

Mt. Angel Urban Design Verification Study

Prepared for

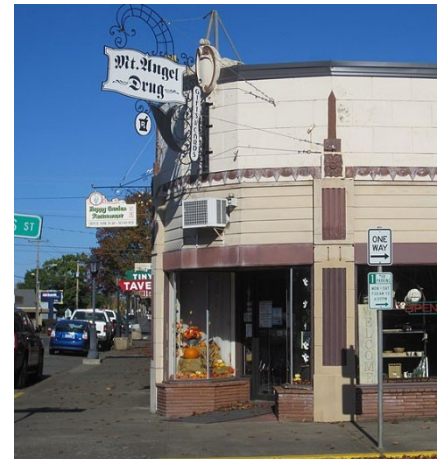
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ACRONYMS AND ABBREVIATIONS

ADA	Americans with Disabilities Act
BUD	Blueprint for Urban Design
MP	mile point
mph	miles per hour
ODOT	Oregon Department of Transportation
ROW	right of way
RRFB	rectangular rapid flashing beacon
STIP	Statewide Transportation Improvements Program
TSP	Transportation System Plan
UDV	Urban Design Verification
UGB	urban growth boundary

1. INTRODUCTION

Urban Design Verification Study Background and Purpose

The Mt. Angel Urban Design Verification (UDV) Study aims to bridge the transition between long-range planning and implementation of Statewide Transportation Improvements Program (STIP) projects, specifically projects in the Fix-It and American with Disabilities Act (ADA) programs. Table 1 presents the common funding sources for urban transportation enhancement projects.

The Oregon Department of Transportation (ODOT) does not have an identified “planning to project” transition process. Currently, ODOT’s region planning units focus on long-range planning activities which result in project lists that are often more general in nature. These lists also do not necessarily identify leverage opportunities for adding improvements to maintenance projects, and leverage opportunities can be effective strategies for cost-effective implementation. This results in a planning to project disconnect because ODOT’s current funding focuses primarily on Fix-It program projects. This UDV process focuses on bridging that gap by finding specific solutions to attach to future STIP maintenance projects.

The primary objective of this study is to identify design solutions that are supported by both the community and by ODOT before the scoping process begins for future projects. The UDV Study assesses design alternatives and recommends a preferred design solution that considers cost, community context, transportation safety, and the goals of ODOT’s Strategic Action Plan. This study also evaluates identified overlapping corridor needs for the different Fix-It programs and identifies strategies to implement the preferred multimodal design solutions.

This study is intended to provide the following benefits:

- Identify active transportation leverage opportunities – with a preferred design solution – ahead of scheduled maintenance projects and final STIP project prioritization.
- Conduct corridor-specific public engagement to identify multimodal design solutions and options.
- Better inform communities about upcoming STIP Fix-It projects.

This final project summary provides a set of vetted improvements and cost estimates that can be used for budgeting and programming purposes. This summary provides a basis for initial cost estimates to identify and assess various alternative courses of action and make a pre-design recommendation to restore, resurface, rehabilitate, or reconstruct roads within the study area with reasonable and cost-effective design. This summary includes a list of corridor/location assets within the proposed project limits, enhancements that are community-supported from previous planning efforts, and a preferred design solution.

Table 1. Common ODOT Funding Sources for Urban Projects (Source: Blueprint for Urban Design)

Program Type	Program Focus	How Are Projects Selected?	Urban Design Opportunities ¹	Who Develops Project?
Fix-It Programs	Fix or preserve existing facilities (bridges, pavement, culverts, signals, etc.)	Data-driven, condition of assets	<ul style="list-style-type: none"> • Consider low cost opportunities to address needs through innovative design (e.g., lane reconfiguration when repaving) • Leverage other funding programs to address other needs in project area 	ODOT or Certified Local Agency
Enhance Programs	Enhance or expand transportation facilities	Legislature, ACTs, and ODOT staff recommend priority investments from state and local plans (can be competitive grants or discretionary).	<ul style="list-style-type: none"> • Most flexible to address urban design issues across modes and disciplines • Leverage other projects to address multiple needs in project area • Can fund stand-alone urban projects (grants and legislative discretionary projects) 	ODOT or Certified Local Agency
Safety Programs	Reduce deaths and injuries on Oregon's roads	Data-driven, maximize safety impact (cost-benefit)	<ul style="list-style-type: none"> • Approved safety countermeasures list provides multiple options to encourage context appropriate design solutions 	ODOT or Certified Local Agency
Non-Highway Programs	Improve non-single occupancy vehicle (non- SOV) transportation options (e.g., pedestrian and bicycle, public transportation, ADA, transportation options/demand management)	Legislature, ACTs, and ODOT staff recommend priority investments from state and local plans (can be competitive grants or discretionary).	<ul style="list-style-type: none"> • Very flexible to address urban design issues across modes and disciplines • Can leverage other projects to address multimodal needs in project area or fund standalone urban projects 	ODOT or Certified Local Agency
Local Government Programs	Direct funding to local governments	Local governments identify priority investments.	<ul style="list-style-type: none"> • Very flexible to address local priority urban design issues across modes and disciplines 	MPO or Local Agency (if state funds) ODOT or Certified Local Agency (if federalized)

Program Type	Program Focus	How Are Projects Selected?	Urban Design Opportunities ¹	Who Develops Project?
State-Funded Programs	Preserve and/or enhance transportation system (generally smaller projects than STIP Fix-It or Enhance) Examples: Safe Routes to School, Connect Oregon, State Pedestrian/Bicycle Program	Program-specific objectives (e.g., improve safety on school routes, promote economic growth)	<ul style="list-style-type: none"> • Very flexible to address urban design issues across modes and disciplines • Most flexible timeline (e.g., “Quick Fix” Safety or Pedestrian/Bicycle funds can be used for immediate improvements) • Not subject to Federal requirements or required to be in STIP • Can leverage other projects to address multimodal needs in project area or fund stand-alone urban projects 	ODOT or Local Agency
Development-Related Projects	Serve demand generated when property develops or redevelops	Part of land use permitting process. ODOT works with local agency (land use authority) and developer to identify needed improvements.	<ul style="list-style-type: none"> • Consider opportunities to incrementally implement improvements in adopted plan and/or dedicate right-of-way for future improvements • Not subject to Federal requirements or required to be in STIP • Consider opportunities to address needs through innovative design and/or to leverage developer funded improvements 	Developer and Local Agency (Land Use Authority)
Local Agency Projects	Locally funded projects	Local governments identify priority investments	<ul style="list-style-type: none"> • Consider opportunities to address needs through innovative design and/or to leverage locally funded improvements 	Local Agency

¹ All projects that receive state and federal funds are required to include at least the minimum bicycle and pedestrian facilities (per ORS 355.514) and ADA accommodation within the project budget. Some funds can be used for stand-alone bicycle, pedestrian and ADA projects or enhanced bicycle and pedestrian facilities within another project.

2. BACKGROUND

The study area for the Mt. Angel UDV Study is the segment of Hillsboro-Silverton Highway No. 140 (OR 214/N Main Street/Wilco Highway), including its right of way, within the Mt. Angel urban growth boundary (UGB), mile point (MP) 45.29 to 46.51. At the north end of the study area, OR 214 is also known locally as N Main Street from the UGB to the intersection with Wilco Highway (MP 46.13). At the south end of the study area, OR 214 is also known as Wilco Highway. The intersection of N Main Street and Wilco Highway forms a triangle with the intersection of Church Street. This intersection is at times referred to as the “Tricky Triangle” by the community.

