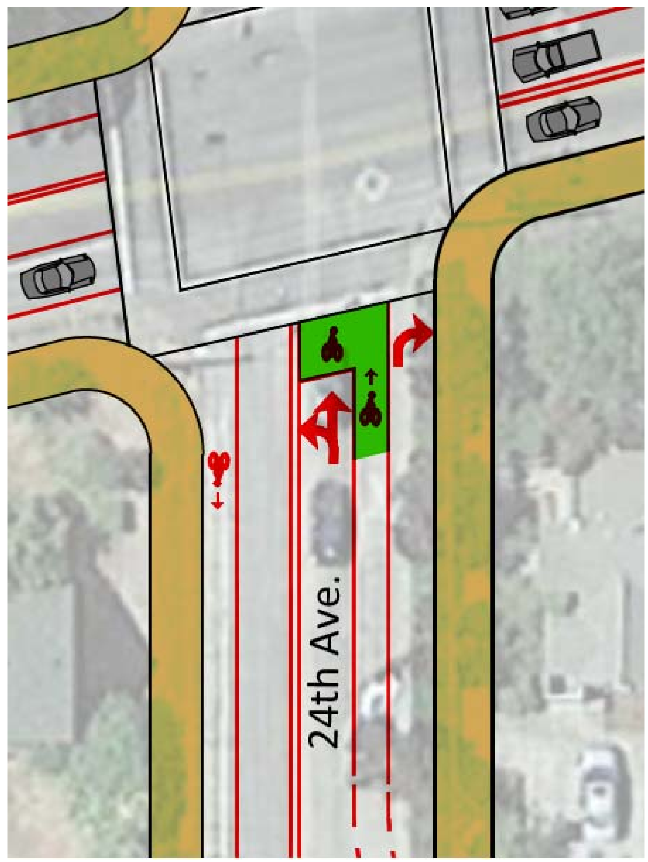
- **Combined bike/turn lane on 24th Avenue**: a bike lane would be striped with a dashed line within the inside portion of the existing right turn lane. Signage would be used to identify the combined lane and guide users toward the proper positioning. This would extend the existing bike lane on 24th Avenue (which currently drops away) and improve comfort for some riders who wish to travel through to the proposed Bike Boulevard on Portland Street. A local example of this configuration is located on 13th Avenue at Patterson Street. For Alternative 3 (which includes bike lanes on Willamette Street) a green bike box may be added to improve access for bicycle riders making a left turn from 24th Avenue to Willamette Street.

- **Crosswalk with Pedestrian Hybrid Beacon at 29th Place**: a Pedestrian Hybrid Beacon is a traffic control device that stops roadway traffic to allow pedestrians or bicycles to cross safely. The beacon is activated only when a pedestrian or bicyclist pushes the button to cross. By locating a safe crossing where the current northbound bike lane ends north of 30th Avenue (at the driveway/ path connecting to 29th Place), safe access will be provided for southbound bicycle riders wishing to connect to Willamette Street from Oak Street, via 29th Place. The beacon would be most beneficial in Alternatives 1 and 5, where there are no continuous bike lanes on Willamette Street, but may also be considered as part of Alternative 3.

These improvements are illustrated in the excerpts of the plan view drawings shown in Figure 24 below for Alternative 1 and Alternative 3. The plan view illustrations for each alternative are included in the appendix.



Alternative 1 – Shared Lane



Alternative 3 – Shared Lane with Bike Box

Figure 24: Bicycle Improvement Design Options

ENHANCED PEDESTRIAN CONNECTIONS

The pedestrian environment on Willamette Street will be improved with wider sidewalks that are included in each alternative. To further enhance the pedestrian experience, crossing opportunities should be improved along Willamette Street. A variety of design treatments can be implemented to enhance the pedestrian crossings.

- **Signing and striping:** pedestrian accessibility may be emphasized through enhanced signing or striping near intersections
- **Modified pavement surface**: physical differences such as raised pavement or textured crosswalks provide a visual signal to drivers to watch for pedestrians.
- **Median pedestrian crossing refuges** (i.e., island): pedestrians may cross a roadway in stages when a median pedestrian refuge is available. This is especially beneficial for users who require more time for crossings.
- **Leading pedestrian interval**: pedestrians at signalized intersections could be provided with a three- to four-second head start for entering into the crossing, before parallel traffic is given a green light. Leading pedestrian intervals allow for pedestrians to be more visible to turning vehicles.
- **Mid-block crossings**: Opportunities for pedestrian crossings outside of existing intersections may be provided at mid-block crossing locations. Mid-block crossings improve pedestrian access by decreasing the distance between destinations that require crossing the roadway. A variety of design treatments exist for mid-block crossings including rectangular rapid flashing beacons and overhead flashing beacons.

Currently the two largest distances between signalized crossings on the corridor are over 1,400 feet (between 29th Avenue and 32nd Avenue) and

Median pedestrian crossing refuges provide a waiting area for a two-stage pedestrian crossing.

Overhead flashing beacons inform drivers that pedestrians are crossing the road.

Rectangular Rapid Flashing Beacons (RRFBs) are also used to inform drivers that pedestrians are crossing the road.

over 900 feet (between 27th Avenue and 29th Avenue.) Two potential crossing improvements are proposed for the corridor:

- **Traffic signal with crosswalks at Woodfield Station Driveway**: a traffic signal at this location would provide a safe crossing for pedestrians between commercial areas and transit stops on both sides of the street. The intersection could be designed with a median pedestrian crossing refuge (i.e., island) on the north crosswalk in Alternatives 3 and 5, which include a center left-turn lane. The median refuge allows pedestrians to cross a roadway in stages, which is especially beneficial for users who require more time for crossings.
- **Crosswalk with Pedestrian Hybrid Beacon at 29th Place**: a Pedestrian Hybrid Beacon could be located south of 29th Avenue to provide a safe crossing for both pedestrians and bicycle riders. The signal would be most beneficial in Alternatives 1 and 5, where there are no continuous bike lanes on Willamette Street, but may also be considered as part of Alternative 3.

These improvements are illustrated in the plan view drawings included in the appendix.

On-Street Parking

On-street parallel parking provides convenient access for adjacent businesses and a buffer between pedestrians and motor vehicles. On-street parking would likely have a very favorable benefit to the pedestrian environment, however, given the constrained right-of-way and community priorities, on-street parking is not considered in any of the three design alternatives. On-street parking may be reconsidered as part of long-term enhancements to the corridor.

To provide on-street parking along Willamette Street, either travel lanes will need to be eliminated, or the right-of-way will need to be expanded to relocate sidewalks further from the roadway travel lanes. On-street parallel parking spots are typically seven to eight feet wide. Figure 25 illustrates one concept regarding how on-street parking may be incorporated into the corridor. The concept effectively swaps off-street private parking for on-street public parking. This strategy may be applied along the length of the corridor or along individual blocks.

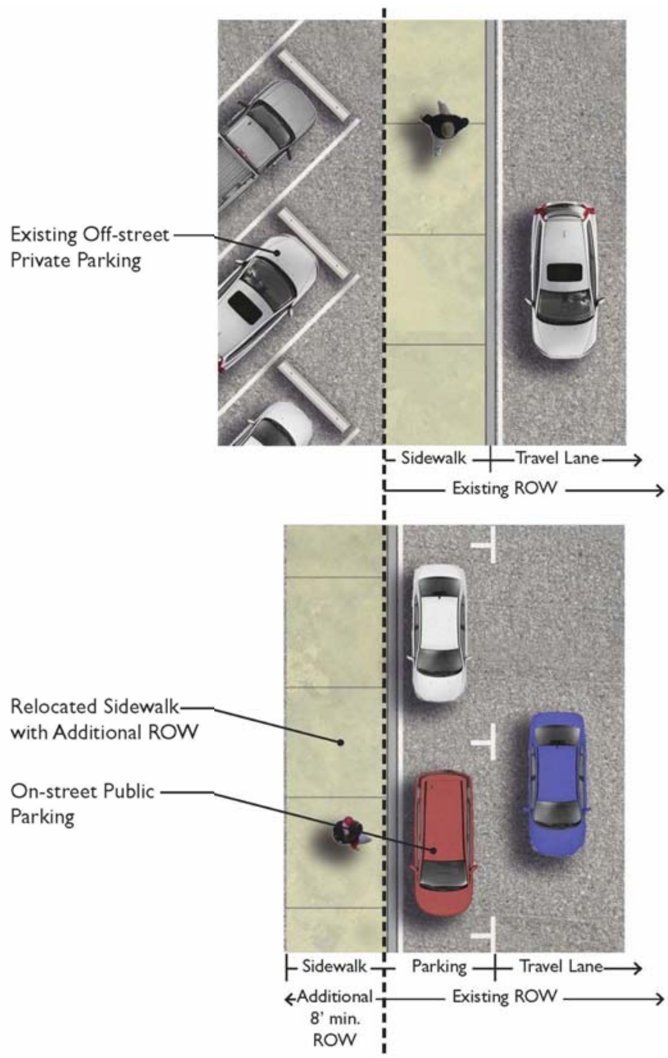


Figure 25: Conceptual Illustration of On-Street Parking on Willamette Street

ALTERNATIVE COST ESTIMATES

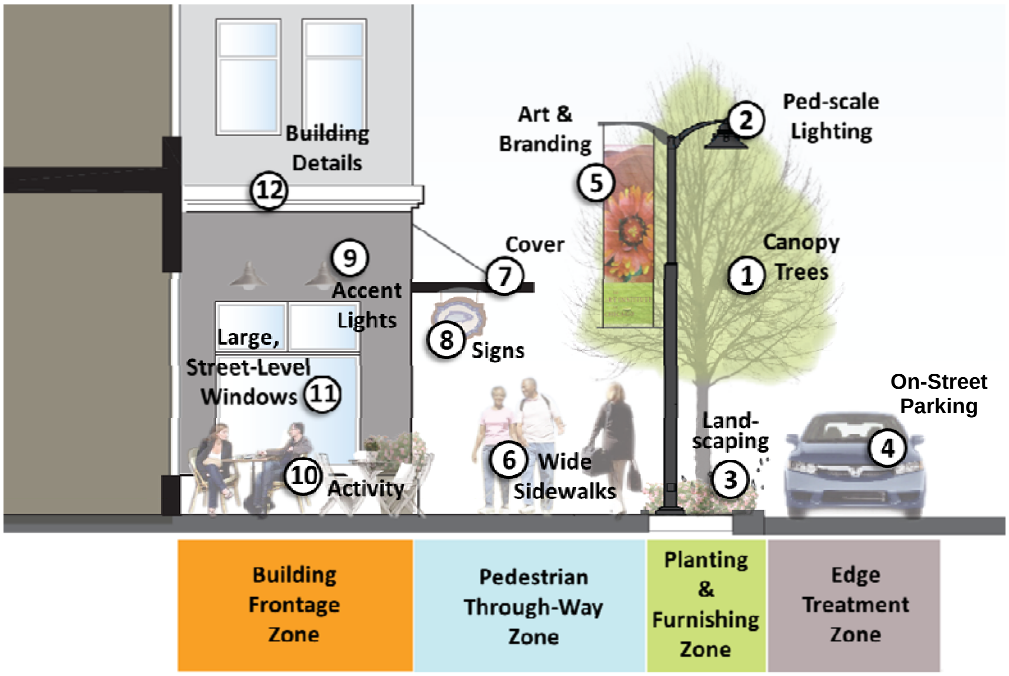
Planning-level cost estimates were developed for each alternative, with the facility designs specified in this memorandum. The cost estimates are shown in Table 9. The cost of the paving project ($2.1 Million) is the same for each alternative. The remaining costs vary by alternative, with the bulk of the costs due to rebuilding the sidewalks. Alternative 5 is the most expensive because it would provide the widest sidewalk and require reconstruction of existing curbs.

