East Forest Grove Safety Improvement Plan

February 2022

Oregon Department of Transportation

FOREST GROVE OREGON
A place where families and businesses thrive.

Jacobs

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Introduction

The *East Forest Grove Safety Improvement Plan* (Plan) details the implementation timeline and funding sources of the projects aimed to improve safety along Oregon Route 8 (OR-8) in Forest Grove, Oregon. This Plan is Technical Memorandum focuses on the segment of OR-8 in Forest Grove from South 1st Avenue to OR-47/Quince. This Plan also describes the results of a series of public outreach events that were used to inform and further safety projects detailed in previous *East Forest Grove Safety Improvement Plan* memoranda.

The previous Technical Memorandum 5 listed high-level project concepts that described the estimated cost, implementation time, and level of prioritization for each improvement project. Further quantified funding and timelines for each project are detailed in Section 5.2 and profile sheets provided with this memo. Figure 1 is a map of the Plan study area.

Figure 1. Study Area Map

A Vision for OR-8 in East Forest Grove

East Forest Grove has developed around OR-8, also known as TV Highway or Pacific Avenue. It is a dynamic corridor serving people walking, bicycling, using scooters and mobility devices, riding transit, and driving. People use OR-8 to get to and from Forest Grove's city center, and it

connects Forest Grove to communities to the east including Cornelius, Hillsboro, Aloha and Beaverton. The vision for OR-8 in East Forest Grove is to create a corridor that supports livable and vibrant long-term growth. To realize this vision, the City of Forest Grove, the Oregon Department of Transportation (ODOT) and partner agencies have worked with community members to identify improvements to the roadway to improve safety, comfort and mobility in this important transportation corridor.

The study corridor includes public transportation via GroveLink, which connects to TriMet's line 57 and Ride Connection's WestLink. The GroveLink bus serves a greater part of the city to help link residents with downtown locales and adjacent transportation services. There are nine transit stops on the corridor, each of which generates pedestrian traffic on OR-8.

The community vision for OR-8 in East Forest Grove includes the improvement items described below.

Slower traffic speed that improves safety for people walking or rolling, and people in vehicles. Potential changes include the following:

- Narrower travel lanes that match the scale of land use development
- A 35-mile per hour speed limit, matching the speed limit in Cornelius and west OR-47
- Installing radar speed monitoring signs

Connected, complete and the sidewalk network. While sidewalks exist along the OR-8 corridor in East Forest Grove, gaps remain, and some corners lack Americans with Disabilities Act (ADA)-accessible curb cuts. Potential changes include the following:

- Complete gaps in the sidewalk network
- Construct ADA-compliant corners
- Improve sidewalk access to bus stops and other locations

Improved crosswalks that make crossing the roadway safer and more predictable. Potential changes include the following:

- Additional signals at intersections and enhanced crossings would provide pedestrians the safety and confidence needed to more freely access and cross OR-8

Sidewalks that are welcoming and accessible for all. Potential changes include the following:

- Pedestrian friendly sidewalks are at the core of a safe and pleasing environment for OR-8, and these sidewalk-related potential changes include the following:
    - Wider sidewalks to allow for people to walk two-abreast, outdoor seating, and to allow businesses and restaurants to use sidewalk space for customers
    - Pedestrian-scale lighting to create corridor character and improve visibility
    - Trees and landscaping that provide shade and reduce heat during the summer months, while also beautifying the streetscape

- Complete bus stops that include shelter, seating, route and schedule information, and lighting for people to wait and catch the bus
- Access management to limit the number of driveways cutting across the sidewalk and to improve access to stores and to transit and street crossings

A complete roadway that prioritizes people walking, biking, and rolling, while making motorized travel safe. Potential changes include the following:

- Designated bike facilities, complete sidewalks with ADA-compliant ramps, pedestrian-scale lighting, signals at intersections, and enhanced crossings.

Figure 2 is a view of OR-8 looking west.

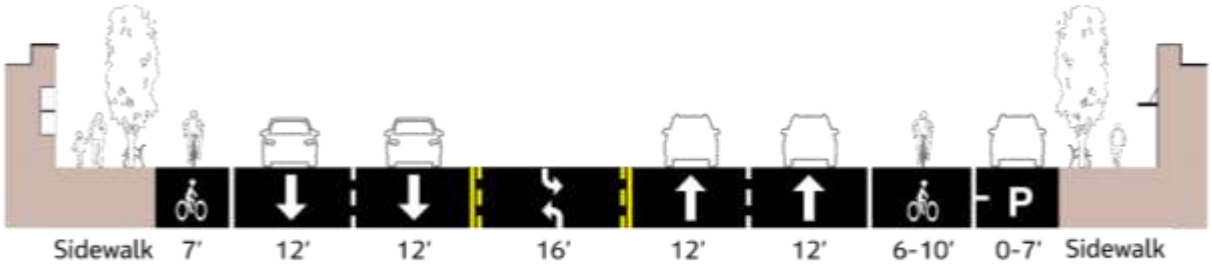
Figure 2. OR-8 Looking West Near Bank of America/Sherman Williams/O'Reilly Auto

Source: Jacobs

Existing Roadway

OR-8 within the study area has a posted speed of 40 miles per hour (mph) and a cross-sectional width of approximately 84 feet (curb to curb) with two through lanes in each direction and a two-way left turn lane in the middle. The lane measurements includes four 12-foot vehicle travel lanes, one 16-foot center turn lane, one 6 to 10-foot bike lane, one 7-foot bike lane, a 7-foot parking lane on the south side of the road, and sidewalks on both sides of the road. Marked crossings exist at the intersections of OR-8 and OR-47 and OR-8 and Mountain View Lane, but there are no marked pedestrian crossings between these two intersections, which is a distance of more than 2,000 feet. Figure 3 shows a cross section of the existing roadway.

Figure 3. Roadway Cross Section (Representative Existing)

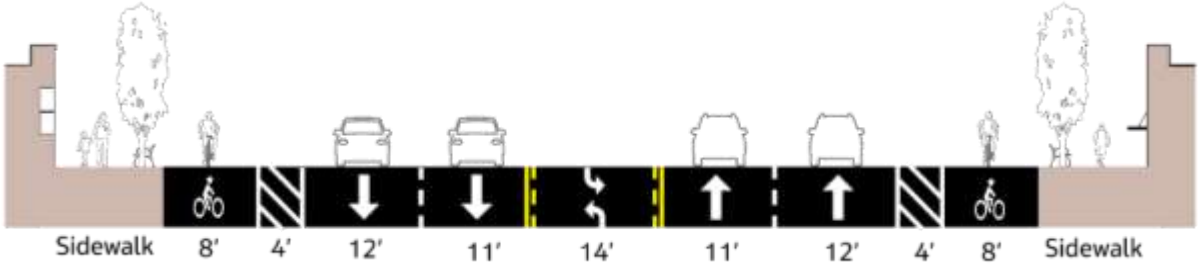


Source: Jacobs

Future Roadway

Changing OR-8 roadway and sidewalk design can help make East Forest Grove a safe and pleasing roadway for all users. Incorporating many of the elements this vision will be crucial in achieving a corridor that works better for everyone. The lane configuration illustrated below is the potentially improved OR-8, narrowing the vehicle travel lanes, which provides wider bike lanes with buffers for each direction and sets the foundation for more friendly sidewalks. Elements such as an 8-foot bike lane and 4-foot buffer would need adoption in the *Transportation System Plan* (Author Year). Figures 4 shows a cross section of the proposed, improved roadway.

Figure 4. Roadway Cross Section (Proposed Vision)



Source: Jacobs; the City of Forest Grove Transportation System Plan *has not adopted or committed to adopting the roadway cross section in this figure.*

Corridor Issues and Needs

Identifying the issues and needs was the first step in the process to determine and develop solutions to improve transportation safety in East Forest Grove[1]. The area's needs focus on vulnerable users—people who are walking, biking, riding motorcycles, and using wheelchairs or other mobility devices—in locations with key destinations, like schools, stores, medical offices, and bus stops.

Figure 5. Public Engagement Event in Forest Grove in 2019

PEDESTRIAN | Walking or traveling without a vehicle challenging and feeling uncomfortable or unsafe

✓	Gaps in sidewalk network, narrow or obstructed sidewalks
✓	Lack of ADA-accessible facilities (e.g., curb ramps and level surfaces)
✓	Pedestrians must cross five lanes of general-purpose traffic and parking (up to 85 ft) with few enhanced crossings
✓	Lack of pedestrian-oriented lighting for improved user visibility

Figure 6. OR-8 Improved Sidewalk

[1] Technical Memorandum 3, *Safety Audit and Evaluation*, identified safety needs based on historical crash data, community feedback, and field safety assessment conducted within the study area, as well as preliminary solutions.

BICYCLE | Biking on the roadway difficult due to objects or pavement damage in the path, and the stress of riding next to high-speed vehicle traffic

✓	Gaps in bicycle network, as well obstacles in bike lanes (e.g., storm drain grates, signs, trash cans, etc.)
✓	Roadway is too fast and carries too much traffic for existing bicycle facility

Figure 7. OR-8 in East Forest Grove

TRANSIT | Transit access and operation can be difficult due to stop placement and limited pedestrian facilities

✓	Bus stops lack marked pedestrian crossings and ADA-compliant curb ramps
✓	Bus stop locations increase the risk of potential collisions, as buses pull across bike lane and merge back into traffic

Figure 8. Bus Stop on OR-8 in East Forest Grove

CORRIDOR OPERATIONS | Frequent turning movements, sightline issues, and high vehicle travel speeds can make travel difficult along OR-8

✓	OR-8/OR-47 includes multimodal conflict points with limited visibility and protection for people walking and biking
✓	Consolidate driveways and turning movements along OR-8 (i.e., access management)
✓	Visibility challenges due to signage and vegetation
✓	High vehicle operating speeds on OR-8 and associated high crash history

Figure 9. OR-8 Sidewalk in East Forest Grove

BEHAVIORAL | How people navigate the roadway can be a challenge if signs or guidance are not provided or made clear

✓	Discourage wrong-way traffic
✓	Motorists use wide bike lane segments for on-street parking
✓	School bus stop needed

Figure 10. Driveway on OR-8 in East Forest Grove

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Public Engagement

This study undertook community engagement strategies with a focus on hearing from local residents, business owners, and young individuals in the Forest Grove community. Outreach materials were provided in both English and Spanish, and the engagement team partnered with Centro Cultural, a trusted community-based organization located in neighboring Cornelius, OR. Engagement was divided into two phases due to the coronavirus disease 2019 (COVID-19) pandemic, with one phase occurring in 2019 and the other in 2021. Methods for engagement included the strategies listed below.