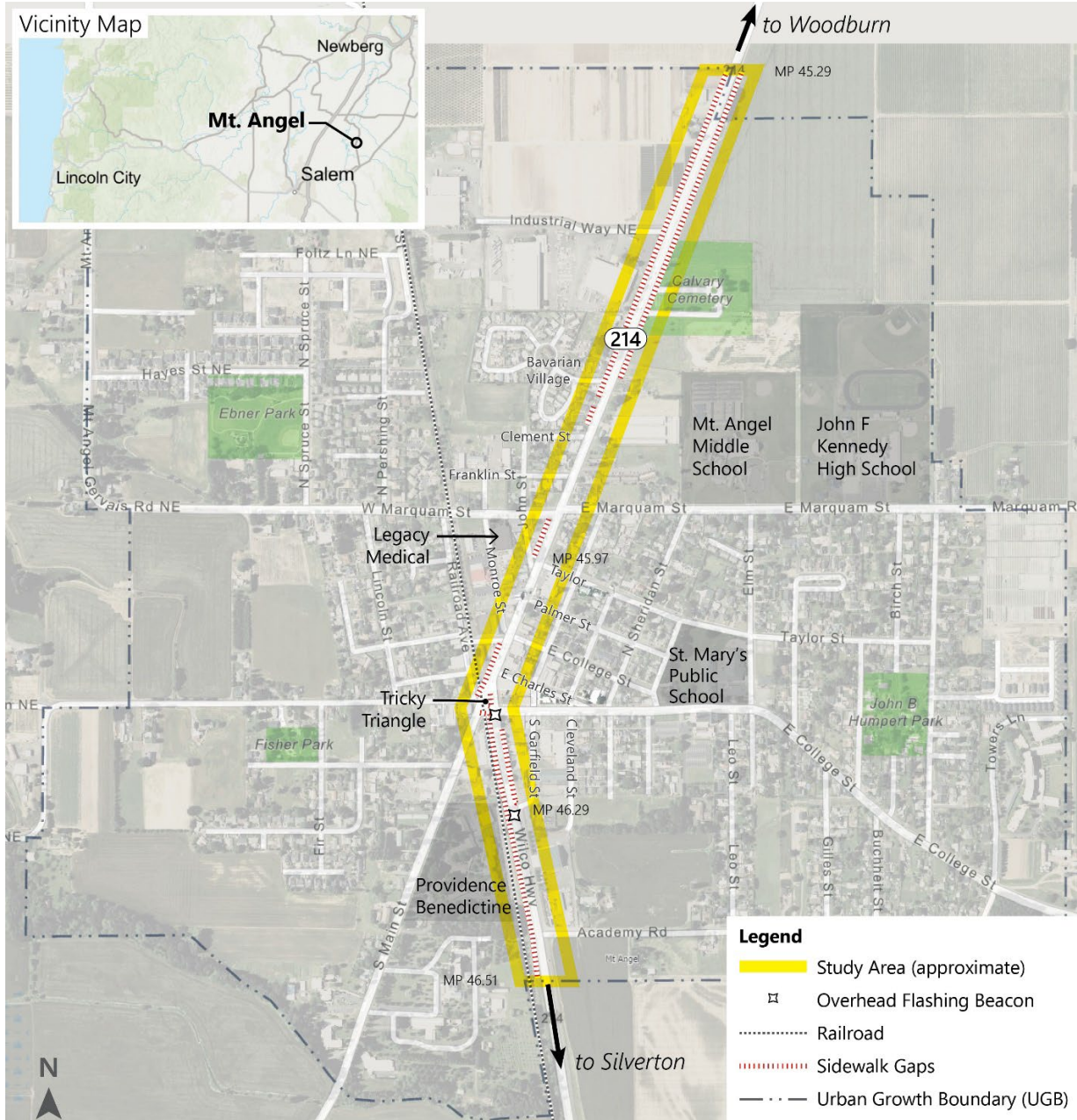


Figure 1. Study Area

2.1 Prior Planning and Documentation

The following goals and projects directly affect the OR 214 corridor in Mt. Angel and helped inform the development of solution alternatives in the UDV.

- Oregon Highway Plan (updated 2015)
- Mt. Angel Transportation System Plan (updated 2003)
- Mt. Angel Downtown Plan (2001)
- City of Mt. Angel Parks Master Plan (updated 2011)
- Salem-Keizer Transit: Long Range Regional Transit Plan (2013)

- ODOT 2024-27 ADA Scoping Notes (2022)
- Safe Routes to School Project Identification Program Plan (*planned 2022*)

For a full summary of relevant goals and projects from planning documents related to the study area, see Appendix A: Background Document Scan Memo.

2.2 Blueprint for Urban Design Context and Guidance

Transportation system solutions on OR 214 considered guidance from the Blueprint for Urban Design (BUD).¹ The BUD provides design guidance for state-owned facilities in urban contexts according to the land use and transportation characteristics of a given corridor.

Land Use Contexts

The project team determined urban contexts for OR 214 using guidance from Chapter 2 of the BUD. Contexts are based on current land use, zoning, and land use designations in the comprehensive plan. The urban context varies along the 1.22 miles of the study segment. These contexts are described in more detail in Table 2 and mapped in Figure 2.

- The North Segment of the corridor has a less dense character with a mix of land uses, including residential and commercial, as OR 214 transitions away from downtown. This segment was determined to be *Urban Mix*.
- OR 214 through downtown was subdivided into two segments: Downtown Segment A (north of Church Street) and Downtown Segment B (south of Church Street). Downtown Segment A matches the *Traditional Downtown / Central Business District* context. Downtown Segment B is not currently as dense as Segment A, but it includes the Mt. Angel Festhalle which becomes a center of activity during events, such as the annual Oktoberfest celebration. The City includes this within their “Downtown Core” zoning area, so it was also determined to be the *Traditional Downtown / Central Business District* context.
- The South Segment has a relatively less dense character and more closely aligns with the *Suburban Fringe* context, due to the longer block length and built environment characteristics.²

¹ https://www.oregon.gov/ODOT/Engineering/Documents_RoadwayEng/Blueprint-for-Urban-Design_v1.pdf

Note that the Blueprint for Urban Design has been incorporated into the 2023 Highway Design Manual. Projects that start after January 1, 2023, will use the 2023 Highway Design Manual instead of the Blueprint for Urban Design.

² Early in the project, the urban context for the South Segment was determined to be *Urban Mix*. However, after further review during development of this document, the project team determined *Suburban Fringe* to be the more appropriate context.

Table 2. Segment Urban Contexts

Segment	Mile Points / Length	Urban Context	Description
North Segment	45.71 – 45.90	<i>Urban Mix</i>	<p>This segment begins at the Bavarian Village Mobile Home Park access road. Adjacent land use is residential and commercial. This segment transitions to the Downtown Core at Marquam Street.</p> <p>Segment includes land use elements consistent with the <i>Urban Mix</i> context:</p> <ul style="list-style-type: none"> • Mix of land uses within. • Small to medium block sizes. • Some buildings oriented for pedestrian access from the street. • Medium building coverage. • Parking mostly off-street with some in front, in back, and on the side.
Downtown Segment (A + B)	45.90 – 46.29 Segment A: 45.90 – 46.17 Segment B: 46.17 – 46.29	<i>Traditional Downtown / Central Business District</i>	<p>This segment extends through the length of the City’s Downtown Core zoning designation, beginning at Marquam Street and continuing to S Garfield Street (includes Segments A and B).</p> <p>Segment includes land use elements consistent with the <i>Traditional Downtown / Central Business District</i> context:</p> <ul style="list-style-type: none"> • A mix of residential and commercial uses. • Small and consistent block sizes. • Buildings oriented for pedestrian access from the street.
South Segment	46.29 – 46.45	<i>Suburban Fringe</i>	<p>This segment begins at Garfield Street, where adjacent land uses are zoned and designated commercial and public. These land uses continue through most of the segment until the very south end, where the east side is currently zoned urban transition farm and is designated low-density residential in the comprehensive plan. This segment ends at Academy Street.</p> <p>The South Segment includes land use elements consistent with the <i>Suburban Fringe</i> context:</p> <ul style="list-style-type: none"> • Mix of land uses. • Mix of block sizes. • Few buildings fronting the street. • Medium building coverage. • Parking mostly off-street with some in front, in back, and on the side.