All costs shown are planning-level estimates in 2013 dollars and are subject to change. Details and assumptions for the cost estimates are shown in the appendix. The costs estimated for utility relocation ($2.6 Million) are not included in the estimates shown in Table 9.

Table 9: Planning-Level Cost Estimates (Million Dollars, in 2013 Dollars)

Alternative	Pavement Project	24th to 29th Ave	29th to 32nd Ave	Total
1	$2.1	$2.0	$0.5	$4.6
3	$2.1	$2.3	$0.5	$4.9
5	$2.1	$3.0	$0.5	$5.6

Pavement Project – City of Eugene project is planned to include paving, ADA accessibility, and stormwater improvements from 24th to 29th Avenue
24th to 29th Avenue – Additional costs vary by alternative
29th to 32nd Avenue – Additional costs same for all alternatives
*All costs are planning-level estimates subject to change



There are multiple elements of a successful street-side realm. While right-of-way constraints and other limitations can not be ignored, incorporating as many of these elements as feasible can help improve the functioning of the street.

Travel lanes, sidewalks, bike lanes, intersection design and transit stops are fundamental facility design elements. Each has a function and must provide safety and comfort for the intended users. The configuration of these elements will play a part in the streetscape design of Willamette Street, as the perceptions of ease of travel and the sense of safety and comfort may change for different users with each alternative.

The following section is focused on the elements of a unified streetscape that should be considered in conjunction with the roadway facility design alternatives described previously. The design concepts are intended to better balance comfort, safety, and appeal for all users and may be incorporated into many or all Plan alternatives to varying degrees.

Streetscape Elements

Most of the right-of-way design elements that will be experienced and appreciated as a streetscape occur within the sidewalk corridor. The sidewalk corridor is defined by the roadway curbs and the back of sidewalks. When that corridor has been well-designed, it accommodates three primary functions, with design treatments to support those functions. Figure 26 illustrates conceptual sidewalk corridors and how the streetscape elements and the pedestrian experience may be affected.

Through Pedestrian Zone: Comfortable and unobstructed walking is the primary function of the sidewalk corridor. Draft federal guidelines developed by the Public Rights-of-Way Access and Advisory Committee (PROWAAC), require a minimum

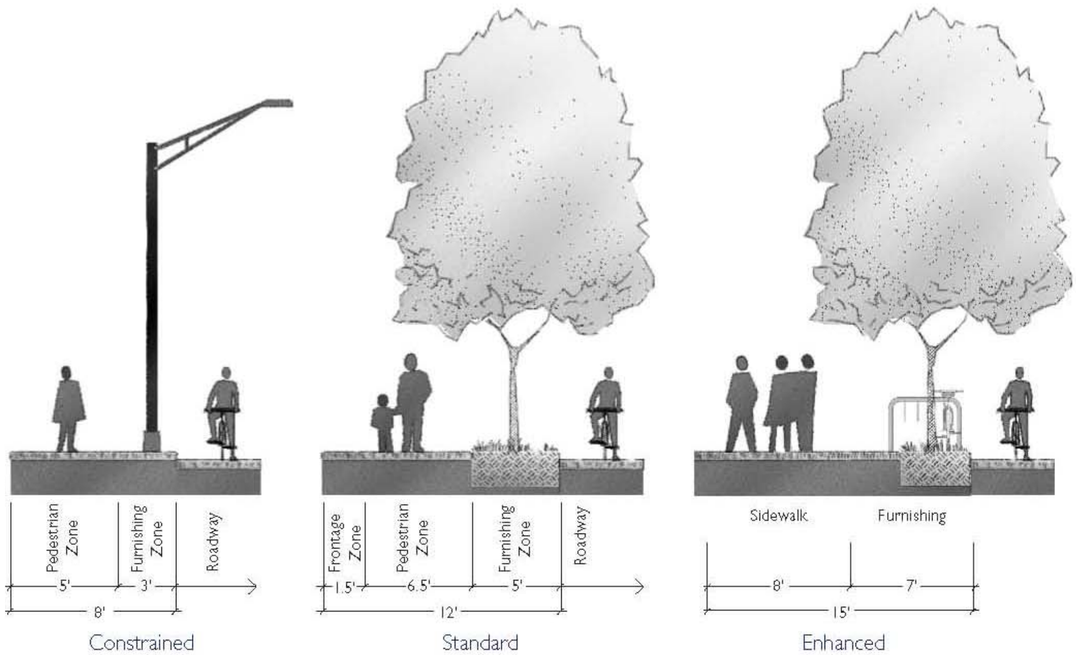


Figure 26: Sidewalk Corridor Design

width of 4-feet and a preferred width of 5-feet. A useful urban design standard is the ability of two people to walk comfortably side-by-side, which typically requires at least 6-feet.

Furnishings Zone: Accommodates streetscape elements such as utility poles, street lights, planters, trees, benches, bike racks and bus shelters. It may also accommodate Low-Impact Development (LID) features such as flow-through storm water planters. Pedestrian activities include transit boarding at designated stops, access to bike racks and access to on-street parking. The minimum desired width is 4-feet, with preferred widths of 5-feet to 7-feet.

Building Front Zone: For streets that support a significant amount of pedestrian-oriented retail, with buildings set close to sidewalks, an additional 1-foot to 2-feet is desirable to support storefront displays and window shopping.

Developing a Design Theme

Potential elements of a streetscape design theme for Willamette Street are described in the following section. Graphic representations of the potential elements are included in the appendix.

Unifying Streetscape Elements

Typical unifying elements of a streetscape are texture, color and form, along with other distinctive elements that create a unique functional or art-based character. Each of these elements can play an important role in the eventual transformation of Willamette into a signature street for the district.

Texture: Texture can be a unifying element by using a consistent palette of materials such as paving, walls, columns and railings. Opportunities for Willamette Street include sidewalk reconstruction and textured crosswalks at intersections, formalized mid-block pedestrian crossings or distinctive pavements for bike lanes.

Color: Color is a unifying element visually linked to texture. Colors can tie together places separated by distance and by function. Opportunities include any of the above elements that have special textures, as well as street furnishings such as bike racks, benches and bus shelters, and landscape materials with distinctive flowers or foliage colors.

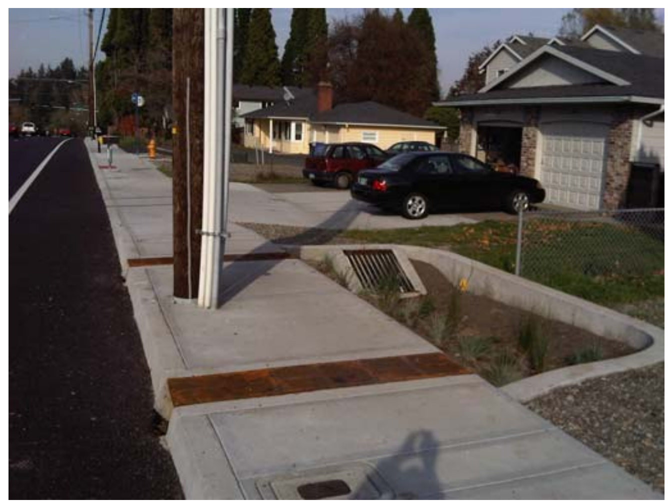
Form: Form can provide both visual unity and visual distinction. Both unity and distinction have a place in a well-designed streetscape. Form also provides a sensed of orientation within the public realm and can provide visual landmarks for the district. Opportunities include site furnishings, pedestrian-scale lighting, signage and bus shelters.

Flow-through planters serve for both landscaping and bioretention.

Additional Distinctive Elements — Green Street

Green Streets are primarily thought of as innovative facilities to treat and manage stormwater within the right-of-way. Those facilities create an ecological function for our streets, in addition to the traditional mobility and access functions. There are a number of Green Street facilities for stormwater. The selection of one or more facilities for Willamette Street will require detailed engineering analysis and consistency with existing City of Eugene stormwater standards. The choice of techniques will also be affected by the width of the sidewalk corridor in a preferred alternative. Typical facilities include the following:

Flow-Through Planters: Flow-through stormwater planters are a common bioretention facility in urban areas. They provide a distinctive architectural feature for the sidewalks of an urban Green Street where sidewalk widths are 12 feet or greater, with a minimum 5-foot furnishing zone available. The design and location of planters should consider other sidewalk uses, such as outdoor seating storefront displays, as well as maintenance of adequate passenger loading/unloading space for on-street parking.



Example of a basin.

Basins: Because of their larger size, basins are usually located behind the sidewalk. They are an alternative to planters in the furnishing zone if the sidewalk width is too constrained to accommodate both the planter and a comfortable walking space for pedestrians. In those instances, the overall street right-of-way need may be greater, or a stormwater management easement required since the width of a basin is greater than a planter due to side slopes.

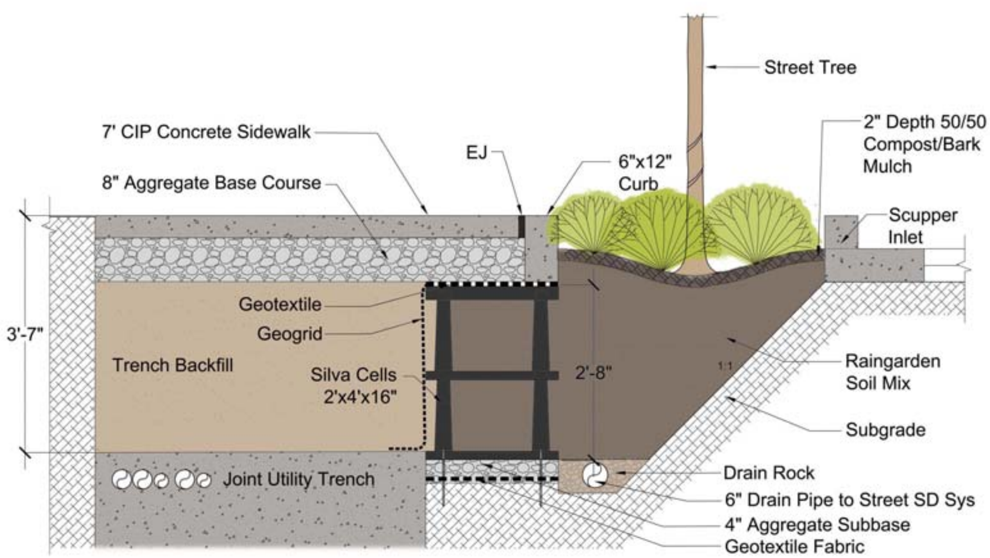
Filterras: Proprietary devices that treat stormwater through a physical process using amended soil and bioretention media combined with small street tree or a shrub. These devices can fit within the furnishing zone of a sidewalk corridor of 12-feet or greater in width.