- Online survey
- Business canvassing/interviews
- Stakeholder interviews and focus groups
- Technical advisory committee (TAC)
- Focus group meeting
- In-person tabling events

Figure 11. 2019 Public Engagement Event in Forest Grove

In-Person Events: 2019 Outreach

Event participants could provide feedback in a variety of ways at each event, including comment forms, a pre-stamped postcard, and a comment map. Community members were encouraged to provide comments on the project website if they were unable to speak with staff at the events.

Forest Grove is a diverse community and engaging with Spanish-speaking community members was a crucial step in the outreach process. As part of the summer outreach, staff participated at Taquiza and El Grito events which were attended by many Latinx and Hispanic community members. These events were hosted by Centro Cultural.

Centro Cultural hosted two focus groups with members of the Latinx community. The first focus group took place on September 21, 2019. Participants expressed similar concerns to those noted below. However, there were additional suggestions:

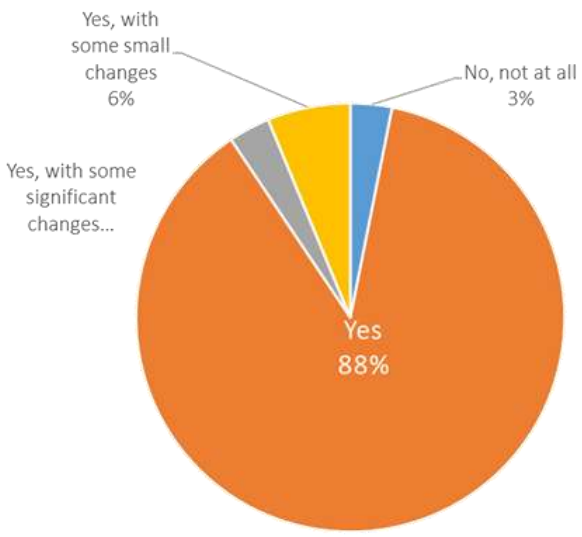
- The city is growing. We need more pedestrian crossings, and signals with sound for those who are visually impaired
- Bilingual information on traffic signals would be very helpful
- More lights, particularly for the evening and wintertime
- Re-think the flashing yellow arrow on OR-47 and Pacific
- Drivers are impatient and traffic cameras should be installed to provide safe, equitable, low-cost traffic enforcement

The second focus group included members of Edad de Oro, the senior program at Centro Cultural, which serves the elderly members of the Latinx community. Again, comments were similar to those previously heard at the tabling events and the first focus group. All participants except one uses bus line 57 to get to Centro. Their concerns were the lack of pedestrian crossings throughout TV Highway and the impatience of bus drivers with the elderly.

Needs Survey (2019)

Over 200 people shared their opinions and identified potential needs and opportunities to improve safety within the study area. The three top improvement priorities identified were signals at Yew and Pacific/Adair, filling sidewalk gaps, and better lighting. Other priorities considered were enforcement, median dividers, and a speed limit reduction. The two locations that were identified with the highest need for intervention included Yew Street and OR-47. See Appendix A for detailed survey responses.

Figure 12. Survey Question: Do you support adding missing sidewalks?



Strategies Survey and Business Canvassing (2021)

In contrast to the 2019 outreach, which assessed the community's safety needs, this process served to seek feedback from the business community about specific proposed strategies. The business canvas interview comprised of interviewing 17 businesses along the OR-8 corridor. These surveys were conducted through in-person canvassing with the option of leaving paper surveys to engage in minimal contact with the canvassers if desired. Additionally, online surveys

were administered to gain insight into the proposed project improvements and the foreseen impacts on the community.

Common traffic problems leading to a dangerous environment for both vehicles and pedestrians were attributed to low signage, poor lighting, and lack of pedestrian infrastructure. Recommended interventions included improved vehicle signage, better pedestrian-scale lighting, completion of the sidewalk network, and an increased number of mid-block crosswalks. Suggestions to generally improve traffic included repainting medians, widening lanes, and fixing potholes. Refer to Appendix A for survey questions administered and detailed interview responses.

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Background Information

The project team conducted several analyses to inform public engagement, strategy development and strategy selection. This analysis is summarized in this section.

Safety and Crash History Analysis

The project team conducted a Safety Audit and Evaluation and Crash History Analysis (see Appendices D and I for more information). The Audit and Crash History Analysis helped was an on-the-ground assessment and better understand specific roadway and pedestrian infrastructure needs and the types of countermeasures that would best address the safety issues on OR-8. The Safety Audit and Evaluation and Crash History Analysis helped identify the types of crashes and any trends that would help understand priority motorist issues that result in conflicts. Analysis focused on particular risks for bicyclists and pedestrians as they navigate to locations in East Forest Grove. Key findings include the following:

- Observed crashes in the study area were higher than would be expected on a similar facility (per Highway Safety Manual methodology) and higher than the statewide average
- Between 2012 and 2017, 244 crashes were reported along the OR-8 corridor. One crash resulted in fatal injuries for a person walking; seven crashes caused serious injuries
- There were five crashes involving someone walking and six crashes involving someone biking in the study area
- Crash types vary, but the majority were rear-end, turning movement, or angle crashes
- All four of the study intersections were flagged as safety focus locations and were found to be top 10% priority safety sites in ODOT's Safety Priority Index System

ODOT Design Process

All design concepts must follow the guidelines set forth in the ODOT Traffic Manual. ODOT's Blueprint for Urban Design provided guidelines to help support approaches to alternatives development and evaluation that fit the local land use and corridor context.[2]

ODOT and City of Forest Grove staff, along with members of the project TAC, agreed that that OR-8 in East Forest Grove most closely matches the Commercial Corridor context, with some Urban Mix characteristics, particularly with surrounding homes and schools nearby.

[2] Blueprint for Urban Design, ODOT, January 2020.

The basis for this assessment includes the following:

- Medium to large building setbacks, with most frontages dominated by off-street parking. Where newer buildings front the sidewalk, most orient their entrances to parking/ driveways at building side or rear. Consistent with Commercial Corridor, with some areas of Urban Mix.
- Few buildings have front doors that can be accessed from sidewalks via a pedestrian path. This is consistent with a Commercial Corridor land use context.
- Most uses are commercial, institutional, or industrial, but there are significant residential areas at the Forest Place Apartments, Rose Grove manufactured homes, and behind other non-residential uses. Characteristics of both Commercial Corridor and Urban Mix.
- Most sites have very low building coverage adjacent to right-of-way. Some newer developments locate buildings near sidewalk. Consistent with Commercial Corridor, with some areas of Urban Mix.
- Parking is largely off-street and in front of buildings along right-of-way. Some newer developments locate parking to the side or back of buildings. Consistent with Commercial Corridor, with some areas of Urban Mix.
- Blocks are very large, with long spaces between public street connections.
- While zoning and code allow uses and development styles consistent with Urban Mix, they do not restrict or disincentivize uses and development styles consistent with Commercial Corridor. There are not regulatory pressures that would change the characteristics of the corridor to more closely resemble Urban Mix.

The recommended speed for Commercial Corridors is 30 to 35 mph, with 25 to 30 mph recommended for Urban Mix. Given the emphasis on transit and the number of residences and schools in the study area, the project team recommends 30 mph.

The project team's long-term goal was to have OR-8 and land use in East Forest Grove become more like Urban Mix than the Commercial Corridor today. This will require coordinated investments in land use and transportation infrastructure. The strategies in the *East Forest Grove Safety Improvement Plan* are intended to align the transportation infrastructure with this vision.

Figure 13 and

Figure 14 show example cross section options for Commercial Corridor and Urban Mix blueprints, respectively.