Urban context elements from Table 2-2 in the Blueprint for Urban Design.

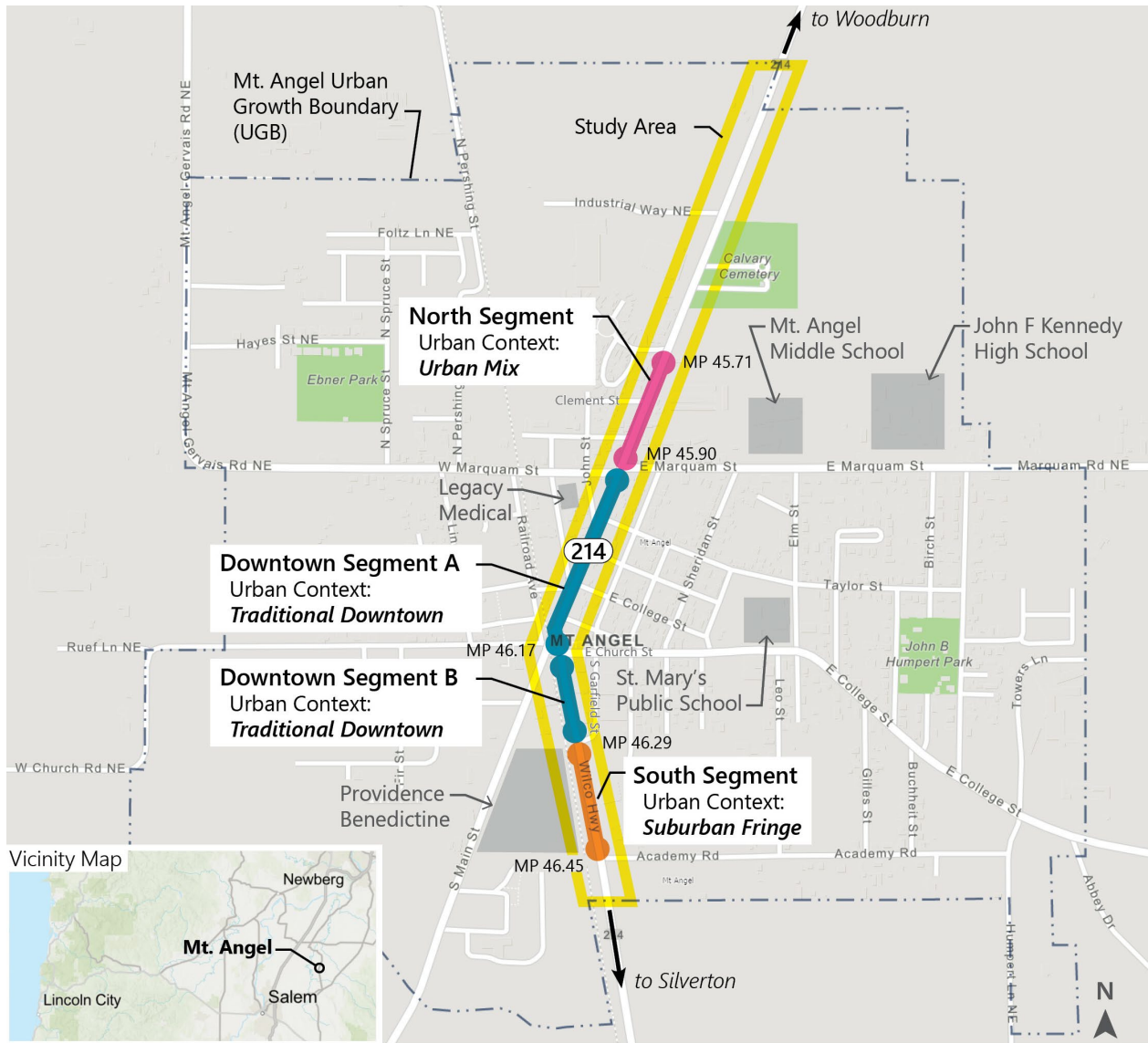


Figure 2. Segment Urban Contexts

Urban Design Context Comparison

Tables 3, 4, and 5 compare BUD design guidance to future no-build conditions along OR 214 in Mt. Angel. The purpose of this comparison is to highlight how the corridor does or does not meet guidance.

Table 3. BUD Guidance for North Segment (MP 45.71 – 45.90)

Element	BUD Guidance: <i>Urban Mix</i>	Existing Conditions
Target Speed	25 to 30 miles per hour	Posted Speeds: 25, 30, 45 miles per hour
Travel Lanes	Start with minimum widths, wider by roadway characteristics: <ul style="list-style-type: none"> • Minimum width: 11 ft. to 12 ft.* 	12 ft.
Turn Lanes	Minimize additional crossing width at intersections. Minimum widths: <ul style="list-style-type: none"> • Two-way left turn lane: 11 ft. to 12 ft.* • Left turn lane: 11 ft. to 12 ft.* • Right turn lane: 11 ft. to 12 ft.* 	Not applicable
Shy Distance	Minimal	Not applicable
Median	Optional, use as a pedestrian crossing refuge Minimum widths: <ul style="list-style-type: none"> • Raised median (no turn lane): 8 ft. to 11 ft. • Raised median (with left turn lane): 12 ft. to 14 ft. 	No medians
Bicycle Facility	Start with separated bicycle facility, consider roadway characteristics. Preferred facility design: <ul style="list-style-type: none"> • Tier 1: Separated bikeway using these options for delineation: parking, raised island, flexible delineator posts, parking stops, planters, bioswale. <ul style="list-style-type: none"> ➢ Separated Bicycle Lane (Curb Constrained Facility): 8 ft. to 7 ft. • Tier 2: Evaluate bicycle lane buffer <ul style="list-style-type: none"> ➢ On-Street Bicycle Lane (not including buffer): 6 ft. to 5 ft. ➢ Bicycle/Street Buffer: 4 ft. to 2 ft. • Tier 3: Evaluate bicycle lane vs shared lane 	No dedicated bicycle facility
Sidewalk	Ample space for sidewalk activity (5 ft. to 8 ft.)	0 ft. to 4 ft.
Target Pedestrian Crossing Spacing Range	250 ft. to 550 ft. (1-2 blocks)	250 to 1,500 ft. between unmarked crossings
On-Street Parking	Consider on-street parking if space allows (8 ft. wide)	8 ft. parallel parking lanes

ODOT Blueprint for Urban Design, 2020. Tables 2-6, 3-7, 3-9, 3-12.

Bold values differ from BUD guidelines.

* As part of the National Freight Network, OR 214 should maintain 12-foot minimum lane widths.