Example of Filterras.

Permeable Paving: Many of the impermeable surfaces within the sidewalk corridor could be constructed using permeable paving material such as landscape planting, permeable concrete or porous paving blocks. This requires well-draining native soil. The disadvantages of permeable paving include difficulties with maintenance and repair, higher cost, and limited infiltration effectiveness of streets with a gradient over five percent. Permeable pavement can be used in conjunction with other Green Street features and will help reduce the required size of these facilities by lessening the amount of runoff coming off the paved surface.

Example of permeable paving.

Sidewalk Silva Cells: This technique creates a sidewalk rain garden along the roadway and partially under the sidewalk. Rain falls directly on permeable pavers and planters. The silva cells extend the rain garden underneath the sidewalk and into a soil media that treats stormwater and nurtures the landscaping.



Example concept diagram of sidewalk silva cells, which are located under the edge of the sidewalk adjacent to the landscaping subgrade.

It should be noted that Green Street principles are not limited to stormwater management. Other key elements of a Green Street are:

- Safe and appealing pedestrian environment
- Multimodal travel choices
- Maximizing opportunities for trees and landscaping
- Visual and physical connections to public spaces and open spaces
- Renewable energy for public signs and lighting

Additional Distinctive Elements – Public Art

Public art becomes another means for people to interact with each other and with the urban context. Creating a lively public realm with art intrigues, challenges and inspires us as it becomes part of our larger goal of improving the quality if civic life. Within the unifying elements of streetscape, it is also another opportunity to explore texture, color and form. Implementing a public art program should include assessing the potential for city and regional funding support and coordination with local businesses. Examples of public art within or along a street right-of-way have been included in the appendix.

Sidewalk Design

Existing sidewalks on Willamette Street are generally narrow with numerous obstructions and no separation from travel lanes. Each of the alternatives presented assumes sidewalks will be widened to construct the maximum allowable width within the existing right-of-way. Wider sidewalks that extend beyond the existing right-of-way may be constructed incrementally as properties redevelop.

Sidewalks on South Willamette Street are generally narrow with numerous obstructions, no separation from travel lanes, and a mixture of pedestrian and bicycle traffic.

Sidewalk Widening

Widening sidewalks will provide a more comfortable pedestrian environment that is accessible to more users and offers substantially greater support for the success of future businesses as the area redevelops. Wider sidewalks may also provide opportunities for landscaping, vegetation, storm water/drainage elements (e.g., bioswales), café seating, overhead signing, decorative lighting, bike parking, etc.

Example of narrow sidewalk with clearly defined planting and furnishings zone.

Example of bioswales (Source: OTAK)

Example of medium width sidewalk with furnishings and bike parking.

Example of vegetation/landscaping (Source: OTAK)

Example of wide sidewalk with planting buffer, street trees, and on-street parking .

Utility Relocation

Utilities (poles, hydrants, pedestals, etc.) currently located along the sidewalks result in an inconsistent and obstructed pedestrian environment. Relocating the utilities underground would improve the sidewalk environment by removing some barriers to pedestrian access and making the corridor more aesthetically pleasing. Similar opportunities, as were identified for widened sidewalks, would become available with utility relocation, since the available sidewalk space would be increased.

Alternative 1 and Alternative 3 have the most constrained sidewalk conditions (approximately 9-feet width with reconstruction). Even minor adjustments of utility pole locations to be fully within the Furnishings Zone represents a significant cost, but would increase the Through Pedestrian Zone to minimum widths. Reconstruction of the sidewalk corridor to 13-feet in Alternative 5 would require relocation of all above-ground utilities to the new Furnishings Zone location created by moving the curb lines into the current roadway area. In this scenario, ample pedestrian circulation space would be available.

The planning-level cost estimate for utility relocation on Willamette Street between 24th Avenue and 32nd Avenue is \$2.6 Million.[15] Enhancing the Pedestrian Zone by moving utility poles at select locations would be less expensive than putting all utilities underground.

Example of utility conflicts in sidewalk.

Streetscape Design Matrix

Figure 27 provides a summary matrix of how easily some of the typical amenities of a streetscape can be accommodated within the sidewalk corridors depicted in the alternatives. It is based on design principles described in the Streetscape Design Basics for Willamette Street figure (included in the appendix) and the accompanying narrative.

Willamette Street Amenities Matrix

	Alternative 1	Alternative 3	Alternative 5
Bus Stop Amenities			
Enhanced Bus Shelters	⊗	⊗	●
Sidewalk Character			
Wide Sidewalks (10' or greater)	⊗	⊗	●
Paved furnishing zone	●	●	●
Planter strip	●	●	●
Outdoor seating/retail focus	⊗	⊗	●
Textured Crosswalk	●	●	●
Sidewalk Furnishings			
Bike Racks	⊗	⊗	●
Benches	⊗	⊗	●
Trash receptacles	●	●	●
Lighting			
Pedestrian scale (18' tall or shorter)	●	●	●
Landscaping			
Deciduous tree canopy	⊗	⊗	●
Street corner planting	⊗	⊗	●
Landscaped tree wells	●	●	●
Stormwater facilities	⊗	⊗	●

Key	
Comfortably Accommodated	●
Constrained	⊗

Figure 27: Amenities Matrix

Participants at Community Forum #3, held in June 2013, benefited from a group discussion about the three South Willamette Street corridor alternatives and their expected transportation impacts. The purpose of the forum was to inform participants about the alternatives and solicit input regarding a preferred alternative.

This section compares transportation impacts of the three alternatives advanced for the South Willamette Street Improvement Plan. Traffic analysis was performed for the year 2018, and results include estimates of intersection operations, delay, vehicle queuing, travel time, neighborhood traffic shift and multimodal system performance for bicycles, pedestrians and transit. The analysis findings are further detailed in Technical Memorandum #8. Three case studies are also provided.

Future Traffic Operations

Future year traffic operations were analyzed for 2018 based on forecasts of future travel demand for the study corridor. Travel volume forecasts were developed using the regional travel demand model developed by the Lane Council of Governments (LCOG). The LCOG model provides land use and transportation estimates for base year 2011 and future year 2035. Traffic volumes for 2018 were developed by scaling between traffic counts taken in 2012 and future year 2035 forecasts.

Peak Hour Intersection Operations

Traffic operations analysis is based on applying *2000 Highway Capacity Manual* methodology[16] for isolated intersections. The estimated average delay, level of service (LOS), and volume to capacity (v/c) ratio of each study intersection is included.

Table 10 compares traffic operations for existing conditions (2012) and future year (2018) conditions for the existing configuration of Willamette Street. As shown, all of the study intersections are anticipated to meet the minimum performance

Table 10: Intersection Operations – Existing (2012) and Future No-Build (2018)

Intersection	Operating Standard	Existing P.M. Peak Hour			2018 P.M. Peak Hour		
		Delay	*LOS*	*V/C*	*Delay*	*LOS*	*V/C*
Signalized							
Willamette Street/24th Avenue	LOS D	12.4	B	0.61 (0.74)	12.5	B	0.62 (0.72)
Willamette Street/25th Avenue	LOS D	10.9	B	0.39 (0.50)	11.7	B	0.40 (0.51)
Willamette Street/27th Avenue	LOS D	8.6	A	0.47 (0.50)	9.5	A	0.51 (0.53)
Willamette Street/29th Avenue	LOS D	40.7	D	0.83 (0.85)	46.8	D	0.88 (0.90)
Willamette Street/32nd Avenue	LOS D	6.1	A	0.63 (0.63)	6.6	A	0.64 (0.64)
Unsignalized							
Willamette Street/Woodfield Station Driveway	N/A	4.7	A/D	0.58	4.7	A/D	0.59

Signalized Intersections:
LOS = Level of Service of Intersection
V/C = Volume-to-Capacity Ratio of Intersection (Critical Movement)

Unsignalized Intersections:
LOS = Level of Service of Major Street/Minor Street
V/C = Volume-to-Capacity Ratio of Worst Movement

standard of LOS "D" operations. However, more delay is anticipated in 2018 as a result of expected growth in motor vehicle traffic volumes.

Table 11 compares 2018 p.m. peak hour traffic operations for Alternatives 1, 3, and 5.(17) Alternatives 3 and 5 are considered to be the same for motor vehicle traffic operations. Key facility design assumptions affecting traffic operations are listed below:

- Applying the proposed 3-lane facility design (for Alternatives 3 and 5) on Willamette Street at the 29th Avenue would result in failing operations (LOS F) with traffic demand reaching capacity (v/c of 1.0). Therefore, the previously described design modification was applied to include both of the existing southbound through travel lanes (and a left turn pocket) at 29th Avenue for Alternatives 3 and 5.
- For northbound travel through the 29th Avenue intersection, there are two travel lanes on Willamette Street included in Alternative 1 and one in Alternatives 3 and 5. The existing second northbound travel lane would be replaced by bike lanes (Alternative 3) or wider sidewalks (Alternative 5).
- A traffic signal at the Woodfield Station Driveway intersection is assumed to be constructed in each alternative. The signal provides a pedestrian crossing and improved turning opportunities for motor vehicle traffic.
- The Willamette Street approaches at 24th Avenue, 25th Avenue, and 27th Avenue intersections each have one through lane and a center left turn lane (with permissive left turn signal phasing assumed) in Alternatives 3 and 5.

For most study intersections, more delay is anticipated in Alternatives 3 and 5 due to the reduction of travel lanes for motor vehicles. However, all of the study intersections are anticipated to meet the minimum performance standard of LOS "D" operations in all alternatives,

Table 11: Intersection Operations for Alternatives - Future Year 2018 P.M. Peak Hour

Intersection	Operating Standard	Alternative 1			Alternative 3 and 5		
		Delay	*LOS*	*V/C*	*Delay*	*LOS*	*V/C*
Willamette Street/24th Avenue	LOS D	13.2	B	0.63 (0.75)	22.4	C	0.80 (0.81)
Willamette Street/25th Avenue	LOS D	11.8	B	0.40 (0.51)	17.4	B	0.69 (0.91)
Willamette Street/27th Avenue	LOS D	10.7	B	0.51 (0.53)	13.9	B	0.82 (0.94)
Willamette Street/Woodfield Station Driveway	LOS D	12.0	B	0.41 (0.46)	16.2	B	0.45 (0.50)
Willamette Street/29th Avenue[a]	LOS D	48.5	D	0.87 (0.90)	56.3	E	0.90 (0.94)
Willamette Street/32nd Avenue	LOS D	6.6	A	0.64 (0.64)	6.4	A	0.63 (0.63)

Signalized Intersections:
LOS = Level of Service of Intersection

[a] The saturation flow rate for the northbound approach was reduced by approximately 15% to reflect simulation results showing lanes being blocked in Alternatives 3 and 5.

with the exception of Willamette Street at 29th Avenue in Alternative 3 or 5.