Figure 13. Blueprint for Urban Design: Example Cross Sections for Commercial Corridor

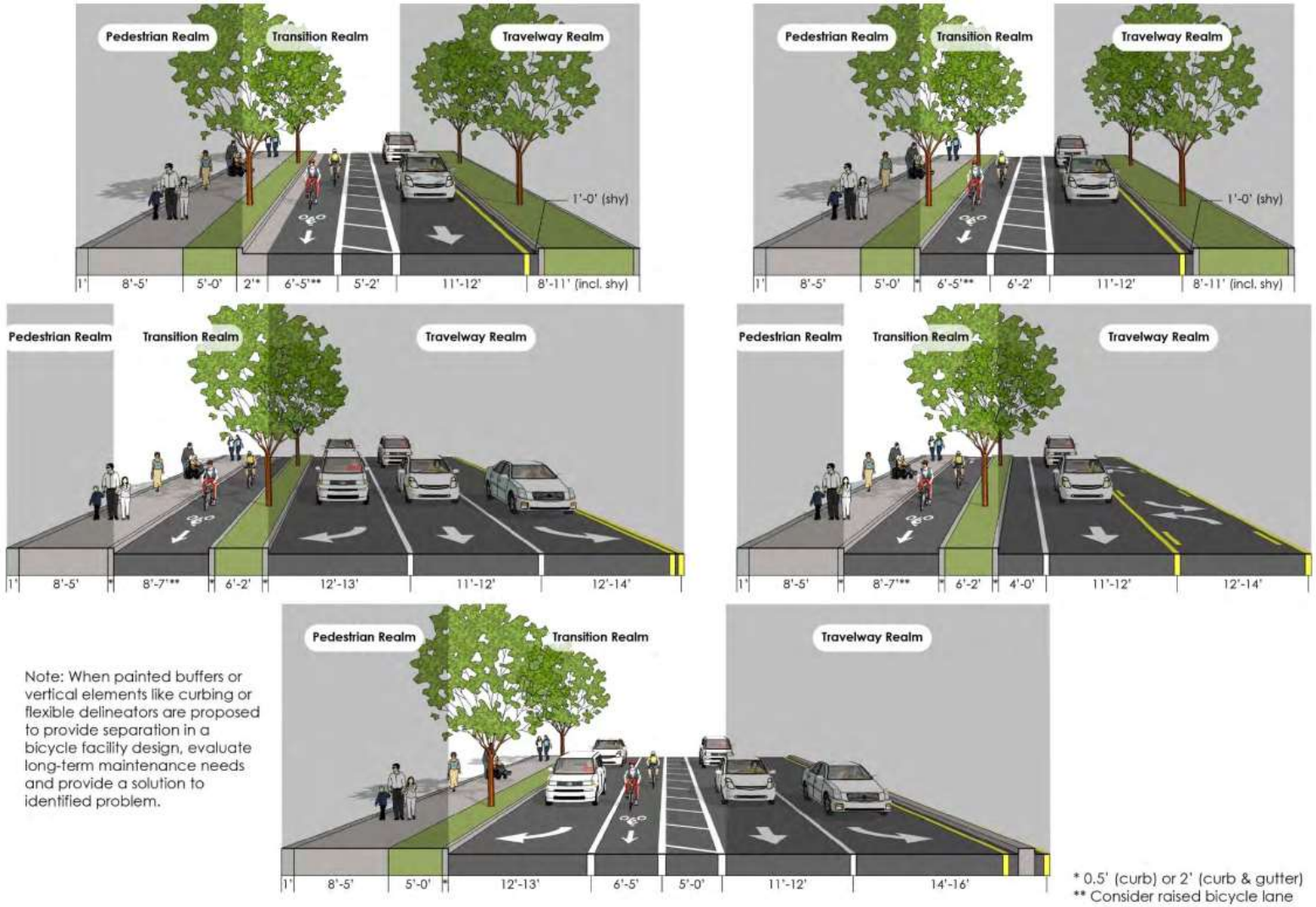
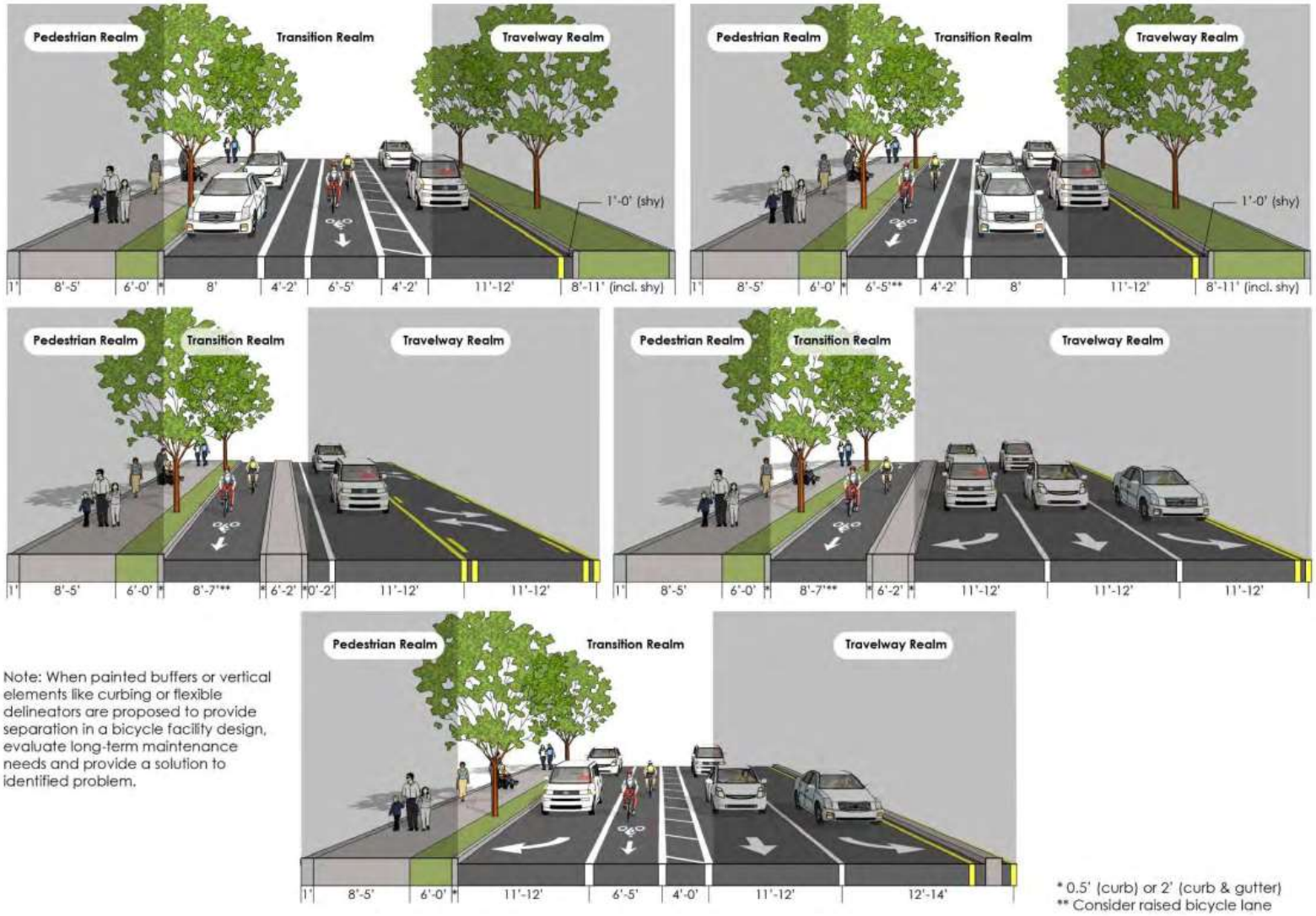


Figure 14. Blueprint for Urban Design: Example Cross Section Options for Urban Mix



Note: When painted buffers or vertical elements like curbing or flexible delineators are proposed to provide separation in a bicycle facility design, evaluate long-term maintenance needs and provide a solution to identified problem.

* 0.5' (curb) or 2' (curb & gutter)
** Consider raised bicycle lane

Potential ODOT Design Exceptions

If ODOT design guidelines cannot be met, a design exception will be required. Based on the proposed projects in this Plan, the following ODOT design exceptions may be considered.

Lane width. Narrowing the general-purpose lanes would require a design exception if proposed lane widths are less than 11 feet. Recommended lane widths for both Commercial Corridor and Urban Mix are 11–12 feet, which is in line with project recommendations.

Median width. The likelihood of a median width design exception will depend on which countermeasures are applied:

- Sidewalks added or widened
- Buffered bike lanes added
- Lanes narrowed

Design Exception Process

The design exception process and required justifications are described in ODOT's Highway Design Manual, Chapter 14. The manual describes six key steps to the process:

Step 1: Project Teams determine justification for design exception(s) at scoping, prospectus, design phases, or planning process.

Step 2: Roadway Designer prepares design exception with supporting justification and with review from Region Roadway Manager.

Step 3: The program manager reviews request and consults with Engineer of Record to assure that the request accurately describes the conditions that warrant a design exception.

Step 4: The ODOT Region Technical Center Manager or the Region Roadway Manager reviews the request and consults with the engineer of record and other applicable groups in Region, such as Traffic or Safety groups.

Step 5: The Design Exception is assigned to a member of the Design Exception Review team for review and a formal recommendation is prepared by the member.

Step 6: The State Traffic-Roadway Engineer reviews the design exception request and recommendation from the Design Exception Review team and stamps the request if sufficiently justified.

Traffic and Signal Warrants Analysis

The project team conducted technical analysis to inform strategy definitions and selection. The analysis was done using historical data and updated traffic counts reflecting existing travel demand and behavior. These studies are summarized briefly here and the full reports are available in the Appendix.

ODOT reviewed traffic data collected at three locations along OR-8 in East Forest Grove including Adair Avenue at Yew Street, Pacific Avenue at Yew Street, and Pacific Avenue at A and B Row. The purpose of this preliminary analysis was to determine what types of traffic and roadway improvements would best suit these priority locations for improving transportation safety. The agency conducted a preliminary pedestrian crossing analysis[3] and a traffic signal warrant analysis,[4] based on historical data, and on observations collected using tube counts and video in April 2021. The report provided key recommendations described below.

- The intersection of OR-8 Adair Avenue and Yew Street would likely meet the requirements for traffic signal. This is based on traffic volumes, crash history, and the number of pedestrian crossings.
- The intersection of OR-8 Pacific Avenue and Yew Street would possibly meet signal warrants, based on traffic and pedestrian crossings.
- If a full traffic signal is not warranted, ODOT recommended a Pedestrian Hybrid Beacon (PHB) or a Rectangular Rapid Flashing Beacon (RRFB).
- In all cases further traffic analysis including an Intersection Control Evaluation is required prior to approval and design of a traffic signal.