Table 4. BUD Guidance for Downtown Segments A and B (MP 45.90 – 46.29)

Element	BUD Guidance Traditional Downtown/Central Business District	Existing Conditions
Target Speed	20 to 25 miles per hour	Posted speed: 25 miles per hour
Travel Lanes	Start with minimum widths, wider by roadway characteristics: <ul style="list-style-type: none"> • Minimum widths: 11 ft.* 	12 ft. north of E Charles St 12 ft. to 20 ft. south of Charles St
Turn Lanes	Minimize additional crossing width at intersections. Minimum widths: <ul style="list-style-type: none"> • Two-way left turn lane: 11 ft. to 12 ft.* • Left turn lane: 11 ft.* • Right turn lane: 11 ft. to 12 ft.* 	<ul style="list-style-type: none"> • Two-way left turn lane: 16 ft. (begins between Church St and S Garfield St)
Shy Distance	Minimal	Not applicable
Median	Optional, use as a pedestrian crossing refuge Minimum widths: <ul style="list-style-type: none"> • Raised median (no turn lane): 8 ft. to 11 ft. • Raised median (with left turn lane): 12 ft. to 14 ft. 	No medians
Bicycle Facility	Start with separated bicycle facility. Preferred facility design: <ul style="list-style-type: none"> • Tier 1: Separated bikeway using these options for delineation: parking, raised island, flexible delineator posts, rigid bollards, parking stops, planters, bioswale. <ul style="list-style-type: none"> ➢ Separated Bicycle Lane (Curb Constrained Facility): 8 ft. to 7 ft. • Tier 2: Evaluate bicycle lane buffer <ul style="list-style-type: none"> ➢ On-Street Bicycle Lane (not including buffer): 6 ft. to 5 ft. ➢ Bicycle/Street Buffer: 3 ft. to 2 ft. • Tier 3: Evaluate bicycle lane vs shared lane 	No dedicated bicycle facility
Sidewalk	Ample space for sidewalk activity (8 ft. to 10 ft.)	4 ft. to 10 ft.
Target Pedestrian Crossing Spacing Range	250 ft. to 550 ft.	120 ft. to 600 ft. between crossings (marked or unmarked)
On-Street Parking	7 ft. to 8 ft.	8 ft. parallel parking lanes on both sides

ODOT Blueprint for Urban Design, 2020. Tables 2-6, 3-7, 3-9, 3-11.

Bold values differ from BUD guidelines.

* As part of the National Freight Network, OR 214 should maintain 12-foot minimum lane widths.

Table 5. BUD Guidance for the South Segment (MP 46.29 – 46.45)

Element	BUD Guidance: <i>Suburban Fringe</i>	Existing Conditions
Target Speed	35 to 40 miles per hour	Posted Speeds: 25, 45, 55 miles per hour
Travel Lanes	Start with minimum widths, wider by roadway characteristics: <ul style="list-style-type: none"> • Minimum width: 11 ft. to 12 ft.* 	Approximately 18 ft
Turn Lanes	Balance crossing width and operations depending on desired use. Minimum widths: <ul style="list-style-type: none"> • Two-way left turn lane: 11 ft. to 12 ft.* • Left turn lane: 12 ft. to 14 ft.* • Right turn lane: 12 ft. to 13 ft.* 	Two-way left turn lane: 16 ft.
Shy Distance	Consider roadway characteristics, desired speeds	Not applicable
Median	Optional, use as a pedestrian crossing refuge Minimum widths: <ul style="list-style-type: none"> • Raised median (no turn lane): 8 ft. to 13 ft. • Raised median (with left turn lane): 14 ft. to 16 ft. 	No medians
Bicycle Facility	Start with separated bicycle facility, consider roadway characteristics. Preferred facility design: <ul style="list-style-type: none"> • Tier 1: Separated bikeway using these options for delineation: raised island, flexible delineator posts, concrete barrier, guardrail, bioswale, ditch. <ul style="list-style-type: none"> > Separated Bicycle Lane (Curb Constrained Facility): 8 ft. to 7 ft. • Tier 2: Bicycle lane or wide shoulder. Evaluate buffer. <ul style="list-style-type: none"> > On-Street Bicycle Lane (not including buffer): 6 ft. > Bicycle/Street Buffer: 5 ft. to 2 ft. • Tier 3: Evaluate bicycle lane vs shared lane 	No dedicated bicycle facility
Sidewalk	Continuous and buffered sidewalks (5 ft. to 8 ft.)	Sidewalk width: 0 ft. to 8 ft.
Target Pedestrian Crossing Spacing Range	750 ft. to 1,500 ft.	850 ft. between unmarked crossings (west side of road has no destinations)
On-Street Parking	Consider on-street parking if space allows (8 ft. wide)	Wide shoulders occasionally used as on-street parking, mainly during events

ODOT Blueprint for Urban Design, 2020. Tables 2-6, 3-7, 3-9, 3-12.

Bold values differ from BUD guidelines.

* As part of the National Freight Network, OR 214 should maintain 12-foot minimum lane widths.

As noted in the Tables 3, 4, and 5, the existing corridor does not meet BUD guidance in these elements:

- **Travel lanes:** BUD guidance recommends travel lanes have a minimum of width of 11 to 12 feet. (As noted in the section, Designations and Freight Considerations, below, driving lanes must be a minimum of 12 feet wide because OR 214 is part of the National Network for freight.) Travel lanes through most of the corridor are 12 feet wide. However, south of Charles Street, travel lanes widen to 20 feet as they taper to accommodate a center turn lane. Lanes also lack a fog line to indicate shoulders between Charles Street and Academy Street. [Downtown and South Segments]
- **Turn lanes:** BUD guidance recommends two-way left turn lanes have a minimum width of 11 to 12 feet. A 16-foot wide two-way left turn lane begins between Church Street and S Garfield Street and continues south through the end of the corridor. [Downtown and South Segments]
- **Target speed:** BUD guidance recommends target speeds of 25 to 30 miles per hour (mph) in *Urban Mix* areas and 35 to 40 mph in *Suburban Fringe* areas. The existing posted speed exceeds this at the north and south ends of the city. North of Industrial Way (approximate MP 45.50), the posted speed limit increases to 45 mph. The posted speed increases to 45 mph at the south end of the corridor, just south of S Garfield Street (approximate MP 46.31), and increases again to 55 mph at Academy Street (approximate MP 46.45). Note: “target” speeds are not necessarily the same as the “posted” speeds.
- **Bicycle facility:** BUD guidance recommends a Tier 1 or Tier 2 bicycle facility. No dedicated bicycle facility currently exists in the corridor. [North, Downtown, and South Segments]
- **Sidewalk:** BUD guidance recommends sidewalks be a minimum of six feet wide, and eight feet wide specifically in *Traditional Downtown* areas. Existing sidewalks widths vary through the corridor. Some Downtown sidewalks are as narrow as four feet. Portions of the North and South Segments lack sidewalks. [North, Downtown, and South Segments]
- **Target pedestrian crossing spacing range:** BUD guidance recommends locating pedestrian crossings every 250 feet to 550 feet in *Traditional Downtown* areas. Unmarked crossings in the Downtown Segment are primarily spaced 250 feet to 350 feet apart. However, crossings are spaced closer together between Charles Street and Church Street, at approximately 125 feet. There is a space of approximately 600 feet between Church Street and S Garfield Street, but this is adjacent to the railroad where there are no destinations.

BUD guidance recommends locating pedestrian crossings every 250 feet to 550 feet in *Urban Mix* areas. In the North Segment, there is a space of approximately 1,500 feet between the unmarked crossings at Clement Street and Industrial Way.

In the South Segment, crossing spacing is approximately 850 feet between S Garfield Street and Academy Street, however the west side of the road has no destinations because it is occupied by the railroad. Crossing spacing is recommended every 750 to 1,500 feet in the *Suburban Fringe* context.

Designations and Freight Considerations

Because OR 214 is part of the National Truck Network, lanes must be a minimum of 12 feet wide or otherwise consistent with highway safety. As an ORS 366.215 Reduction Review Route, OR 214 requires review if the freight vehicle-carrying capacity could be reduced by physical improvements in the corridor. Table 6 provides a full list of classifications and designations.

Table 6. Classifications and Designations: OR 214 through Mt. Angel

Classification	Designation
Federal Functional Classification	Rural Minor Arterial
Statewide Classification System	District
Scenic Byway	Silver Falls Tour Route
National Highway Freight Route	No
High Clearance Freight Route	No
OHP Freight Route	No
Reduction Review Route	Yes
National Truck Network	Yes

Bicycle Facility Tier Designation

Section 3.2.2 of the BUD outlines the process for determining the appropriate bicycle facility for state-owned facilities in urban areas. This process intends to provide a bicycle facility that encourages and accommodates bicycling as a transportation mode, while balancing maintenance needs and other trade-offs. The steps to this process are illustrated in BUD Figure 3-6 and described here.