At the intersection of Willamette Street and 29th Avenue, the southbound capacity is maintained (two southbound travel lanes and a left turn pocket) to serve the peak direction of travel (critical movement) resulting in no significant change in traffic delay in the southbound direction. However, the northbound approach has one fewer travel lanes and motor vehicle delay would increase for northbound travel.

Furthermore, the northbound left turn lane may regularly exceed the available storage length of 150 feet. In the existing configuration (and Alternative 1), through traveling vehicles may use the right lane to get around when the left lane is blocked by the full left turn lane. With one through travel lane (Alternatives 3 and 5), the second lane will not be available and therefore through traveling vehicles will be blocked. This situation may be mitigated by modifying signal timing to provide more green time to the northbound left turn (which requires increasing delay for other movements) or widening to extend the storage length of the northbound left turn pocket.

Off-Peak Intersection Operations

Intersection operations were also analyzed for three periods outside of the p.m. peak hour: the a.m. peak hour (8-9 a.m.), the mid-day peak hour (12-1 p.m.), and the p.m. peak shoulder (4-5 p.m.). Traffic volume forecasts for each period were based on the traffic counts and the growth rate identified for the p.m. peak hour.[18] The off-peak periods generally had less delay than the p.m. peak hour and all of the study intersections were anticipated to meet the minimum performance standard of LOS "D" operations in all alternatives, with the exception of Willamette Street at 29th Avenue during the a.m. peak hour in Alternative 3 or 5.

Due to the directional characteristics of the a.m. traffic volume, delay on northbound approaches is higher in the a.m. peak compared to the p.m. peak. The intersection at 29th Avenue would have higher overall average delay in Alternative 3 and 5 during the a.m. peak hour compared to the p.m. peak hour. Alternative 3 and 5 provide one northbound through lane (compared to two in Alternative 1). The northbound approach volumes would come close to the available capacity during the 2018 a.m. peak, resulting in slightly higher overall delay compared to the p.m. peak hour.

Vehicle Queuing

Traffic simulations were performed for the 2018 p.m. peak hour to estimate expected vehicle queuing. The results of the p.m. peak hour vehicle queuing comparison between Alternative 1 and Alternatives 3 and 5 indicate that vehicle queuing increases most significantly for southbound through travel between 24th Avenue and 27th Avenue and northbound through travel at 29th Avenue.

Average southbound vehicle queues between 24th and 27th Avenue may increase by 50 to 150 feet (or approximately 2-6 car lengths) at these intersections. However, with dedicated left turn lanes present, vehicle queues for left turns would decrease. At 29th Avenue, removing one of the two northbound through travel lanes would increase northbound vehicle queues by up to 200 feet (or approximately 8 car lengths). As a result, access to the northbound left turn lane may be blocked more frequently during peak hours.

Overall, locations where motor vehicle lanes are reduced for through travel may expect to see vehicle queues approximately double in length. A comparison of the average southbound vehicle queue during the p.m. peak hour is illustrated in Figure 28 for Alternatives 1 and 5. The simulation results including vehicle queuing for all lane movements are detailed in the appendix.

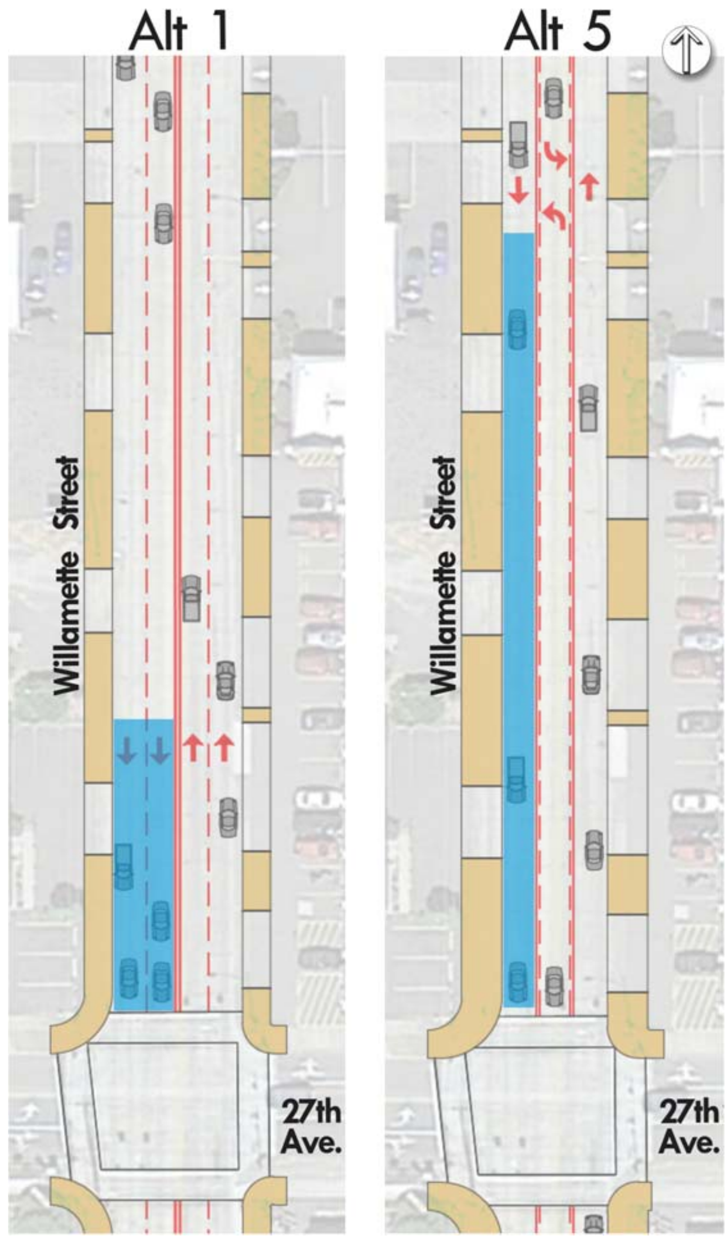


Figure 28: Comparison of Average Southbound Vehicle Queues

Travel Time

The estimated average travel times between 24th Avenue and 32nd Avenue during the 2018 p.m. peak hour are summarized in Table 12 for each alternative and illustrated in Figure 29. The estimated travel times are averages over the hour, based on traffic simulations of a weekday p.m. peak hour in 2018. The base year simulations were calibrated to field-measured travel times for typical weekday travel.

The simulation results including travel times are detailed in the appendix.

Results of the simulation indicate average p.m. peak hour travel times would increase by approximately 30 seconds in both directions for Alternatives 3 and 5. In addition, the reliability of travel time may be better in Alternative 1, as simulation results for Alternatives 3 and 5 showed increased variance.

Table 12: Travel Time Comparison for Alternatives - Future Year 2018 P.M. Peak Hour

Direction	Alternative 1	Alternative 3 and 5
Northbound (32nd Avenue to 24th Avenue)	2 minutes 55 seconds – 3 minutes 05 seconds	3 minutes 15 seconds – 3 minutes 45 seconds
Southbound (24th Avenue to 32nd Avenue)	3 minutes 20 seconds – 4 minutes 10 seconds	3 minutes 30 seconds – 4 minutes 50 seconds

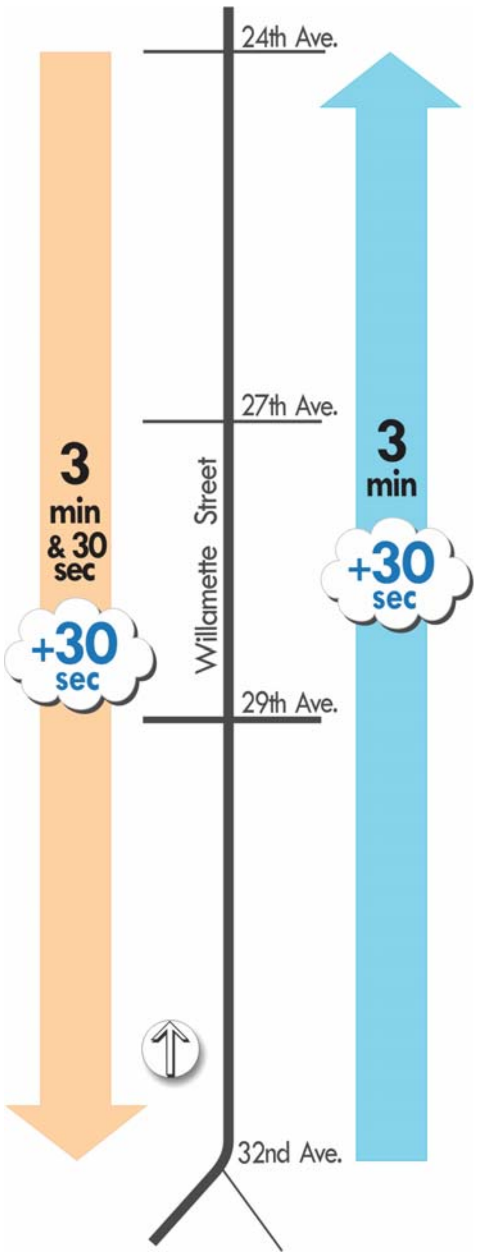


Figure 29: Change in Estimated Average Travel Times (2018 p.m. peak hour) for Alternative 3 & 5 compared to Alternative 1

Roundabout Evaluation

To evaluate the effectiveness of roundabouts on Willamette Street, each of the study intersections was analyzed with a potential roundabout configuration. The assumed size and layout of the roundabouts analyzed are typical for urban environments. The results of the traffic operations analysis for the 2018 p.m. peak hour indicate that that some intersections (at 24th Avenue and 27th Avenue) would have approaches operating near capacity during the p.m. peak hour if constructed as single lane roundabouts.

Although roundabout operations would adequately serve traffic demand at the 25th Avenue and Woodfield Station Driveway intersections, mixing traffic signals and roundabouts in close proximity along the corridor could present negative outcomes for traffic operations and safety due to driver expectations. Roundabouts are not explicitly included in the facility design of any alternative but may be considered further as potential design refinements.

Bicycle Lanes Effects on Traffic Operations

The bicycle lanes included in Alternative 3 would make Willamette Street a more attractive bike route to many types of riders. The bike lanes would also provide a buffer for pedestrians. Bike lanes make it easier for cars and trucks to maneuver in and out of driveways, compared to a three-lane section with no bike lanes. In addition, buses would stop in bike lanes during passenger boarding and alighting, which would provide additional space for motor vehicles to overtake the bus when it is safe to do so.