Improvements at this location including a signal or beacon will require further public engagement with affected stakeholders and improvements to the sidewalk and pedestrian crossing areas such as ADA-compliant ramps, a marked continental crosswalk and other signing and striping modifications.

Figure 15. Pedestrians Crossing OR-8/Adair Avenue Near Transit Stops at Yew Street

Source: DKS Associates

[3] The analysis followed guidance in National Cooperative Highway Research Program (NCHRP) *Report 562*.

[4] The signal warrant analysis followed guidance in the Federal Highway Administration's *Manual on Uniform Traffic Control Devices*.

Strategy Evaluation and Selection

This section of OR-8 in the *East Forest Grove Safety Improvement Plan* is guided by goals that address needs identified through analysis and public engagement. The project team and the TAC identified six goals to guide strategy development and prioritization. The goals are described below.

Goal 1: Safety for all users, especially pedestrians and people on bikes

Improving safety is fundamental to the *East Forest Grove Safety Improvement Plan*. Safety is important for everyone on the road, and especially the most vulnerable: people walking, rolling, and biking. Safe and comfortable facilities for pedestrians and cyclists improve livability and help to establish a sense of community.

Goal 2: Increase transit mode share by improving safe access to transit

This Plan aims to make it easier and safer to access transit services in the project area. Transit provides transportation options to many people, including underserved populations. Every transit trip is inherently a pedestrian trip at each end of the trip, even though people reach a bus stop in a variety of ways.

Goal 3: Promote equitable outcomes

The project team acknowledged the inequitable distributions of burdens and opportunities stemming from past infrastructure choices and service delivery. Community involvement in developing the *East Forest Grove Safety Improvement Plan* has intentionally engaged local communities, focusing especially on communities of color, people with low incomes, people with disabilities, and people who speak languages other than English at home.

Goal 4: Economic development and placemaking

This segment of TV Highway is an important corridor for people traveling through to other local and regional destinations. The *East Forest Grove Safety Improvement Plan* aims to make this segment more of a destination by improving the streetscape and adding elements to define its character. This will promote economic development and help to establish a sense of place.

Goal 5: Funding and Political Feasibility

Integral to achieving the Plan's goals is the reasonable likelihood of an improvement action to be implemented. This is highly influenced by the investment's financial liability and political feasibility. A proposed investment that is lower cost would rate more favorably than would an investment that is higher cost if the benefits of each option are comparable. Similarly, a proposed investment that has an existing funding source would have an advantage over one that would need to rely on new funding or financing.

Goal 6: Support Local, Regional, and State Plans and Policies

All potential investments must be consistent with local, regional, and state plans and policies. This Plan considered the land use and transportation planning context and the optimal function of the roadway for all users.

Funding Sources

Several potential funding sources are available for transportation projects. The table below details several funding programs that could be used for OR-8 improvements.

Table 1. Potential Capital Project Funding Sources

Source	Program	Use
State	Statewide Transportation Improvement Program (STIP)	The STIP is ODOT's capital improvement plan for both state and federally funded projects, and is developed through the Oregon Transportation Commission, ODOT, and the public. The funds are used for a wide variety of transportation projects, from roadway repairs to safety improvements, to bicycle and pedestrian infrastructure.[5]
	All Roads Transportation (ARTS) Program	The ARTS Program is a statewide safety program that addresses safety for all public roads in the state of Oregon.[6]
	Statewide Transportation Improvement Fund (STIF) Discretionary Fund	Pedestrian and bicycle improvements that provide connections to transit are eligible for most public transportation funding sources. ODOT awards discretionary funds to public transportation service providers (e.g., TriMet) based on a competitive grant process.
	Safe Routes to School (SRTS)	The ODOT SRTS construction grant programs focus on safe walking and biking routes through investments in crossings, sidewalks and bike lanes, flashing beacons, and other improvements. The program includes three grant programs as of 2021: Competitive Construction (majority of funds), Rapid Response Construction, and Project Identification.
Federal	Regional Flexible Fund Allocation (RFFA)	Regional flexible funds provide federal funding for investments in sidewalks, trails, and roadways in communities across the region. These funds are from two federal funding sources, the Surface Transportation Block Grant and Congestion Mitigation/Air Quality programs. Portland Metro leads an annual regional process to prioritize and target

[5] https://www.oregon.gov/odot/STIP/Pages/About.aspx
[6] https://www.oregon.gov/odot/Engineering/Docs_TrafficEng/ARTS_FAQ.pdf

Source	Program	Use
		projects to use these funds. The RFFA provides flexibility - allowing for a variety of uses.[7]
	Rebuilding American Infrastructure with Sustainability and Equity (RAISE)	The RAISE Discretionary Grant program allows U.S. Department of Transportation (USDOT) agencies to invest in road, rail, transit and port projects that promise to achieve national objectives. This program was formally known as Transportation Investment Generating Economic Recovery (TIGER), then Better Utilizing Investments to Leverage Development (BUILD) Discretionary Grants.[8] In past rounds, the average BUILD award size was $14.5 million.
	Healthy Streets Program[9] - New program in IIJA	Counties can apply directly to the USDOT for this new discretionary grant program (to be created in fiscal year 2022) to install cool and/or porous pavements or to expand tree cover with the goal of reducing urban heat centers and improving air quality. Priority will be given to applicants who: - Are proposing projects in low-income or disadvantaged communities - Have entered into a community benefits agreement with community representatives - Are partnering with a qualified youth or conservation corps The federal cost share for this program is 80%, with a waiver of up to 100% available at the discretion of USDOT.

[7] https://www.oregonmetro.gov/public-projects/regional-flexible-funding-transportation-projects/background
[8] https://www.transportation.gov/RAISEgrants/about
[9] Legislative Analysis for Counties: The Infrastructure Investment & Jobs Act (naco.org)

Source	Program	Use
Washington County	Major Streets Transportation Improvement Program (MSTIP)	The MSTIP is Washington County's innovative, proactive road improvement program. MSTIP funding improves the County's transportation system for bicyclists, pedestrians, drivers, and transit passengers. The funding cycle for the MSTIP has occurred every 5 years.[10]
	Transportation Development Tax (TDT)	The TDT is imposed on most new development and redevelopment within Washington County. TDT funds can be used to pay for improvements to major roads to expand capacity, such as turn lanes, sidewalks, bike lanes and transit projects (such as bus shelters).[11]
	Road Fund	Washington County receives a portion of the state highway funds generated by Oregon's 30 cent per gallon tax on gasoline, truck weight-mile fees and vehicle registration fees. These revenues are used by the County to maintain roads under County responsibility.
City of Forest Grove	Bike and Pedestrian Pathways Fund	The purpose of the fund is to improve pathway conditions for pedestrians, cyclists and the disabled in Forest Grove through the development of the Bike and Pedestrian Network Plan. Funds come primarily from the State gas tax.
	Traffic Impact Fee	Fees were collected for the purpose of improving the City's transportation network to meet growth impacts. The fee was replaced by the TDT. Funds are used for specific projects relating to improvement and development within the City with a focus on transit improvements.
	Development Approval Conditions	The City (and ODOT) can require that property owners make site improvements to transportation infrastructure as conditions for development permit approvals.

Source: Jacobs

[10] https://www.co.washington.or.us/LUT/TransportationFunding/what-is-mstip.cfm

[11] https://www.co.washington.or.us/LUT/Divisions/LongRangePlanning/PlanningPrograms/TransportationPlanning/transportation-development-tax.cfm

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Strategies

The project team developed this list of project concepts based on identified needs and input from the public and stakeholders. The Initial Project List was included in Technical Memo 4 and was further refined by the TAC. These strategies have planning-level information and will require further planning, engineering and public engagement processes prior to construction.

Project Profiles

The project team developed strategies based on mobility and safety needs, public and partner agency input, and project goals. The strategies are planning-level and require further design and engineering, and funding to advance as projects.

Costs are planning-level estimates and divided into four categories, shown below. Additional cost considerations are noted with the project concept.

$ less than $0.5 million

$$ $0.5–$2 million

$$$ $2–$5 million

$$$$ more than $5 million

Project phasing timelines are planning-level estimates and are divided into three categories as shown below.

Project can be implemented in less than 2 years

Project can be implemented in more than 2 years or with full build out

Project to be implemented with future development, redevelopment, or infill

The project team identified priority projects based on need, community input, and professional expertise. These four projects are indicated with a star:

Seven members of the TAC independently selected their highest priority projects. Most members chose 5 to 7 priority projects, one member chose 12. These were tallied and categorized, and are indicated with chevrons:

Top Priority

High Priority

Priority

Table 2. East Forest Grove Safety Improvement Plan Strategies

Project	Segment	Cost Estimate	Needs Addressed				
			Pedestrian	*Bicycle*	*Transit*	*Operations*	*Behavioral*
Near Term							
Lower Speed Limit	Yew Street and Mtn View Lane	$	●	●	●		●
Mid-Block Crossings	Full corridor	$$	●		●		●
Bus Stop Improvements and Redesign	Quince Street	$	●	●	●		●
Leading Pedestrian Interval	Mountain View Drive	-	●				
Medium Term							
Yew Signal and Crossing	Yew Street and Pacific/Adair Avenues	$$$$	●	●	●	●	●
Restripe and Narrow General-Purpose and Center Turn Lanes	Quince Street and Pacific Avenue	$$$	●	●	●	●	●
Update Slip Lanes at Quince	Tualatin-Valley Highway	$$	●	●		●	●
Protected or Raised Bike lane	Full corridor	$$$	●	●			●
Mountain View Lane Pedestrian Refuge	Marked crossing locations	$$	●				●
Redesign Bus Pull-Out	Yew and N Adair Street; Yew and Pacific Avenue	$	●		●	●	
Implement With Future Development							
Complete Sidewalk Network	Mountain View and Tualatin-Valley Highway	$$$-$$$$	●		●		●
Pedestrian-Scale Lighting	Full corridor	$$	●	●	●	●	●
Access Management Plan	Full Corridor	$	●	●	●	●	●

Cost Estimate Key:
$ = $1–$500,000 **$$** = $5k–$2M **$$$** = $2M–$5M **$$$$** = $5M+
Source: Jacobs

Lower Speed Limit

Community members expressed concerns regarding high-speed limits throughout the corridor, threatening the safety of both pedestrians and drivers. The OR-8 speed limit now in East Forest Grove is 40 mph, 10 mph faster than in Cornelius, and above recommended speeds for the Target Speed ODOT recommends for Commercial Corridors and Urban Mix areas. Reducing the speed limit to 30 or 35 mph, combined with enforcement, would create a safer environment for pedestrians and bicyclists, who face exponentially increasing chances of serious injury as vehicle speeds increase. Having a speed limit consistent with neighboring communities in East Forest Grove can create a more predictable roadway environment and improve driver compliance.