1. **Establish Policy.** Bikeway Selection Policy is already established in the Oregon Bicycle & Pedestrian Plan with nine goals and policies within each goal.
2. **Plan.** The Mt. Angel Transportation System Plan (TSP) (updated 2003) identifies priority bicycling improvements in the Bicycle/Pedestrian Network Plan (page 38). Though dated, this is the most current bicycle network planning for Mt. Angel.
3. **Identify Context.** As noted above, the urban context for the Downtown Segment of OR 214 is *Traditional Downtown/Central Business District*, the North Segment is *Urban Mix* and the South Segment is *Suburban Fringe*. BUD guidance for bicycle facilities is similar for each of these contexts.
4. **Identify Role of Highway in Bikeway Network.** Mt Angel TSP’s Bicycle/Pedestrian Network Plan identifies OR 214 as part of the bikeway network and proposes bike lanes along the highway through the extents of the urban growth boundary. The TSP does not specifically identify a “low-stress” bicycling network nor does it address a lane configuration through town that would allow for bike facilities.
5. **Identify Desired Bikeway Tier.** The desired tier for the bike facility is based on motor vehicle travel speeds and traffic volumes. Annual average daily motor vehicle traffic on OR 214 (Main Street) at Marquam Street is 6,007 (as of 2020).³ According to the Facility Tier Identification Matrix (BUD Figure 3-7), roads with volumes over 3,000 vehicles per day should use physically separated (Tier 1) or striped (Tier 2) bicycle lanes.

Implementing either a physically separated or a striped bicycle lane within the existing right of way would require removing parking on both sides of the highway. A physically separated facility would require a minimum of 7 feet of roadway space to implement, and could be separated from the motor vehicle lanes with delineators such as parking, raised island, flexible delineator posts, rigid bollards,

³ <https://gis.odot.state.or.us/transGIS/>

parking stops, planters, or a bioswale. A striped bicycle lane would preferably include a buffer and would require a minimum of 7 feet of roadway space.

Of the two tier options, the physically separated bicycle lane (Tier 1) is preferred because it would provide an additional sense of comfort and safety while requiring a similar amount of roadway space. Furthermore, though OR 214's traffic volume of 6,000 vehicles per day is within the range of a Tier 2 facility, it is at the high end of the range. A physically separated facility would better accommodate bicycling if traffic volumes increase in the future.

2.3 Corridor Opportunities and Needs

Table 7 summarizes corridor opportunities and needs identified in the study area. These needs and opportunities reflect BUD guidance and include needs identified through discussion with City and ODOT staff. For a detailed summary of corridor opportunities and needs, see Appendix B: Opportunities and Needs Memo.

Table 7. Corridor Opportunities and Needs

Opportunity/Need	Description
Sidewalks	The corridor needs new sidewalks and sidewalk improvements to establish a continuous and connected walking facility on both sides of the roadway. Public feedback identified narrow, obstructed, or missing sidewalks as an important issue.
Stormwater Management	There is limited and intermittent stormwater infrastructure in the corridor, particularly south of Palmer Street. Stakeholders at the city have not indicated that ponding or flooding is an issue in the corridor. However, during a site visit, the project team noticed visible evidence of puddling in some locations. Future sidewalk improvements or paving projects should include an investigation of stormwater needs in the corridor.
Crosswalks	All crosswalks (marked and unmarked) in the study area need improvements to meet current standards and provide sufficient pedestrian access. This includes pedestrian crossings of railroad tracks. Public feedback identified pedestrian crossings as one of the top things to improve. Existing flashing beacons are not to standard.
Railroad Crossings	Church Street and Main Street lack sidewalks at the railroad crossing locations. On Church Street, people can walk on the asphalt shoulder, though the asphalt is aging and uneven (Figure 4). On Main Street, people can walk on an unpaved gravel shoulder. Railroad crossings need pedestrian improvements to create ADA accessible sidewalks and pedestrian crossings with even surfaces.
ADA Accessibility	The study area needs ADA upgrades at all locations that require a curb ramp, including locations with existing curb ramps.
Bike Facilities	The study area lacks dedicated bike facilities. BUD guidance recommends either a separated bikeway, a buffered bike lane, or a shared lane (see the April 2022 Corridor Background Memorandum for more details).
Safety	Safety concerns include speeding, unconventional intersection designs, the unconventional design and challenging sightlines of the Tricky Triangle, and the special circumstances during the annual Mt. Angel Oktoberfest. Public feedback identified safer intersections as a priority need throughout the corridor.

Opportunity/Need	Description
Reported Crashes	A total of 19 reported crashes occurred in the study area from 2016-2020. No crashes resulted in serious injury or fatality (all crashes resulted in either a possible injury or property damage only). Most of the crashes (8) were rear ends. Identified “hotspots” of crash frequency are at and near Palmer St (5 crashes) and Church St (6 crashes).
Community Concerns	Corridor concerns mentioned by City staff, police, and residents include speeding, lack of illumination, the unconventional/confusing design of the Tricky Triangle, and increased safety concerns during the annual Oktoberfest celebration.
Pavement	Pavement through the majority of the study area is rated “Poor” and needs improvement. Public comments indicated a strong desire for pavement improvements. However, the study area does not include any Fix-It Priority projects or other non-ADA projects in the STIP. The segment between mile points 45.50 and 46.45 needs pavement improvements.
Accesses	Through much of the study area, accesses (including driveways, alleys, and streets) are spaced closer than spacing standards specify (OAR 734 Division 51). Access management strategies are needed to bring access spacing into compliance with standards.
Parking	Parking capacity in the study area appears to be more than sufficient for a typical weekday, especially north of College Street.

Figure 3, Figure 4, and Figure 5 further illustrate several of the corridor issues and needs.



Figure 3. Missing Sidewalk North of the Tricky Triangle



Figure 4. Railroad Crossing at E Church St Adjacent to OR 214 - Uneven Surface, Lacking Sidewalks



Figure 5. Crosswalks Lacking Curb Ramps
Left: Wilco Highway and Church Street. Right: Main Street and Palmer Street.

3. FINAL CORRIDOR DESIGN CONCEPTS

This section documents the proposed lane configurations, intersection improvements, and suggested local bicycle connections developed to address identified issues within the corridor. Proposed enhancements were designed to avoid or minimize impacts to private property. All assume stormwater management would be included. Corridor design concepts are based on BUD guidance within the ODOT Highway Design Manual, and the urban contexts as defined by the BUD (*Traditional Downtown/Central Business District, Urban Mix, and Suburban Fringe*) were considered during concept development. Justification is provided where design concepts do not align with BUD guidance. These concepts were also informed by input from the public, City staff, and ODOT Region 2 staff.

It is important to note that these design concepts cannot by themselves address every need in the corridor. This study focuses on design of improvements with reasonable costs that could be potentially implemented through the upcoming STIP investments in the next 10 years or through Safe Routes to School grants along the corridor.

Some needs identified in previous sections will be addressed through future planning efforts, such as updates to the Mt. Angel Transportation System Plan. For example, the project team heard a strong desire to rebuild the Tricky Triangle to a more standard and intuitive design with better sightlines. Multiple people suggested implementing a roundabout here. A redesign of this intersection would likely provide safety benefits and be appreciated by the public. However, this would be a substantial effort and is outside the scope of this UDV Study. Additionally, implementation would require resources beyond those in upcoming STIP investments.

These UDV Study design concepts were vetted with the community as well as the Mobility Advisory Committee (MAC) and provide ODOT a blueprint for confidently moving forward on advanced design in the corridor when funding is available.

3.1 Lane Configurations

Proposed lane reconfigurations for each segment are described in Table 8 and displayed in Figure 6. Cost estimates are conceptual, planning level estimates in 2022 US dollars. They include capital and owner costs, including cost of materials, labor rates, and equipment. Estimates exclude finance costs, escalation costs, right of way acquisition, and others. For more details, see Appendix F: Detailed Cost Estimates.