However, to construct bike lanes either the roadway must be widened or existing travel lanes must be removed. Previous sections of this memorandum have covered the increased motor vehicle delay that results from removing travel lanes (i.e., traffic operations in Alternative 1 compared to Alternatives 3 and 5). This section discusses the differences in traffic operations between Alternative 3 and Alternative 5 (i.e., the effect of bike lines to otherwise identical roadway configurations).

Although bicycle lanes would not have a significant direct effect on motor vehicle operations, higher volumes of bicycles on the roadway may increase delays for turning motor vehicles. The magnitude of potential increase in bicycle traffic is not precisely known. However, to demonstrate potential sensitivity of motor vehicle operation to bike lanes, the intersection operations analysis was repeated with existing bicycle volumes doubled. Traffic operations analysis outputs, with bicycle volumes doubled for Alternative 3 are included in the appendix.

The results of this analysis indicate that doubling bike volumes would increase average delay per motor vehicle by less than half a second at all study intersections. No changes to level of service were found to result from this sensitivity test. Therefore, motor vehicle traffic operations for Alternatives 3 and 5 are considered to be the same.

Bus Pullout Effects on Traffic Operations

Bus pullouts provide a dedicated space outside of the primary travel lane for passenger boarding and alighting. Where bus pullouts are constructed, buses exit the travel lane for passenger boarding and reenter (merge) after boarding is complete.

The primary benefit of bus pullouts is that motor vehicles avoid delays when the travel lane is blocked by stopped buses. However, bus service would likely incur increased delay and potential conflicts when attempting to merge back into the travel lane. Therefore, transit operators often prefer to locate bus stops within the travel lane. Lane Transit District (LTD) has no official policy on bus pullouts, but would generally prefer to keep curbside transit stops along Willamette Street.[19]

To attempt to quantify the effect of including bus pullouts, p.m. peak hour intersection traffic operations were evaluated with and without bus blockages for Alternatives 3 and 5. The analysis assumed the existing service frequency was doubled (i.e., twice the number of buses on the corridor relative to the existing service which provides two per hour north of 29th Avenue and the five per hour south of 29th Avenue.) Details for intersection operations with bus pullouts are included in the appendix. Bus pullouts are not considered for Alternative 1 due to the presence of two travel lanes for most of the corridor.

Although travel time would likely increase a few times an hour for vehicles delayed behind slower-moving buses, the average effect for the overall p.m. peak hour is negligible. The results of the analysis indicate that bus pullouts would reduce average delay per vehicle by less than one second at all study intersections. No changes to level of service results were found.

Due to the relatively minor differences in travel delay, the right-of-way impacts if constructed, increased difficulty for bus operations and lack of support from LTD, bus pullouts are not included in any of the alternatives. Constructing bus pullouts may be revaluated with future redevelopment of the corridor or if additional transit services are provided (e.g., increased frequency, routing changes).

TRAFFIC SHIFT

Potential changes in traffic patterns could result from modifying portions of Willamette Street from four motor vehicle travel lanes (in Alternative 1) to three (in Alternatives 3 and 5). With increased travel times on Willamette Street estimated for Alternative 3 and 5, some traffic may shift away from Willamette Street to other roadways. Table 13 and Figure 30 identify estimated traffic volumes on Willamette Street for each alternative.[20]

Traffic shifting away from Willamette Street would primarily reroute to streets east of Willamette Street. Approximately two thirds of the shift would go to Amazon Parkway and Hilyard Street. Approximately one third of the shift would redistribute to streets west of Willamette Street including Lincoln Street, Jefferson Street, Adams Street and Polk Street. The traffic shift west of Willamette Street would be fairly evenly distributed between those roadways.

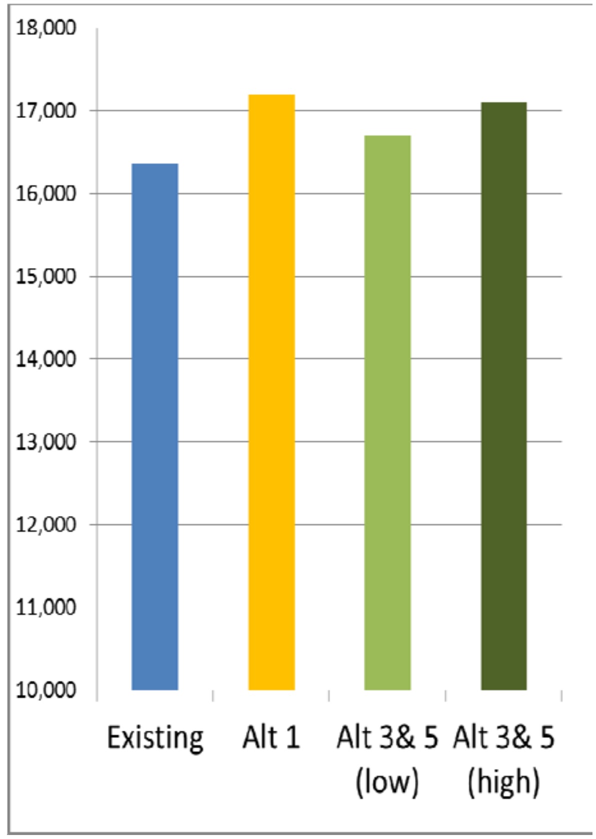


Figure 30: Average Daily Traffic Volumes

Table 13: Willamette Street Traffic Volume Comparison for Alternatives – Future Year 2018

Scenario/Measure	Average Daily	P.M. Peak Hour
Current Year (2012)	16,360	1,550
Alternative 1	17,200	1,625
Alternative 3 & 5	16,700 to 17,100	1,525 to 1,600
Change (reduction compared to Alternative 1)	-100 to -500	-25 to -100
Percent Change (compared to Alternative 1)	-1 to -3%	-2 to -6%
Traffic volume estimates are for Willamette Street south of 27th Avenue		

Multimodal Level of Service

Auto, pedestrian, bicycle and transit operations along Willamette Street were evaluated for the plan alternatives by using the multimodal level of service (MMLOS) methodologies previously described for the existing conditions analysis. The MMLOS evaluation assesses users' perceived comfort level along a facility segment for each mode of transportation.

Analysis was performed based on 2018 p.m. peak hour conditions when the higher traffic volumes would result in the worst case level of service for each mode of transportation. Despite the previously noted limitations of the approach, the MMLOS evaluation provides value as an objective comparison between alternatives that consider multiple modes.

The expected MMLOS operations for Willamette Street in the 2018 p.m. peak hour are shown for Alternative 1 in Figure 31, Alternative 3 in Figure 32, and Alternative 5 in Figure 33. Results are summarized for each mode below:

- The auto mode results indicate the best performance in Alternative 1, with southbound segments from 24th Avenue to 27th Avenue degrading from LOS C or D to LOS F in Alternatives 3 and 5.

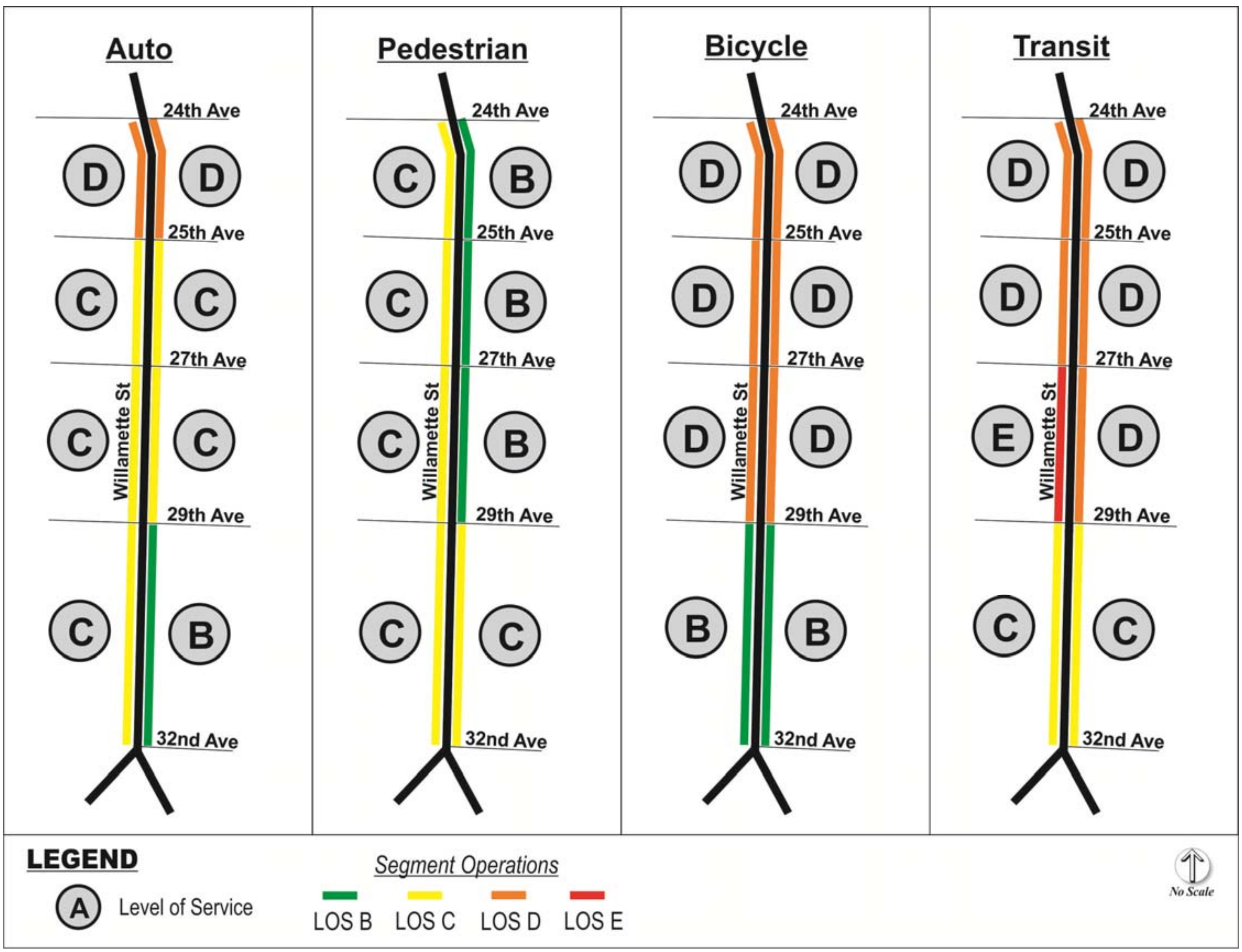


Figure 31: Alternative 1 — 2018 PM Peak Hour Multimodal Level of Service (MMLOS)

- The pedestrian mode results are best for Alternative 5, with several segments improving due to wider sidewalks than Alternative 1 or 3. Alternative 3 results in the lowest pedestrian operations; LOS D southbound between 24th Avenue and 27th Avenue, due to the higher volume of vehicles in the near travel lane. It should be noted that the MMLOS methodology rates pedestrian comfort higher in Alternative 1 than Alternative 3 despite the presence of a bike lane serving as a buffer between cars and pedestrians.