Needs

- Local stakeholders reported concerns regarding walking or biking near high speeds
- Some responded that inconsistent speed limits in the corridor make it difficult for drivers to know the speed limit
- High number of collisions between vehicles and pedestrians at several intersections
- Speed limit that matches community and ODOT vision for Commercial Corridors and Urban Mix neighborhoods

Figure 16. Radar speed sign example

Benefits

- Enhances safety for pedestrians and bicyclists
- Reduces crash severity risk for all transportation types on OR-8 in East Forest Grove
- Creates more consistent speed limit zones between Central Forest Grove and the City of Cornelius

Estimated Cost: $$$$

Elements of this project and cost estimate include:

- ODOT requests, coordination and planning
- Speed signs
- Public engagement and communications

Timing

Near term

Applicable Funding Sources

Source	Applicant(s)
ODOT Statewide Transportation Improvement Program	ODOT

Action Plan

Action	Description	Leads
Speed zone investigation request	ODOT must receive a request for an investigation with a recommended speed. This request must be from Forest Grove Public Works and should include concurrence from any interested jurisdictions. The investigation will determine if a change in speed is appropriate. (For more information see the ODOT Speed Zone Manual[12])	Forest Grove
Speed Zone Order (if applicable)	If approved ODOT issues a Speed Zone Order changing the speed limit and issuing notices to interested agencies.	ODOT

Related Projects

Project	Coordination
Restripe Lanes	Narrowing lanes results in slower traffic speeds, which will complement official speed zone changes
All other projects	Slower speeds will enhance safety outcomes for all infrastructure strategies.

[12] Oregon Department of Transportation Traffic-Roadway Section, *Speed Zone Manual* (May 2021). Accessed December 2021 at https://www.oregon.gov/odot/Engineering/Docs_TrafficEng/Speed-Zone-Manual.pdf

Mid-Block Crossings

A distance of over 2,000 feet separates the two pedestrian crossings at Quince Street and Mountain View Lane. This project would create up to three pedestrian crossings in that span, each separated by approximately 500 feet. In project surveys, pedestrian crossings were noted as important more than any other issue. The community reported the need for marked pedestrian crossings, especially near bus stops. These would be protected mid-block crossings with a pedestrian refuge and illumination.

Crossings may be included with new signals (such as proposed for Yew Street in this Plan) or standalone, signalized with actuated pedestrian signals, hybrid beacons, or rapid flash beacons. When possible, signals should be coordinated with other signals in the corridor. Recommended mid-block crossings should have pedestrian-scale illumination to improve pedestrian and driver visibility. Pedestrian refuge islands can provide safe places for people to wait between signal phases as needed, given the wide crossing distance. Curb extensions will shorten crossing distances and improve visibility.

*Note: ODOT will be designing a mid-block crossing at the Rose Grove manufactured home community **A and B Row** in 2022 under an existing project to design and construct three crossings in Washington County (STIP Key Number 21608).*

Needs

- Housing, businesses, services and bus stops are located along both sides of OR-8 between Mountain View Lane and OR-47/Quince Street, with no crossings
- Most people will cross as needed in this location rather than walk nearly .5-mile to their location.

Figure 17. OR-8 in East Forest Grove near Rose Grove

Benefits

- Improved safety conditions for pedestrians, bicyclists, and drivers
- Improved transit access
- Improved access and mobility for people walking, biking, riding the bus and driving

Timing

Near-term

Estimated Cost: $$$$

Elements of this project and cost estimate include:

- Design and engineering
- Utilities survey, relocation or upgrade
- Crossing upgrades for curbs and ADA-compliant ramps
- Access management plan
- Construction, striping and signs

Applicable Funding Sources

Source	Applicant(s)
ODOT Statewide Transportation Improvement Program	ODOT
ARTS Program	Forest Grove
Bike and Pedestrian Pathways Fund	Forest Grove

Action Plan

Action	Description	Leads
Design mid-block crossing at Rose Grove/ A and B Row (STIP 21608)	ODOT will lead a project to design and construct a pedestrian crossing at this location, with flashing lights to increase safety	ODOT
Explore additional mid-block crossings	While one expected project is a priority in this road OR-8 segment, 1–2 other pedestrian crossings will provide even greater safety and access. The city can explore potential for added crossing locations that enhance safety and the pedestrian network.	Forest Grove, ODOT

Related Projects

Project	Coordination
Complete Sidewalk Network	This segment has one area of missing/non-compliant sidewalk in front of the ReStore retail location. Other areas should be kept free from obstructions and widened when possible.
Pedestrian-Scale Lighting	Lighting is a priority for crosswalks. Lighting along the corridor will improve safety and comfort once sidewalks and crossings are implemented.
Restripe Lanes	Restriped (narrower) travel lanes may affect the design of pedestrian median refuges and crosswalks.
Median Pedestrian Refuges	Median pedestrian refuges, like those at existing crosswalks, should be integrated into new crossing designs.
Access Management Plan	Protecting crosswalks by providing safe and effective access management on both sides of the crossing area will reduce conflicts and risk for pedestrians and drivers.

Bus Stop Improvements

Many of the bus stops in East Forest Grove are little more than a post with a nearby concrete pad. This project would improve the four transit stops concurrent with sidewalk and crossing improvements to ensure transit riders have safe and accessible ways to get to and from their destinations. The stops may be redesigned and/or relocated. In this process, considerations include sight lines, creating safe places for buses to stop, and space for installing bus stop amenities such as lights, seats, garbage cans and shelters.

Needs

- Survey respondents have expressed concerns regarding drivers' capabilities to see pedestrians and bicyclists
- Stops that are near crossings and not located near driveways or other unsafe sidewalk areas

Benefits

- Improved multimodal connections and access for people living in East Forest Grove and riding the bus
- Upgraded sight lines lead to improved safety conditions for areas surrounding stations

Timing

Medium term

Estimated Cost: $$

Elements of this project and cost estimate include:

Figure 18. Trimet Bus Stop near Rose Grove in East Forest Grove

- Design and engineering
- Crossing upgrades for curbs and ADA-compliant ramps
- Construction: placing lighting, enhanced station amenities, bus shelters and concrete pad, as needed

Funding Sources

Source	Applicant
STIF Discretionary Fund	TriMet or Ride Connection
Traffic Impact Fee	Forest Grove
RFFA	Forest Grove

Action Plan

Action	Description	Leads
Funding Application	Prepare project purpose and need to include with funding applications for design and construction.	Forest Grove, TriMet
Project Improvement Design	All designs on OR-8 require ODOT coordination and participation to ensure safety and consistency with state requirements and standards.	ODOT, Forest Grove
Project Coordination	Coordinate bus stop improvements with transit service enhancements including potential bus rapid transit along the TV Highway corridor.	TriMet, Forest Grove

Related Projects

Project	Coordination
Pedestrian-scale lighting	Construction of pedestrian-scale lighting will be included in improved station amenities. Coordination of these projects will assure that pedestrians are able to navigate the corridor and use the transit system with optimal lighting.
Sidewalk Network	Bus stop improvements and station amenities must be coordinated with sidewalk improvements to assure optimal safety for the pedestrian environment.
Mid-Block Crossings	Median pedestrian refuges help pedestrians cross at these locations. Bus stop improvements can be coordinated with new crossing locations to ensure consistency and efficiencies.

Leading Pedestrian Interval

This project will implement a leading pedestrian interval at Mountain View. Leading pedestrian intervals give pedestrians a head start of 3 to 10 seconds before the corresponding vehicle traffic signal changes to green. The pedestrian signal to cross OR-8 at Mountain View Lane starts its phase at the same time as the left turn signal for people driving north from Mountain View Lane, creating a potential conflict. This project would adjust the signal pedestrian phase timing to have the pedestrian signal start before the drivers' left turn green light. This will allow pedestrians time to enter the intersection and create more visibility for drivers of oncoming vehicles from Mountain View Lane. Pedestrian intervals require complementary adjustments to existing signal timing.

Needs

- Most common survey response consisted of concerns over pedestrian safety and lack of crossings
- Need for improved multimodal connectivity to bus stops

Benefits

- Increased visibility of crossing pedestrians, prioritization of pedestrians within intersection
- Reduction of pedestrian-vehicle collisions

Timing

Near-term

Estimated Cost: $$$$$

Elements of this project and cost estimate include:

- Signal timing

Funding Sources

Source	Applicant(s)
NA	NA

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Yew Street Traffic Signals

Stakeholders reported that current conditions make it challenging to cross or drive at the Yew Street intersection with OR-8 where it is split into separate westbound (Adair Avenue) and eastbound (Pacific Avenue) roadways. This was borne out in safety analysis, which showed above average crash rates at this location. The area has bus stops for each direction, and stores and nearby restaurants that generate walking, biking and driving traffic. The intersection is controlled by stop signs, and all turning movements are permitted.