Table 8. Corridor Lane Configurations by Segment

Location	Description	Cost Estimate
North Segment: MP 45.71 - 45.90	Removes on-street parking and adds a 6-foot-wide bike lane with a 2-foot-wide painted buffer on both sides of the street.	\$261,000
Downtown Segment A: MP 45.90 - 46.17	Retains on-street parking and adds painted shared lane markings (sharrows) to indicate that both lanes are shared. Four intersections in Downtown Segment A would be enhanced with bulbouts (see section, Intersection and Crossing Design Concepts, below).	\$378,000
Downtown Segment B: MP 46.17 - 46.29	Narrows the existing 20-foot-wide driving lanes to 12 feet wide. Adds a 6-foot-wide bike lane with a 2-foot-wide painted buffer on both sides of the street.	\$164,000
South Segment: MP 46.29 - 46.45	Narrows the existing 16-foot-wide center turn lane and 16-foot-wide driving lanes to 12 feet wide. Unstriped shoulders would use the remaining pavement space. Each shoulder would be approximately 8 feet wide. At most times, the shoulders would be open for use by people biking. During events at the Festhalle, the shoulders could be used for parking and cyclists would transition onto the planned parallel route off of Academy Rd	\$275,000

Cost estimates include grind and overlay of existing pavement to remove potential of ghost lines and to maintain proper curb height.
MP= mile point.

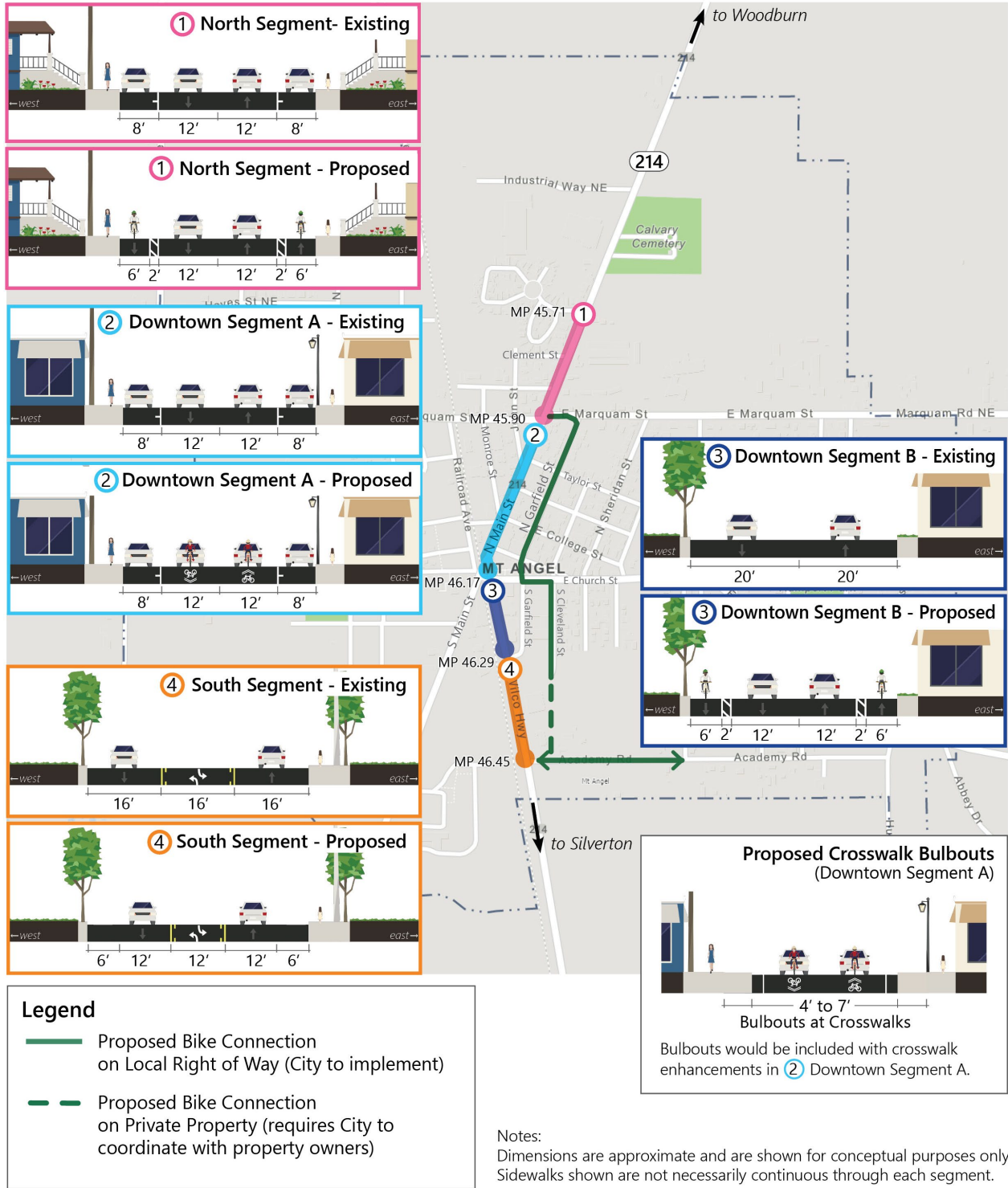


Figure 6. Corridor Design Concepts

3.2 Bicycling Accommodation

ODOT urban design guidance prioritizes encouraging and accommodating bicycling as a transportation mode in urban projects. Following this guidance, the project team considered multiple bike facility types through the length of the corridor, including separated bike lanes throughout. In the North Segment and Downtown Segment B, the proposed lane configuration on OR 214 would remove on-street parking and add separated bike lanes. These dedicated bike facilities would improve the biking connection between the Bavarian Village Mobile Home Park and Marquam Street along the North Segment, and between Church Street and Garfield Street along Downtown Segment B.

However, the final concept design does not include dedicated bike facilities on OR 214 along Downtown Segment A or the South Segment. Instead, these segments would have a shared facility on OR 214 and a parallel route along local streets.

Downtown Segment A travels through downtown Mt. Angel, which is a popular area for walking and using mobility devices. Downtown Segment A also has high demand for on-street parking to support adjacent businesses. Design solutions therefore emphasize pedestrian accommodation and maintain on-street parking in lieu of dedicated bike lanes recommended in the BUD guidance:

- Curb extensions would enhance pedestrian crossings and help calm traffic.
- Shared lane markings (sharrows) would be added along Downtown Segment A, instead of bike lanes, to remind drivers to share the road with people biking. Though the speed limit along this segment is slower (25 mph), biking in traffic is likely to be stressful and uncomfortable for many people due to high traffic volumes, freight traffic, parking maneuvers, and turning vehicles.
- A lower stress, parallel route along local streets is proposed as an attractive option for people who would prefer a calmer route. More details in the section, Parallel Bike Route, below.

The **South Segment** travels from the south end of downtown Mt. Angel to Academy Street. The South Segment is adjacent to the Mt. Angel Community Festhalle, which regularly hosts events that attract a large number of people and increased traffic. Parking from these events often spills out to the shoulders of OR 214. Public feedback indicates that these events are important to the community. Therefore, design solutions on OR 214 in this segment balances biking accommodation and parking demand:

- Unstriped shoulders would allow permitted parking during Festhalle events. At other times, the shoulders could be used by people biking and walking.
- A lower stress, parallel route along local streets is proposed instead of dedicated bike lanes. More details in the section, Parallel Bike Route, below.

Parallel Bike Route

A parallel, low stress bike route is proposed along local roads from Marquam Street to Academy Street (see Figure 6). This route would be a “bicycle boulevard,” and would only require sharrows and wayfinding signs to formalize as a bike route.