- Bicycle operations would improve from LOS D to LOS B by replacing a motor vehicle lane with continuous bike lanes (Alternative 3). However, bicycle operations would degrade from LOS D to LOS E on some segments if travel lanes are reduced without adding bike lanes (Alternative 5).

- Transit operations are rated slightly higher in Alternative 1 than in Alternatives 3 and 5 due to providing the highest level of mobility (i.e., travel time) for all motor vehicles, including buses.

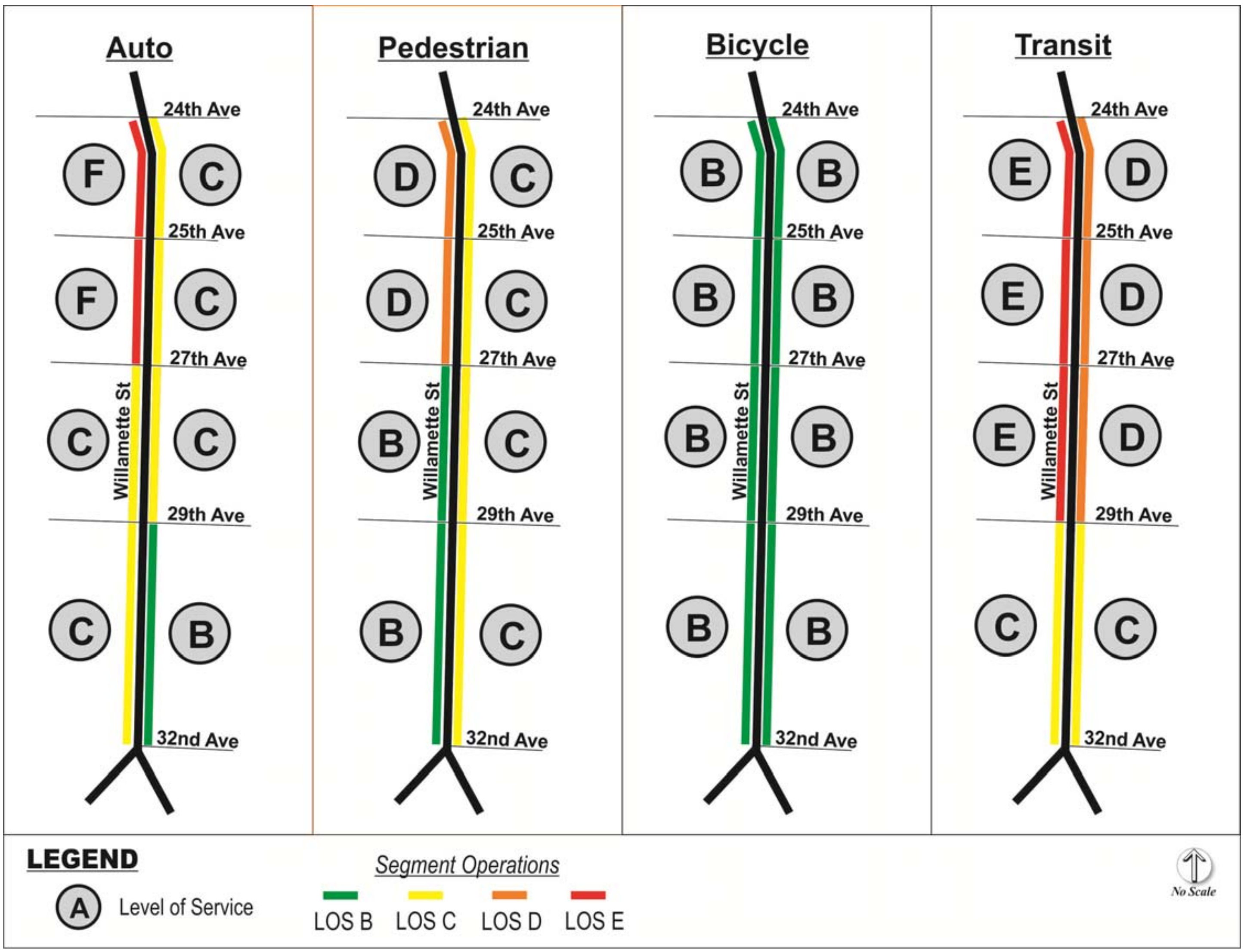


Figure 32: Alternative 3 — 2018 PM Peak Hour Multimodal Level of Service (MMLOS)

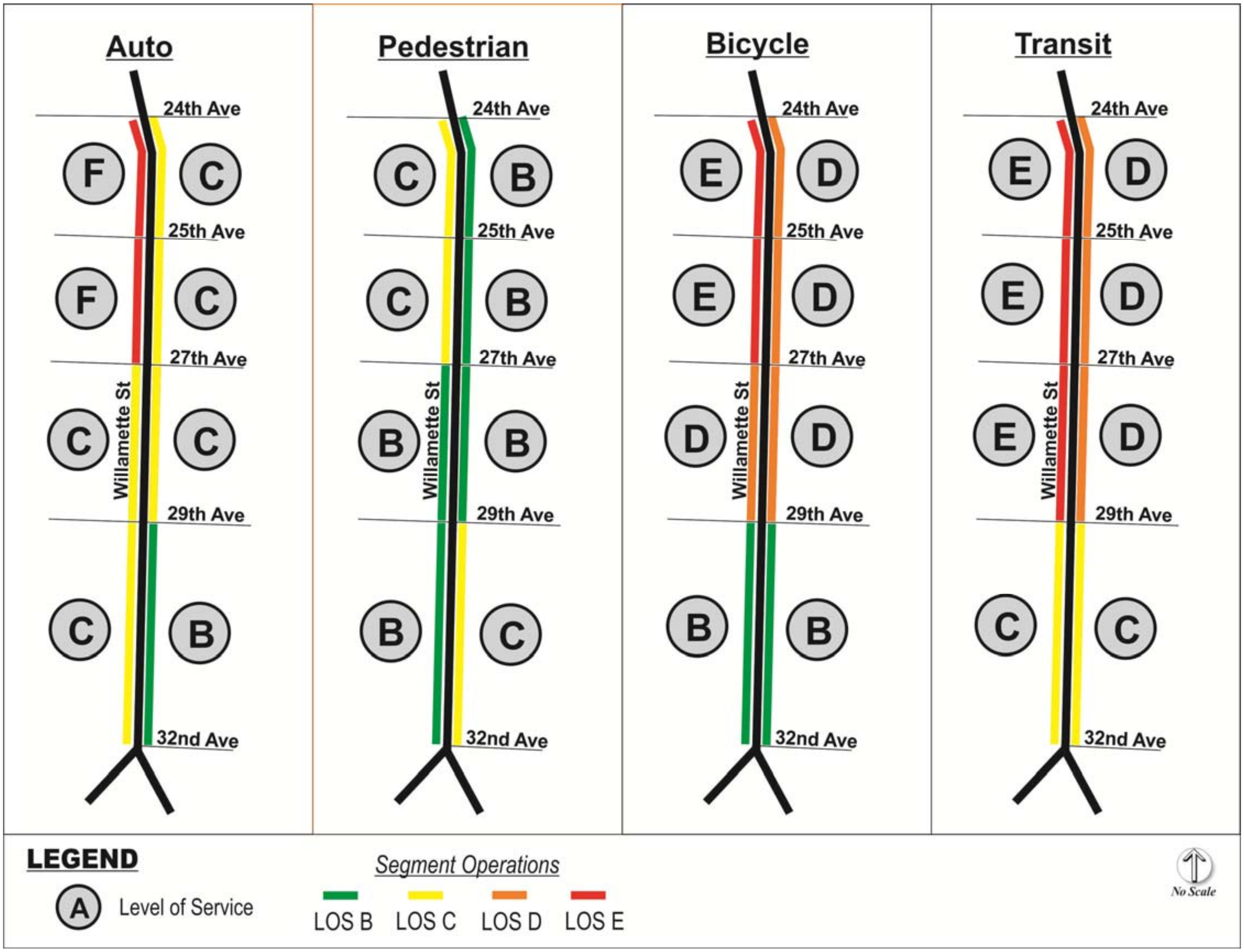


Figure 33: Alternative 5 — 2018 PM Peak Hour Multimodal Level of Service (MMLOS)

Case Studies

Converting a 4-lane roadway into a 3-lane roadway has become a common practice to improve safety, accessibility and livability of a corridor. Several corridors with characteristics similar to Willamette Street were selected as case studies to demonstrate the potential effectiveness of this strategy, which has been proposed in Alternatives 3 and 5.

The average daily traffic (ADT) is a key characteristic when selecting comparable corridors, as there is concern that traffic volumes along Willamette Street will result in excessive congestion if it is converted to a 3-lane roadway. Other important factors to determining the potential effectiveness of this strategy along Willamette Street include adjacent land use, number of driveways, and the frequency of signalized intersections.

Table 14 summarizes the characteristics of Willamette Street along with the corridors selected as case studies. Each case study is described in further detail in the following paragraphs. The roadway conversion outcomes are summarized in Table 15.

Table 14: Case Study Corridors — Characteristics Summary

Corridor	Length	Posted Speed	ADT	Number of Traffic Signals	Adjacent Land Use
Willamette Street (Eugene, OR)	0.8 miles	25 mph	16,500	5	Mostly commercial, some single-family homes and apartments
Nickerson Street (Seattle, WA)	1.2 miles	30 mph	18,500	4	Commercial, light industrial, medium-density residential
Fourth Plain Blvd (Vancouver, WA)	1.0 miles	30 mph	17,000	5	Single-family residential, some commercial and light industrial
Edgewater Drive (Orlando, Florida)	1.5 miles	30 mph	20,000	8	Commercial and retail

Table 15: Case Study Corridors — Roadway Conversion Outcomes Summary

Outcome Category	Measure	Corridor	Before	After	Change
Motor Vehicle Speed	85^{th} Percentile Speed	Nickerson St.	41 mph WB 44 mph EB	33 mph WB 33 mph EB	-18% WB, -24% EB
	Average Speed	Fourth Plain Blvd.	29 mph	24 mph	-18%
	Top-End Speeders	Nickerson St.	17% WB 38% EB	1% WB 2% EB	-92% WB, -96% EB
	Top-End Speeders	Edgewater Dr.	18%	12%	-33%
Safety	Collisions	Nickerson St.	34 per year	26 per year	-23%
	Collisions	Fourth Plain Blvd.	4.2 per month	2.0 per month	-52%
	Collision Rate (per Million Vehicle Miles)	Edgewater Dr.	12.6	8.4	-34%
	Injury Collision Rate (per Million Vehicle Miles)	Edgewater Dr.	3.6	1.2	-68%
Volume	Average Daily Traffic	Nickerson St.	18,500	18,300	-1%
	Average Daily Traffic	Edgewater Dr.	20,500	18,100	-12%
	Pedestrians	Edgewater Dr.	2,136	2,632	23%
	Bicycles	Edgewater Dr.	375	486	30%

Note: WB = Westbound, EB = Eastbound

Nickerson Street (Seattle, WA)

In 2010, a 1.2 mile section of Nickerson Street was reconfigured from four lanes to two travel lanes, a two-way left-turn lane, and bike lanes in select locations.[21] When compared to Willamette Street, this corridor carried slightly higher traffic volumes, was similar in adjacent land use and driveway frequency, and had fewer traffic signals. Similar to Willamette Street, it also had two local bus routes operating with peak headways of 15-60 minutes.