ODOT's preliminary signal warrant analysis (see Appendix J) suggested that the area is likely to meet requirements to install traffic signals at the Yew Street Intersections with OR-8 (Adair Avenue) and possibly at the intersection with Pacific Avenue. Further study and actions required for this strategy to be further developed are described below.

A signal warrant alone does not justify a traffic signal. ODOT's evaluation must indicate that the installation of a traffic signal will improve the overall intersection safety and operations, and then be preferred alternative. ODOT and the City explored two other strategy concepts.

Figure 19. Yew Street and OR-8 Intersection

Alternate Traffic Signal Concepts

- *RRFB or PHB.* The signal warrants analysis suggests beacons as alternatives to a traffic signal. These pedestrian-activated lights and signs provide added visibility to the crosswalk and alert drivers to stop prior to the intersection and allow pedestrians to cross. Requirements to meet design guidelines for beacons are different than for signals, but will still require additional analysis to determine if the traffic control device would improve safety and traffic operations.
- *Restricted turning movements on Yew Street.* A median divider can channel traffic into right (westbound) turns only. This would prevent drivers from continuing straight on Yew Street then turning eastbound on Pacific Avenue, which crash data suggests results in above average crashes. Restricting eastbound travel from Yew Street could be mitigated for passenger cars and trucks by allowing U-turns at Mountain View Lane. Trucks will not be able to make the U-turn there, however, and will therefore require alternate routes or lane permissions.

Needs

- Lack of enhanced pedestrian crossings create a less desirable environment and have resulted in crashes and reports of near-misses.
- Bus stops are relatively inaccessible due to the lack of enhanced crossing and the overall pedestrian environment.
- A high rate of vehicle crashes over the past 7 years at this two-way stop-controlled intersection where the speed limit increases by 10 mph (westbound), most of which involve turn movements.

Benefits

- Shorter walking times for pedestrians
- Enhanced safety for pedestrians, bicyclists, and drivers

Estimated Cost: **$$$$**

Elements of this project and cost estimate include:

- Interagency coordination
- 24-hour Traffic Study/Counts
- Intersection Control Evaluation
- Access management analysis and planning
- Roadway design and engineering
- Construction/installation

Figure 20. Trimet bus stop at Yew Street in Forest Grove

Timing

Near term (Work on signal warrants analysis and design alternatives development should start in the near term to ensure data collection and analysis is completed in a timely manner. Implementation and delivery is likely to require more than 2 years.)

Applicable Funding Sources

Source	Applicant(s)
ODOT Statewide Transportation Improvement Program	ODOT, Forest Grove
ODOT ARTS Safety	ODOT, Forest Grove
Metro Regional Flexible Fund	Forest Grove

Action Plan

Action	Description	Leads
Signal Warrant Analysis	ODOT recommends further analysis of traffic and pedestrian crossings to ensure compliance with the Federal Highway Administration's Manual on Uniform Traffic Control Devices (MUTCD) and ODOT Traffic Manual guidance and requirements.	ODOT
Intersection Control Evaluation	ODOT recommends completing an Intersection Control Evaluation to evaluate the possibility of installing a roundabout at this location.	ODOT
Goods Movement Outreach	Early engagement with freight-dependent businesses in the area will help guide design choices at Yew Street, and ensure any changes provide options for safe and efficient goods movement. This may be conducted as part of the access management plan strategy.	ODOT and Forest Grove
ODOT signal approval	The satisfaction of a warrant or warrants is not justification for a traffic signal. The intersection traffic control study must indicate that the installation of a traffic signal will improve the overall safety and operation of the intersection and be the preferred intersection control alternative. The City can assist by supplying information about issues such as land use, public input, business needs and the wider transportation network.	ODOT and Forest Grove
Design	Engineering to identify roadway designs that maximize safety and traffic operations at this location. Includes ADA ramps and sidewalk improvements, pedestrian crossings signs and access management.	ODOT

Related Projects

Project	Coordination
Yew Signal and Yew Crossing RRFBs	This intersection was identified as having issues with speeding traffic and poor pedestrian infrastructure. Public involvement concluded that a consistent speed limit and these interventions may prevent cars from reaching dangerously high speeds.
Mid-Block Crossings	Median pedestrian refuges help pedestrians cross at these locations. These projects can be coordinated with new crossing locations to ensure consistency and efficiencies. The presence of mid-block crossings also impacts the planned speed limit.
Access Management Plan	Any preferred solution at this intersection will be enhanced by improvements to access management at this location, to ensure that people movements, whether non-motorized or motorized, are operating in a safe environment.
Complete Sidewalk Network	Mobility is best supported by crossings that connect to a fully integrated sidewalk network.

Restripe and Narrow General-Purpose and Center Turn Lanes

The project team heard that travel speeds in East Forest Grove were high and kept people from feeling safe walking near and crossing OR-8. Historical crash data illustrated the danger for drivers, bicyclists and pedestrians. While speed limits set a policy, this relies on consistent enforcement to ensure drivers maintain safe speeds. People tend to change their behavior and drive slower, however, as lanes become narrower, as they turn more attention to controlling their vehicle and watching for potential conflicts. This strategy proposes narrowing the inner two travel lanes (one in each direction) to 11 feet from 12 feet, and the median turn lane from 16 feet to 14 feet. The bike lane, which ranges today from 6 to 10 feet, would maintain a consistent 8 feet on each side with a 4-foot striped buffer, and parking lane would become a flex or bike lane only.

The project sponsors will need to consider that a grind and overlay requires rebuilding all non-compliant ADA ramps, and may affect privately maintained driveways. "Ghost stripes" left in the strips removal process would be permitted in the buffered area but ghost stripes on other sections of the roadway requires a grind and overlay to remove.

Figure 21. Existing Road Striping

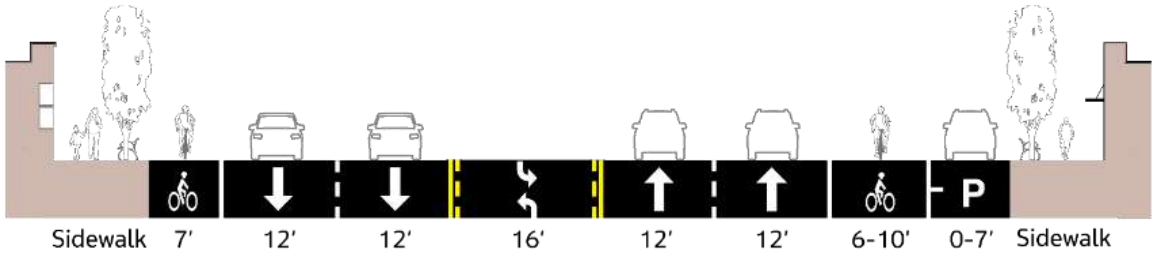
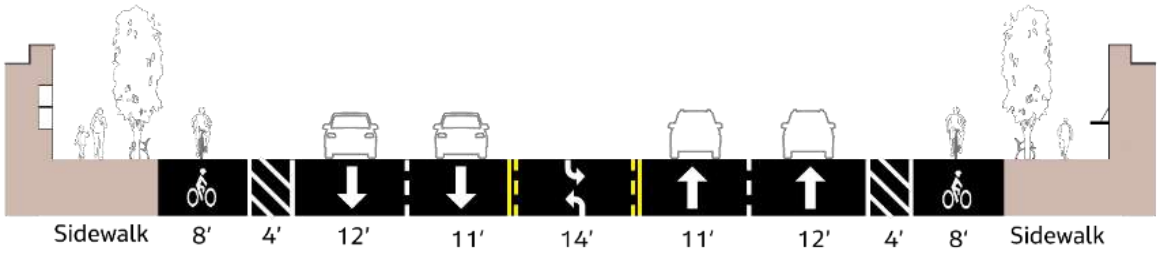


Figure 22. Future (Narrowed) Road Striping



Needs

- Current lane configuration and widths encourage fast traffic speeds
- The wide lanes leave little room for safe bike and pedestrian facilities

Benefits

- Enhanced safety for pedestrians and bicyclists by providing more space for people walking, riding, or rolling
- Provides space for bicyclists to pass one another without drifting into traffic
- Encourages bicycling, walking and riding transit by reducing vehicle speeds and creating a safe pedestrian realm

Estimated Cost: $$$$$

Elements of this project and cost estimate include:

- Signal work and roadway striping
- Asphalt grind and overlay
- Construction of ADA-compliant curb ramps

Timing

Near-term

Funding Sources

Source	Applicant
ODOT Statewide Transportation Improvement Program	ODOT, Forest Grove
ODOT ARTS Safety	ODOT, Forest Grove
Metro Regional Flexible Fund	Forest Grove
MSTIP	Forest Grove

Action Plan

Action	Description	Leads
Roadway Design	Further design and study will refine the lane widths, sidewalks, and compliance with plans and traffic design guidance.	ODOT, Forest Grove
Cross section adoption	Adopting the roadway cross section in the City's Transportation System Plan is one way to gather public feedback on the vision for the roadway, and ensure compliance with other plans.	Forest Grove
Funding Applications	Prepare project purpose and need to include with funding applications for design and construction.	Forest Grove

Related Projects

Project	Coordination
Sidewalk network	Lane restriping must be coordinated with sidewalk network changes or improvements to ensure that adequate space is provided.
Bicycle lanes	Since restriping the roadway will provide additional space for bike lanes, any facility enhancement must be closely coordinated to ensure there is room for a safe and protected bike lane.
Pedestrian crossings	Restriping the roadway will narrow lanes, and reconfigure how the roadway is used, including crosswalks.
Speed Limit	Lane restriping is designed to not only provide space for other modes of travel, but also to slow driving speeds. Speed limits will need to be coordinated to ensure safety for all users.