This parallel bike route would provide benefits for people biking specifically and for the corridor generally. Because of the relatively high volume of trucks, agricultural equipment, parking maneuvers, higher access density and general traffic, biking on OR 214 can be stressful even with dedicated bike lanes. A parallel route on local roads with less and slower-moving traffic, less freight traffic, and greater driver expectation for presence of people walking and cycling would be comfortable and attractive to

more people. Encouraging people to bike along an off-highway route also reduces potential conflict points and risk of severe injury crashes between people driving on the highway and people biking.

Because the proposed parallel route is along local roads, the City of Mt. Angel would likely be responsible for implementation. The City has indicated support for this route and willingness to implement it.

Between the south end of Cleveland Street and Academy Street, the proposed route would connect across private property along the parking lot of the Mt. Angel Community Festhalle (see Figure 7). Views from each end of this connection are shown in Figure 8 and Figure 9.

The City would need to coordinate access to the property with the property owners. Suggestions for wayfinding signage along this segment are included in (see Figure 7).

Development of the parallel bicycle route should include:

- Adding shared lane markings sharrows and wayfinding signs on local streets and through the Festhalle parking lot and driveway.
- Coordinating public access through the Community Festhalle property. This includes establishing an opening in the existing fence at the northeast corner of the Festhalle parking lot.

Additionally, traffic calming elements along the local roadways such as bulb-outs, speeds bumps, and speed tables can improve the experience for people walking and biking this route.



Figure 7. Proposed Long-Term Bike Connection



Figure 8. End of Cleveland Street Connecting to Festhalle Parking Lot (looking south)



Figure 9. Driveway from Academy Street to the Mt. Angel Community Festhalle (looking north)

3.3 Intersection and Crossing Design Concepts

The final design concept would update pedestrian crossings through the corridor to meet ADA guidelines and improve safety.

Crosswalk Enhancements

Existing marked crosswalks at uncontrolled intersections and at midblock locations (except for locations where they would be moved) would be restriped with continental markings (see Figure 10), which are easier to see and have higher compliance from drivers compared to standard striped crosswalks.

Rectangular Rapid Flashing Beacons (RRFBs) are pedestrian-activated flashing lights used in combination with a crossing warning sign to improve safety at uncontrolled crosswalks, and are recommended at the Church Street crossing and Marquam Street Crossing.



Figure 10. Enhanced Crosswalk Improvements

Left: Crosswalk Marking Patterns. Right: Continental-Striped Crosswalk with RRFBs.

Source: Federal Highway Administration

Intersection Designs

The final design concept would also enhance uncontrolled crossings at four intersections by installing bulbouts to shorten crossing distances, improve visibility, and reduce the skew at acute-angled intersections. Bulbouts can potentially improve vehicle operations by shortening pedestrian crossing time. Bulbouts also help with traffic calming and would be designed to discourage parking within 20 feet of intersections on OR 214 and side streets. Illumination at the marked crosswalks will need to be evaluated to ensure minimum lighting levels are met; additional illumination may be required as part of these design concepts. Proposed intersection design concepts are described in Table 9 and displayed in Figures 11 - 14.

These intersections were designed to be safer and more comfortable for all users, and particularly people walking. However, the project team understands that large vehicles travel through these corridors regularly, including agricultural equipment, fire trucks, and local freight trucks. Intersection designs took care to accommodate vehicle sizes that can currently move through these intersections. The design vehicle is a SU-30, and a WB-40 (which includes large school buses and fire trucks) and can be accommodated through all intersections (see Figure 11). A WB-67 can travel through all intersections along OR 214 (see Figure 12). The project team checked agricultural equipment, and it can make all turns through all intersections. For more details, see Appendix E: Intersection Turning Diagrams (electronic dwg file).

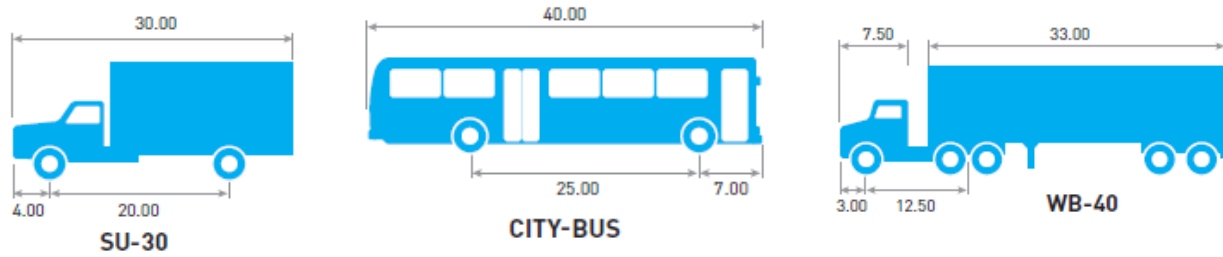


Figure 11. Vehicles Accommodated by the Existing and Proposed Intersection Designs

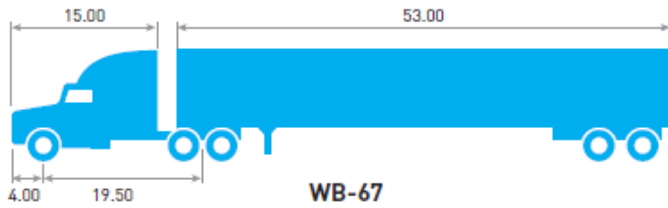


Figure 12. WB-67 Trucks Can Travel Through Intersections on OR 214

Cost estimates are conceptual, planning level estimates in 2022 US dollars. They include capital and owner costs, including cost of materials, labor rates, and equipment. Estimates exclude finance costs, escalation costs, right of way acquisition, and others. For more details, see Appendix F: Detailed Cost Estimates.

Table 9. Intersection Design Concepts

Location	Description	Cost Estimate
Marquam Street <i>see Figure 13</i>	<ul style="list-style-type: none"> • Enhances the center crossing of this offset intersection with bulbouts, continental striping, and RRFBs. The center crossing is prioritized over the north and south crossings because it would connect to existing sidewalks and because it is already established as the existing crosswalk. • Additional RRFB beacons would be located at the east and west approaches from Marquam Street for visibility. • Sidewalk bulbouts would also have bike ramps to guide people biking between the bike lanes on OR 214 north of the intersection and the proposed parallel bike route on Garfield Street south of the intersection. • Adds landscaping at the approaching side of the bulbouts to provide a buffer between motor vehicle traffic and people on the sidewalk. Landscaping vegetation would be low-growing so it will not obstruct visibility. 	\$490,000
Taylor Street / John Street <i>see Figure 14</i>	<ul style="list-style-type: none"> • Enhances south leg crosswalk with bulbouts and continental striping. • Closes and removes striping for existing center crosswalk in the offset intersection between Taylor Street and John Street. • North leg crosswalk would be open but not striped. • Connects with planned sidewalk along east side of OR 214 north of John Street. • Adds landscaping on west side. 	\$437,000
College Street / Monroe Street <i>see Figure 15</i>	<ul style="list-style-type: none"> • Enhances crosswalk at the south leg of the Monroe Street intersection (north leg of the College Street intersection) with bulbouts and continental striping. • Removes crosswalk striping at the north leg crossing of OR 214. • Adds landscaping in remaining available right of way at west center bulbout. 	\$407,000
Tricky Triangle (Church Street / Charles Street) <i>see Figure 16</i>	<ul style="list-style-type: none"> • Adds a new crosswalk with continental striping south of Charles Street and north of the triangle. • Closes and removes striping for existing crosswalks at the north end of the triangle and at the south leg of the intersection with Charles Street. • Adds sidewalks on the west side of OR 214 through the triangle to establish a continuous, ADA-accessible walkway. • Widens sidewalk on the east side to discourage parking. Additional width and landscape buffer allow for café seating. • Enhances crosswalk at the south end of the triangle with an RRFB and continental striping. • Adds a pedestrian median island across the south leg crossing of Main Street. Consider using mountable curbs to accommodate large trucks with the skew of the intersection. • Improvements to the railroad crossing are recommended at this intersection, but are outside the scope of this project. 	\$762,000