Collision, speed and traffic volumes were monitored before and after the conversion to determine its effectiveness. Prior to the conversion, motor vehicle speeds commonly exceeded the posted speed limit of 30 mph. The 85^{th} percentile traffic speeds were measured as 41 mph westbound and 44 mph eastbound. After the reconfiguration, 85^{th} percentile speeds reduced to approximately 33 mph in both directions, a decrease of 18% for westbound traffic and 24% for eastbound traffic. The number of top-end speeders (i.e., those traveling 10+ mph over the speed limit) was reduced by over 90% in both directions.

The number of collisions was monitored for one year after completion of the project. A total of 26 collisions were recorded, 23% less than the previous 5-year average of 33.6 collisions per year. Traffic volumes on Nickerson Street decreased from 18,500 to 18,300 vehicles, or approximately 200 fewer vehicles per day (1% decrease). Potential alternative routes also experienced slight decreases in traffic volume, indicating that the change was likely part of a region-wide decrease.

Fourth Plain Boulevard (Vancouver, WA)

In 2001, a 1.0 mile stretch of Fourth Plain Boulevard was restriped to include two travel lanes, a center two-way left-turn lane, and bicycle lanes on both sides. This corridor is surrounded by slightly more residential land uses than Willamette Street, but it is similar in ADT, driveway spacing, and number of traffic signals. There are several closely spaced signalized intersections along the western portion of the project.

Figure 34 depicts conditions along the corridor before and after implementation. In addition, a post-

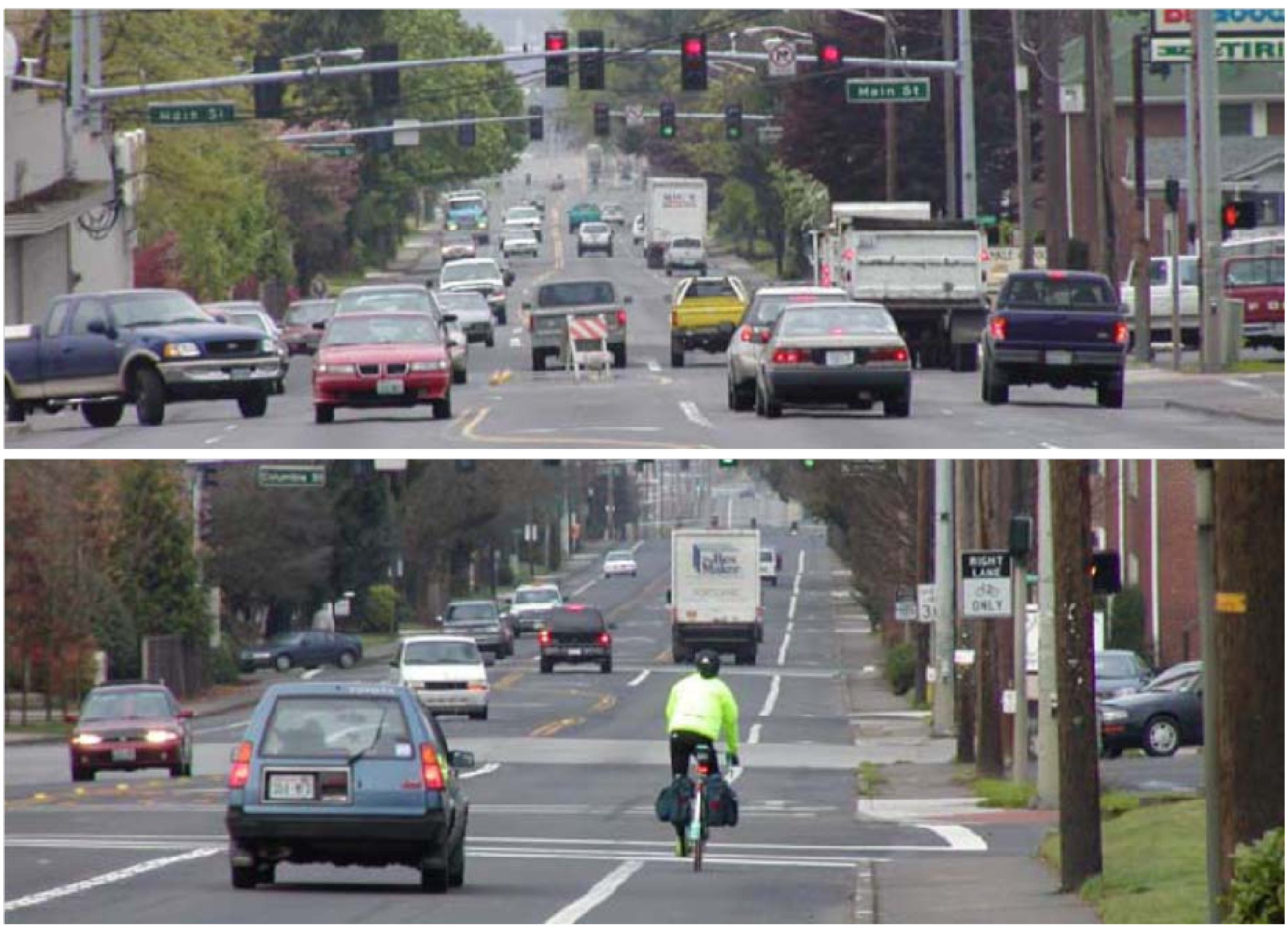


Figure 34: Before (Top) and After (Bottom) Photos along Fourth Plain Boulevard[22]

implementation report[22] was prepared to evaluate the impact of the roadway changes. It was found that speeds dropped approximately 18% (from 29 mph to 24 mph) in the year following the conversion, stabilizing around 25 mph afterwards. The number of collisions dropped by more than 50% (from approximately four per month to two) following implementation when compared to the previous three years of crash data.

Traffic operations were a major concern associated with changing the lane configuration of the corridor. There were no reports of queues continually interrupting access to adjacent residences or businesses, rather, improvements in access were noted due to the addition of a center turn lane. While minor increases in travel time were observed, improved quality of service and safety resulted in an overall positive rating for the project. Periodic signal timing adjustments were identified as a follow-up task to ensure optimal performance between closely spaced intersections.

Edgewater Drive (Orlando, FL)

Edgewater Drive was transformed from four lanes to two lanes, a center two-way left-turn lane, and bike lanes in 2002.[23] The project corridor was approximately 1.5 miles long and almost exclusively surrounded by commercial and retail land uses. This roadway serves as the primary north-south road through the College Park neighborhood and carried approximately 20,000 vehicles a day prior to the conversion. Some portions of Edgewater Drive have on-street parking and there are numerous driveways and unsignalized intersections along the corridor.

A before-and-after evaluation of the implementation found the crash rate decreased by 34%, with injury-causing crashes decreasing by 68%. It was reported that the number of vehicles traveling over 36 mph (posted speed of 30 mph) decreased from roughly 18% to 12%.

Traffic volumes along Edgewater Drive decreased by roughly 12%, dropping from 20,500 vehicles per day to 18,100 vehicles per day. While some locations adjacent to Edgewater Drive experienced up to a 30% increase in traffic volumes, the total combined traffic volumes on all the surrounding streets decreased by an average of 4%. Bicycle and pedestrian counts at 18 locations indicated that the number of pedestrians increased by 23% and the number of bicycles increased by 30%.

Community Forum #3 – Refine the Alternatives

Community Forum 3 was held in June of 2013. The project team presented more detailed information about the three alternatives advanced for public consideration. The information included transportation performance measures, traffic impacts of each alternative, more details of facility design, and cost estimates.

The primary objective of the meeting was to inform participants about the alternatives and ask participants for input in regards to a preferred alternative. Input was received via a survey that was filled out at the meeting or online.

Survey Results

The project developed a survey to gather public input on the impacts of the three remaining design alternatives for the South Willamette Street Improvement Plan. Survey questions were designed to gather public opinion on the results of the transportation analysis presented at Community Forum 3.

The survey was conducted at both Community Forum #3 and online for a 7-day period following the June 11th forum. Out of approximately 275 people who attended Forum #3, 223 completed surveys. In addition, 394 surveys were conducted online. Forum participants benefited from a presentation and group discussion, while online participants relied on graphics built into the survey.

The surveys are unscientific and the results do not represent community demographics. Key highlights of the survey results are summarized below.

- Safety, access to businesses, and improved pedestrian crossings rated highest on a list of nine possible objectives for the study area.
- Support was expressed for further evaluation of a potential installation of a traffic signal at the Woodfield Station driveway, with less than 20% of survey responses in the "definitely not" or "I don't think so" response. The most common response was "It might be helpful."
- More than 60% of respondents said an additional 60 seconds of delay per trip on the corridor would be acceptable to them.
- More than 50% of the respondents said they were "OK with the idea" for a small portion of Willamette Street traffic to shift to parallel routes during peak hours.

Alternative 3 received the most favorable responses in meeting the needs of the community amongst the three alternatives presented.