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Update Slip Lanes at Quince

This project would involve redesigning and tightening the radius of right-turn slip lanes at the intersection of OR-8 and Quince Street (OR-47) to make crossing easier, safer, and more comfortable. Slip lanes will be signalized to allow time for pedestrians to safely cross. Signals will include a leading pedestrian interval to give people crossing a head start and making pedestrians more visible to turning vehicles. Signs will alert drivers in advance of the intersection to the presence of pedestrians. Pedestrian-scale lighting will improve pedestrians' ability to see and be seen.

Needs

- Current slip lane infrastructure lacks safety features for pedestrians
- Low visibility of pedestrians with fast-moving vehicles facilitated by shallow, wide lanes

Benefits

- Improved pedestrian and driver safety
- Enhanced visibility of pedestrians

Figure 23. Slip Lane at OR-47 and OR-8 Intersection

Estimated Cost: $$$$

Elements of this project and cost estimate include:

- Traffic signals on slip lanes
- Construction of ADA-compliant curb ramps and sidewalks
- Pedestrian-scale lighting

Timing

Mid-term (Years 5–10)

Applicable Funding Sources

Source	Applicant	Period	Applications
STIP	State of Oregon	Annual	Late Winter
ARTS	State of Oregon	Annual	Late Winter
MSTIP	Washington County	5-year	Fall
TDT	Forest Grove	Ongoing	N/A
TIF	Forest Grove	Ongoing	N/A

Action Plan

Action	Description	Lead(s)
Funding Application	Slip lane redesign and construction will require funding for at least one capital project	Forest Grove, ODOT
Conceptual Design	Once funds are secured, work with stakeholders to create signal and crossing designs to improve safety	Forest Grove

Related Projects

Project	Coordination
Roadway restriping	Lane restriping should be coordinated with the Quince slip lanes project, as new lane widths geometry will determine how the new slip lanes will fit within the roadway.
Pedestrian-scale lighting	Pedestrian-scale lighting is a critical component of safe pedestrian infrastructure and will also be important at crossings where slip lanes occur.

Protected and Raised Bike Lanes

Existing bike lanes in East Forest Grove are reported to be too narrow and too close to the road for safe mobility. A separated or buffered bike lane, in addition to plastic bicycle bollards, will enhance safety for bicyclists and pedestrians. This increase in safety also may encourage greater utilization of bicycling or walking for some who currently rely on their vehicles.

Preliminary analysis suggests that the roadway crossslope may exceed 2%, in which case a raised bike lane would be required to comply with safe bike way design guidance. This would provide more positive separation from the relatively high-speed travel lanes, increasing rider comfort and visibility.

Figure 24. Conceptual OR-8 Cross Section with raised bike lane

Needs

- Reports of bicyclists feeling unsafe and unseen, facilitating dangerous conditions
- Vehicles may collide with bicyclists
- Current bike lanes used by pedestrians who walk or roll in areas with no sidewalks
- Bicycles lanes are too narrow and not physically separated from vehicle traffic

Benefits

- Enhanced safety for pedestrians and bicyclists by providing greater distance from general traffic
- Provides space for bicyclists to pass one another without drifting into traffic
- Encourages bicycling or walking

Estimated Cost: $$$$

Figure 25. OR-8 at OR-47

Elements rof this project and cost estimate include:

- Construction of concrete traffic separator and new curb
- Construction of raised bike lane with drainage inlets and other design features
- ADA-compliant sidewalk and ramp improvements
- Roadway asphalt grind and overlay
- Landscaping, utility relocation, signal work, signage, and striping

Timing


Medium term

Funding Sources

Source	Applicant
ODOT Statewide Transportation Improvement Program	ODOT, Forest Grove
ODOT ARTS Safety	ODOT, Forest Grove
Metro Regional Flexible Fund	Forest Grove
MSTIP	Washington County
Transportation Development Tax	Forest Grove
Traffic Impact Fee	Forest Grove

Action Plan

Action	Description	Leads
Roadway Design	Further design and study will refine the lane widths, sidewalks, and compliance with plans and traffic design guidance.	ODOT, Forest Grove
Funding Applications	Prepare project purpose and need to include with funding applications for design and construction.	Forest Grove

Related Projects

Project	Coordination
Restripe Lanes	Restriped (narrower) travel lanes will affect the design of bike lanes on OR-8; this would be a prerequisite project.
Bicycle bollards	Bicycle bollards should be considered as part of the buffered bike lanes project. Less expensive options rumble stripe (armadillo) lane dividers or concrete curb, which is also effective and more aesthetic than bollards like tuffcurb.

Project	Coordination
Sidewalk network	Construction of bike lanes will impact the pedestrian environment. Coordination of these projects will assure that pedestrians and bicyclists are able to navigate the corridor.
Access Management Plan	Protecting crosswalks by providing safe and effective access management on both sides of the crossing area will reduce conflicts and risk for pedestrians and drivers.

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Mountain View Lane Pedestrian Refuge Island

Median refuge islands facilitate safer street crossings for pedestrians and bicyclists. The median pedestrian refuge island would be installed in the center lane of OR-8 on the west leg of the intersection with Mountain View Lane. This non-continuous median would reduce the crossing length for pedestrians, provide pedestrian-scale landscaping, and help slow traffic by narrowing the perceived roadway width.

Needs

- Survey respondents report concerns regarding safe crossing opportunities
- Lack of ADA-accessible crossings
- Pedestrian crashes recorded in area near area Middle School

Benefits

- Enhances safety for pedestrians and bicyclists
- Decreases time delays and exposure to traffic for pedestrian and bicyclists crossing the street
- Provides a protected space for bicyclists and allows for greater visibility from general traffic

Figure 26. Example median and pedestrian crossing on OR-26 in Portland, Oregon

Estimated Cost: $$$$

Elements of this project and cost estimate include:

- Design and engineering
- Utilities survey and potential relocation or upgrade
- Crossing upgrades for curbs and ADA-compliant ramps
- Access management plan
- Construction, striping and signs

Timing

Medium term

Applicable Funding Sources

Source	Applicant
Regional Flexible Fund	Forest Grove
Safe Routes to School	Forest Grove
ARTS Program	ODOT

Action Plan

Action	Description	Leads
Funding Application for Design and Construction	The City can lead in acquiring funding for pedestrian refuges in the entire corridor, or in coordination with site-specific projects	Forest Grove
Design	All designs on OR-8 require ODOT coordination and participation to ensure safety and consistency with state requirements and standards	Forest Grove, ODOT

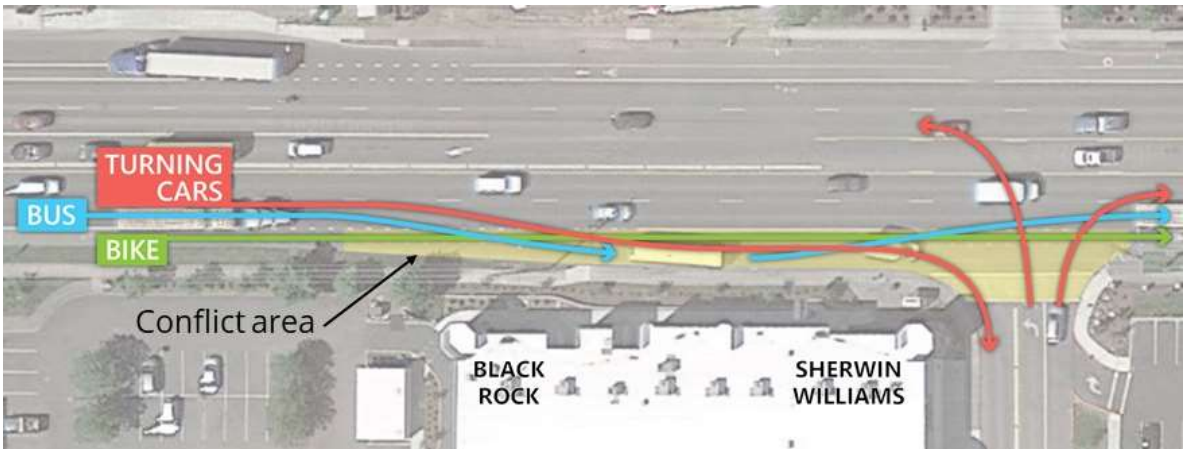
Related Projects

Project	Coordination
Restripe Lanes	Narrowing select roadway lanes would result in a narrower median (turn) lane. Pedestrian refuges should be designed to the desired cross section.
Mid-Block Crossings	Median pedestrian refuges help pedestrians cross at these locations. These projects can be coordinated with new crossing locations to ensure consistency and efficiencies.
Yest Street Traffic Signals (or crossing beacons)	Conceptual alternatives for Yew Street include restricted turning movements that may prioritize U-turns for passenger cars and trucks at Mountain View. While not a recommended alternative in this Plan, a pedestrian refuge may need to make space for U-turns if relevant.

Bus Pull-Out Redesign

This project would redesign the bus stop pull-out location just east of Quince Street/OR-47. The existing bus stop is shared with a right-turn lane to access the adjacent commercial area. This can be confusing for drivers and can create conflicts between cars, buses and bikes. One potential concept strategy is to move the bus stop west, closer to the intersection with Quince Street and thus away from the shopping area driveway. The project may require relocation of the electric systems and new stormwater infrastructure.

Figure 27. Illustrated bus pull-out and turning lane conflicts



Needs

- Current bus stop pull-out creates conflicts for bus drivers, bus riders and vehicle drivers.