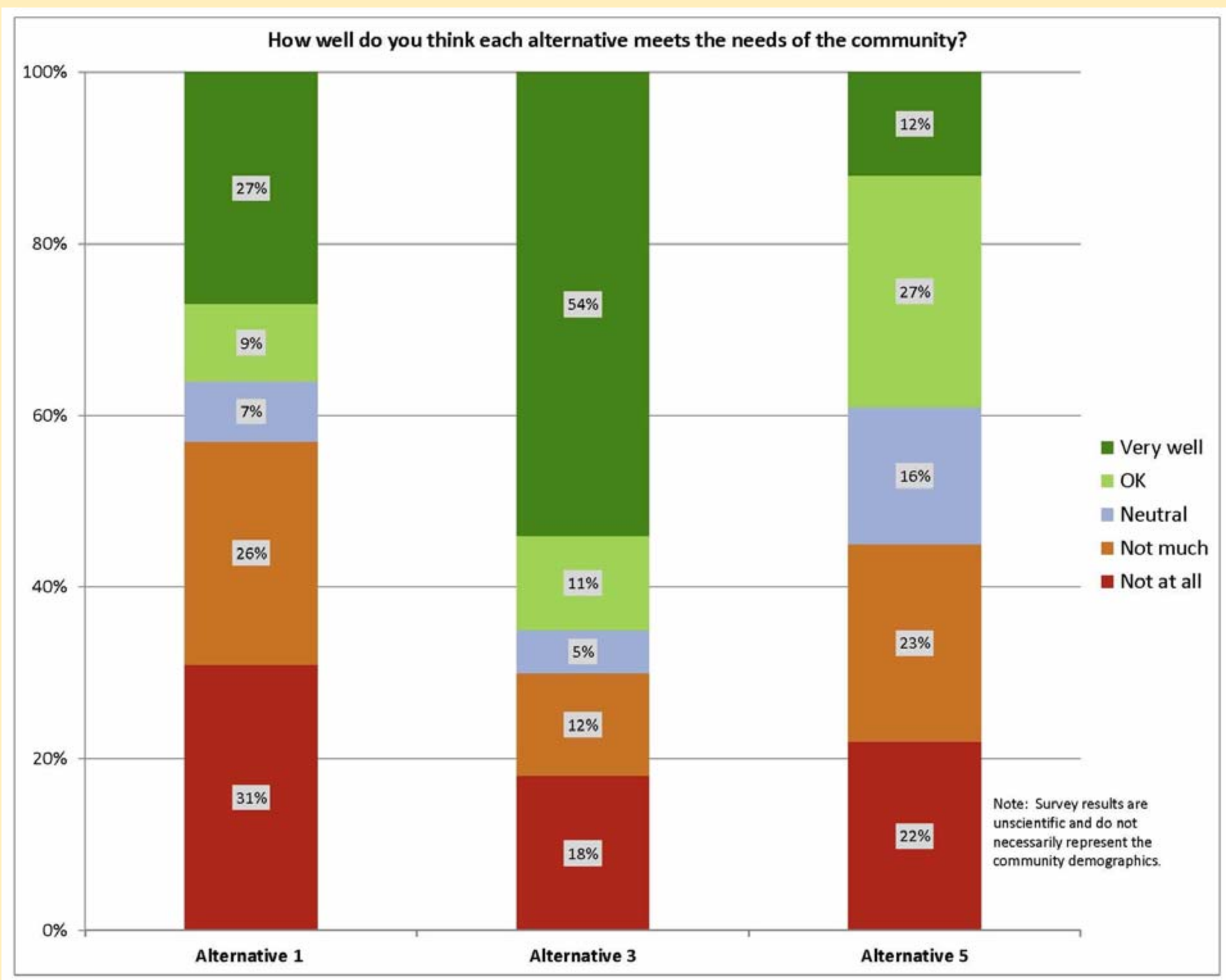


Figure 35: Online Public Survey Response—Meeting Community Needs

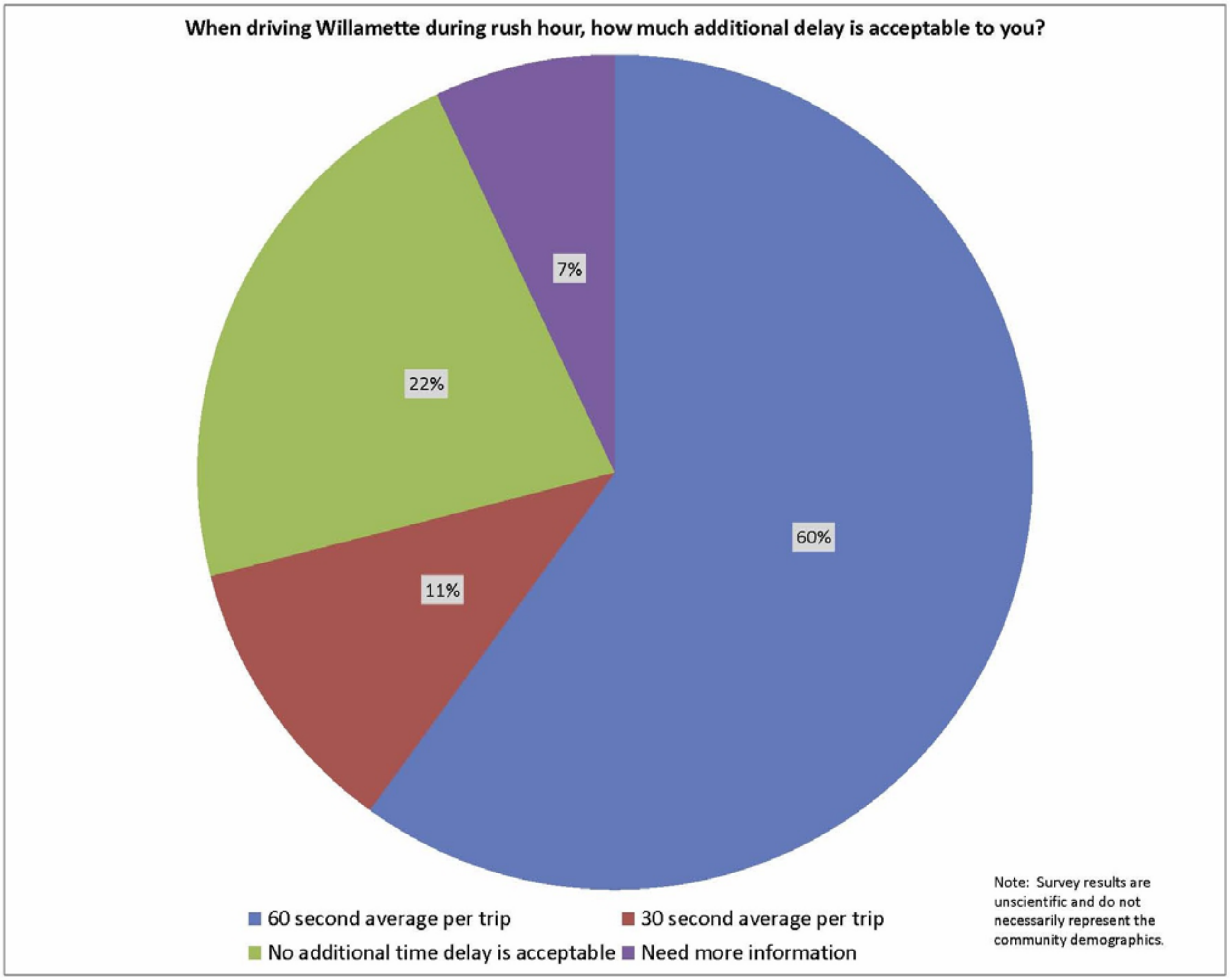


Figure 36: Online Public Survey Response— Additional Delay

Stakeholder Group Discussions

In addition to public meetings and an online survey, stakeholder group discussions were held at four key points during the Plan development process. The discussions provided an opportunity to hear diverse perspectives from business and property owners, freight vehicle operators, bicyclists, pedestrians, local residents, and commuters from south of the study area.

Generalized stakeholder views are summarized below:

Business and Property Owners, and Freight Vehicle Operators

- Many stakeholders expressed serious concern about potential negative impacts on businesses from reducing car travel lanes
- Other stakeholders felt the status quo was unacceptable and welcomed change
- Supported improved pedestrian environment and utility relocation
- Final outcome should do no harm to existing businesses
- Impacts of buses stopped in through lanes were a major concern
- Must be functional for EMS and large delivery vehicles
- Supported development of bike routes on parallel streets with connections to Willamette Street
- Mostly positive feedback toward adding a traffic signal at the Woodfield Station driveway

Local Residents, Bicyclists, Pedestrians, and Commuters from South of the Study Area

- Variety of opinions expressed
- Many stakeholders favored 3-lane with bike lanes (Alternative 3) while others strongly favored 4-lane (Alternative 1)
- Safety is a primary consideration for most
- Separate pedestrians from bicyclists by adding bike lanes, otherwise bicyclists will use sidewalk
- Some stakeholders felt that bike lanes on Willamette will never be safe
- Some bicyclists felt that parallel routes are inadequate and that they have right to use public roadway for their chosen method of transportation
- Support for traffic signal at Woodfield Station driveway and additional pedestrian crossing opportunities

Endnotes

(1) *Tube counts collected south of the Willamette Street/27th Avenue intersection on 7/22/2010*

(2) *TransPlan: The Eugene –Springfield Transportation System Plan, Lane Council of Governments, July 2002*

(3) *Eugene Pedestrian and Bicycle Master Plan Road Reconfiguration Assessment, May 2011*

(4) *Walkable Community Workshop Summary Report, May 2004*

(5) *Willamette Street Traffic Analysis, McKenney Engineering, June 2001*

(6) *City of Eugene 2007 Traffic Flow Map, downloaded from City website (www.eugene-or.gov)*

(7) *24-hour data was collected on weekdays between May 28th and June 5th, 2013.*

(8) *24-hour bi-directional volume count taken on July 20, 2010 and 24-hour speed counts taken on October 2, 2012.*

(9) *Turn movement counts taken on October 2nd and 3rd, 2012.*

(10) *24-hour data was collected on weekdays between May 28th and June 5th, 2013.*

(11) *Turn movement counts taken on October 2nd and 3rd, 2012.*

(12) *This analysis was performed using the LOS+ software that is a hybrid tool that utilizes two different MMLOS methodologies. The auto LOS component of the analysis is based on NCHRP Project 3-70, while the pedestrian, bicycle, and transit components are based on the HCM2010. While NCHRP 3-70 provided the basis for the MMLOS methodology described in the HCM2010, there were some significant differences. One of the main differences is that the LOS methodology for autos presented in the NCHRP 3-70 report requires less input data and is less intensive computationally. The LOS+ software was developed by Fehr and Peers.*

(13) *The most recent three years of available collision data (2008-2010) were obtained from the ODOT Crash and Analysis Reporting Unit and verified against collision data provided by the City of Eugene.*

(14) *2011 State Highway Crash Rate Tables, ODOT Crash Analysis and Reporting Unit, August 2011; Table II, pg. 7.*

(15) *The cost estimate is based on 2013 dollars. The cost shown is a preliminary high-level estimate, subject to change. Estimate was received by email on June 11, 2013 from Mark Oberle, Eugene Water & Electric Board.*

(16) *2000 Highway Capacity Manual, Transportation Research Board, Washington DC, 2000.*

(17) *The 2018 traffic analysis of alternatives assumes bus service frequency is doubled compared to existing service. Pedestrian crossing volumes at study intersections are also assumed to approximately double.*

(18) *The 2018 p.m. peak hour growth rate for each intersection was applied to the traffic counts taken for the a.m. peak hour and p.m. peak shoulder to estimate the 2018 turn movement volumes. Although intersection traffic counts were not available for the mid-day peak hour, 24-hour bidirectional counts taken on Willamette Street (south of 27th Avenue) were used together with the p.m. peak hour intersection traffic counts to estimate the intersection turn movements from 12-1 p.m.*

(19) *South Willamette Street Improvement Plan Memorandum from Will Mueller, Lane Transit District, March 12, 2013.*

(20) The LCOG travel demand model was used to evaluate the potential traffic shift away from Willamette Street and the relative effects to other roadways. The expected traffic shift was estimated by comparing differences in alternative model traffic volumes for the 2035 p.m. peak hour.

(21) Nickerson Street Rechannelization: Before and After Report, Seattle Department of Transportation, 2012

(22) Fourth Plain Boulevard Demonstration Re-Striping Project: Post Implementation Report, City of Vancouver, WA, 2004.

(23) Edgewater Drive Before and After Re-Striping Results, City of Orlando-Transportation Planning Bureau, 2002.