Benefits

- Increased clarity around bus stop operations

Estimated Cost: $$$$

Elements of this project and cost estimate include:

- Bus stop design
- Relocation of utilities
- Construction of new stormwater infrastructure

Timing

Mid-term (Years 5–10)

Applicable Funding Sources

Source	Applicant
STIP	ODOT
Regional Flexible Fund Allocation	Forest Grove
Statewide Transportation Improvement Fund	Trimet
TDT	Forest Grove
Traffic Impact Fee	Forest Grove

Action Plan

Action	Description	Leads
Funding Application		Trimet, Forest Grove
Bus stop design and construction		ODOT, TriMet

Related Projects

Project	Coordination
Bus Stop Improvements	Bus stop improvements should be coordinated to ensure stops are consistent and amenities upgraded when possible.
Update Slip Lanes at Quince	Redesign at Quince Street might accommodate bus stop design on the south east corner.
Access Management Plan	Protecting transit with safe and effective access management will reduce conflicts and risk for pedestrians and drivers.
Restripe Lanes	A restriping design/cross section would need to accommodate or reflect the bus stop relocation and redesign, if selected for development.

Complete Sidewalk Network

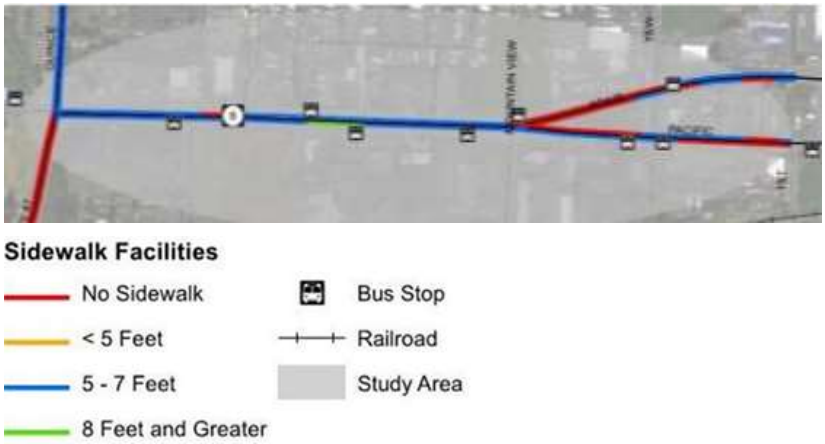
Completing the sidewalk network with modern, ADA-accessible pedestrian facilities will allow people of all ages and abilities to move through the corridor safely. Survey respondents reported insufficient pedestrian facilities, including lack of sidewalk or sidewalk gaps throughout the corridor. People with mobility devices are disproportionately impacted and they will often use the bicycle lanes in areas where sidewalks do not exist or are in poor condition.

Completing the sidewalk network is essential to ensuring all other safety strategies are effective and make measurable difference in people's safety and likelihood to walk and use public transportation. A full corridor project may not be feasible until a discretionary grant is available and related infrastructure issues like utility locations can be resolved. Including sidewalk improvements with future development can provide efficiency through incremental change.

Needs

- People with mobility devices, such as wheel or power chairs, currently must use the bike lanes because sidewalks are not continuous or accessible
- Lack of sidewalks may encourage pedestrians to make illegal crossings, threatening safety for themselves and vehicles
- Existing sidewalks need widening

Figure 28. OR-8 Sidewalk Condition in East Forest Grove



Benefits

- Increased safety and mobility for people who walk or roll along the corridor
- Encouragement of using sidewalks rather than crossing the street in areas without crossings

Timing

Mid-term and with future development

Estimated Cost: $$$$

Elements of this project and cost estimate include:

- Design and engineering
- Utilities survey and potential relocation or upgrade
- Crossing upgrades for curbs and ADA-compliant ramps
- Access management plan
- Construction: placing lighting and new sidewalk
- Property frontage improvements required for development approval

Figure 29. OR-8 Westbound east of Yew Street

Funding Sources

Source	Applicant
ARTS Program	Forest Grove
TDT	Forest Grove
RFFA	Forest Grove
Traffic Impact Fee	Forest Grove
STIP	ODOT
Safe Routes to School	ODOT
Development Approval Condition	Property Owner/Developer

Action Plan

Action	Description	Leads
Conceptual Design	All designs on OR-8 require ODOT coordination and participation to ensure safety and consistency with state requirements and standards	Forest Grove
Funding Application		Forest Grove

Related Projects

Project	Coordination
Pedestrian-scale lighting	Construction of pedestrian-scale lighting will include 3,000 feet of new sidewalk. Coordination of these projects will assure that pedestrians are able to navigate the corridor with optimal lighting.
Bus stop improvements	Bus stop improvements and station amenities must be coordinated with sidewalk improvements to assure optimal safety for the pedestrian environment.
Mid-Block Crossings	Median pedestrian refuges help pedestrians cross at these locations. These projects can be coordinated with new crossing locations to ensure consistency and efficiencies.

Pedestrian-Scale Lighting

New lamps illuminate the pedestrian realm, making the sidewalk more comfortable for people walking and helps drivers see pedestrians on the sidewalks. Lamps add aesthetic value to the sidewalk and help to create a sense of place. Lights are typically spaced 80'-100' apart, and delivery would typically include new sidewalk.

In many areas of East Forest Grove improving the sidewalk and crosswalks would take priority over lighting. Adding new lights without sidewalk improvements like removing obstructions (e.g. utility poles) and an access management plan would be unlikely to encourage walking. Adding new lighting is therefore most successful when combined with sidewalk improvements, whether as a standalone project or improved as a condition for new development.

Needs

- Poor visibility for vehicles to see pedestrians, especially for crossing at night
- Dark crosswalks have led to "close calls" for pedestrians crossing the street

Figure 30. Example of pedestrian-scale sidewalk lighting

Benefits

- Enhanced safety for vehicles, bicyclists, and pedestrians
- Increased comfort for pedestrians and bus riders waiting at bus stops

Timing

With development

Estimated Cost: $$$$

Elements of this project and cost estimate include:

- Design and engineering
- Utilities survey and potential relocation or upgrade
- New sidewalks
- Construction: placing lighting and new sidewalk

Funding Sources

Source	Applicant
ARTS Program	Forest Grove
TDT	Forest Grove
RFFA	Forest Grove

Action Plan

Action	Description	Lead(s)
Access Management Plan	Create a corridor-wide access management plan to guide development review and future transportation projects	Forest Grove
Conceptual Design	All designs on OR-8 require ODOT coordination and participation to ensure safety and consistency with state requirements and standards	Forest Grove

Related Projects

Project	Coordination
Sidewalk network	Construction of pedestrian-scale lighting will include 3,000 feet of new sidewalk. Coordination of these projects will assure that pedestrians are able to navigate the corridor with optimal lighting.
Access Management Plan	Protecting sidewalks with safe and effective access management will reduce conflicts and risk for pedestrians and drivers.
Bus Stop Improvements	Bus stops are priority locations to add pedestrian-scale lighting.

Access Management Plan

Driveways are critical access points for people using cars to get to medical services, stores and other destinations along the OR-8 corridor in East Forest Grove and for larger delivery vehicles to access businesses. However, the area has numerous driveways that encroach on bike lanes and sidewalks facilities. The driveways typically allow drivers to turn either direction onto OR-8 which can disrupt traffic flow and create conflicts.

Figure 31. Turn lanes from parking lot to OR-8 in East Forest Grove

Access management is a set of measures and actions that ODOT can use to extend the operational life of a highway by reducing conflicting vehicle movements to improve traffic flow and reduce crashes. Completing an access management plan will guide improvements that reduce conflict points from driveways and vehicle access points. Driveways serving the same or adjacent parking areas can be consolidated and raised center medians may also be used to restrict left turns. Specific locations will be determined through more detailed engineering investigation that involve affected property and business owners. Specific modifications may be triggered as new development or redevelopment applications arise, as transportation improvement projects are implemented, or as additional safety and operational issues arise

Needs

- High number of collisions between vehicles and pedestrians at several intersections
- Survey respondents report concerns regarding conflicts with vehicles at driveways
- Balance business access and safe mobility for people walking, biking and riding transit

Benefits

- Implementation of effective access management has two primary effects:
    - protecting public investment, and
    - accommodating traffic volumes safely and efficiently into the future while ensuring circulation necessary for access to OR-8
- Enhances safety for pedestrians and bicyclists
- Median pedestrian refuges and mid-block crossings completed in tandem with reduction in speed limit

Estimated Cost: $$$$

Elements of this project and cost estimate include:

- Design and engineering
- Interagency coordination
- Access Management Plan

Timing

With development (or near term for Plan alone)

Applicable Funding Sources

Source	Owner	Period	Applications
Regional Flexible Fund	Metro	Annual	Late Winter

Action Plan

Action	Description	Lead(s)
Funding Application for Planning	The City and/or ODOT can lead in acquiring funding for completing a Plan that includes design and engineering, public engagement and interagency coordination	Forest Grove, ODOT
Project Coordination	Coordinate access management strategy with affected property owners	ODOT, Forest Grove

Related Projects

Project	Coordination
Yew Street Traffic Signal	If installing a traffic signal at this location an access management plan will identify improvements to ensure a safe place for people to cross either by walking, biking or driving.
Mid-Block Crossings	Median pedestrian refuges are a critical part of crossings on roadways as wide as OR-8. An access management plan will identify ways to design driveways to maintain access and avoid conflicts with drivers turning into crossing areas.

Appendices

A. Survey responses

B. TM 1 Policy Framework

C. TM 2 Evaluation Criteria

D. TM 3 Safety Analysis

E. TM 4 Needs Analysis

F. TM 5 Design Concepts

G. Public Outreach Summary

H. Crash Diagrams

I. Crossing and Signal Warrant Analysis Memo