RRFB = Rectangular Rapid Flashing Beacon

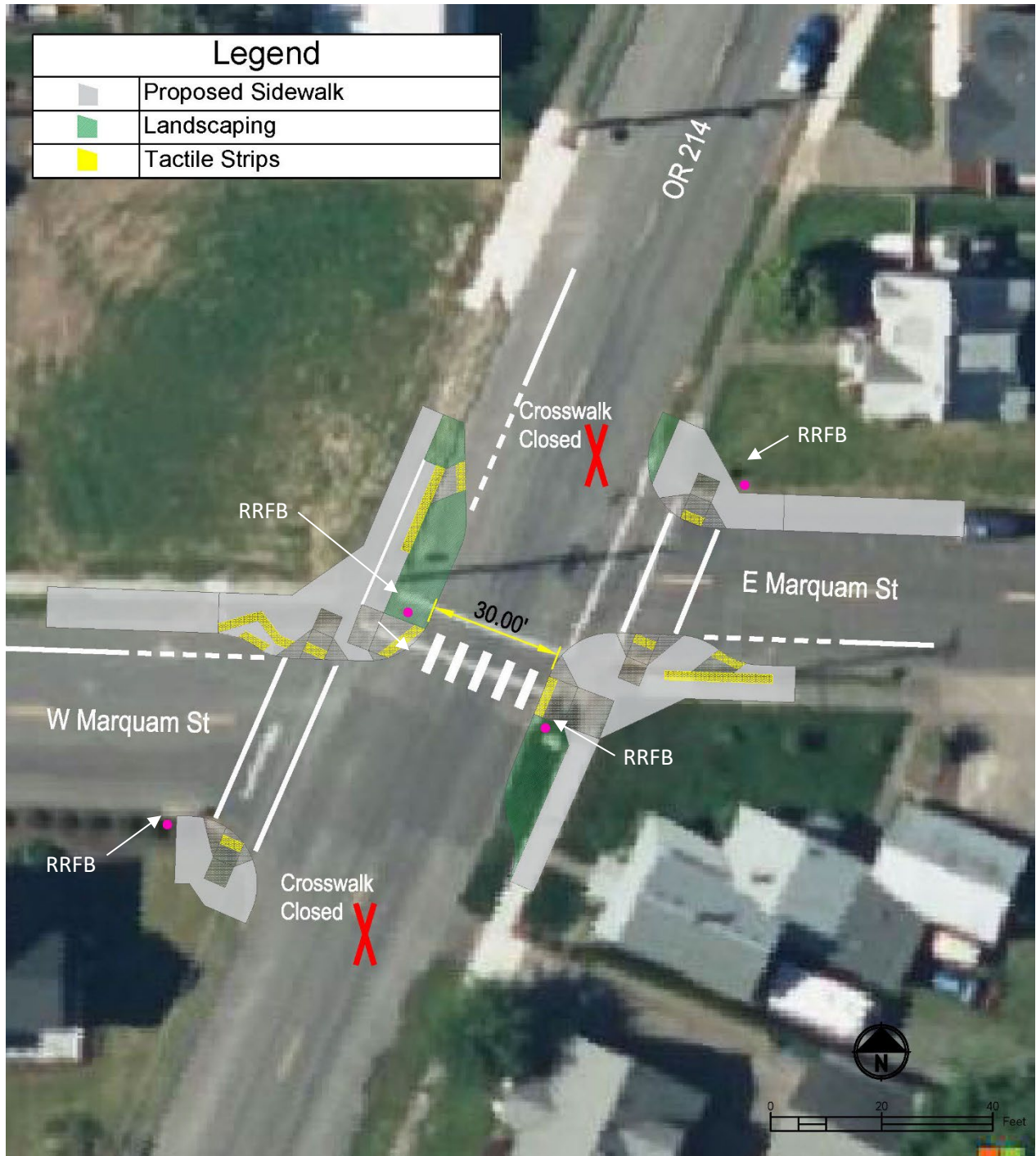


Figure 13. Marquam Street Intersection Design

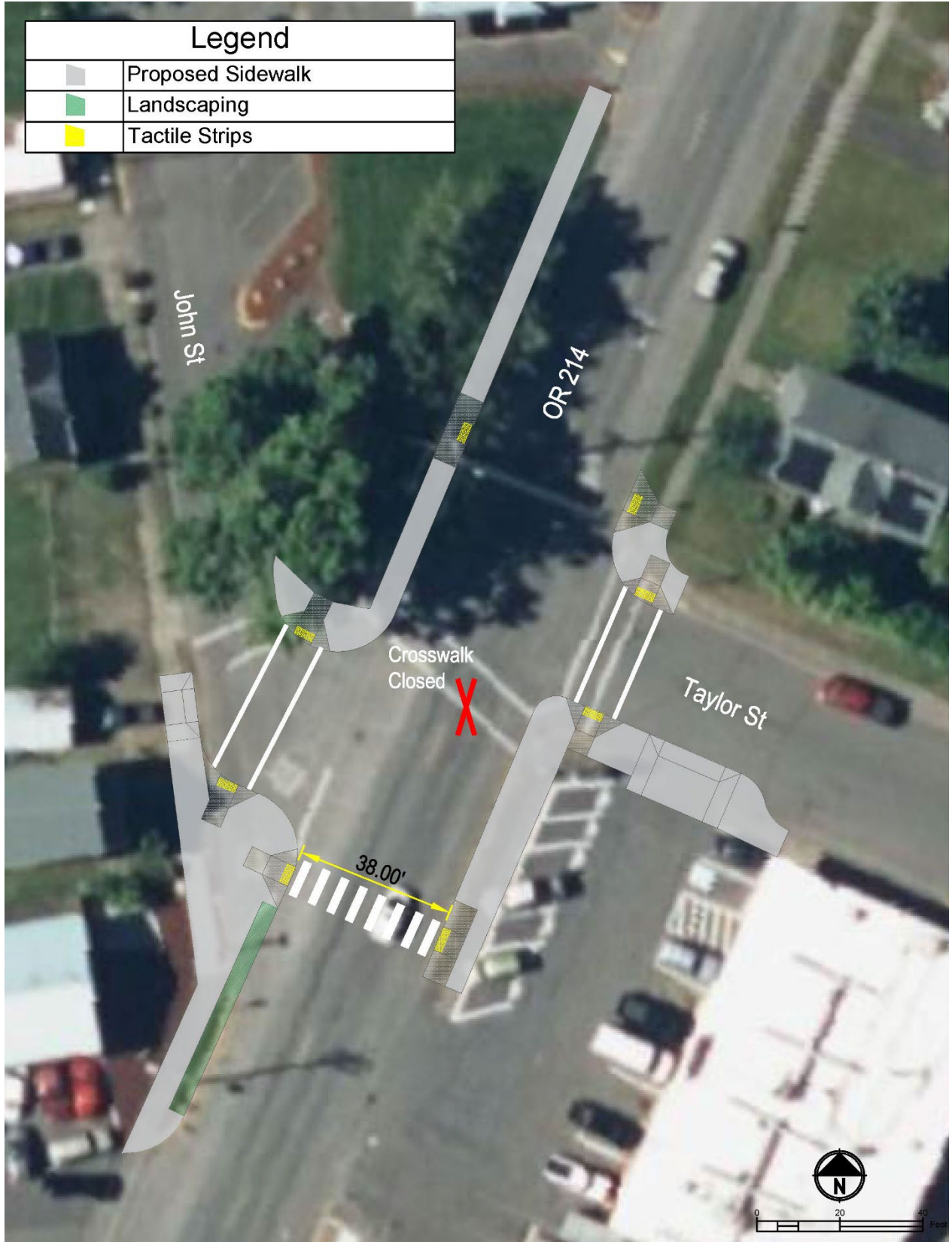


Figure 14. Taylor Street / John Street Intersection Design

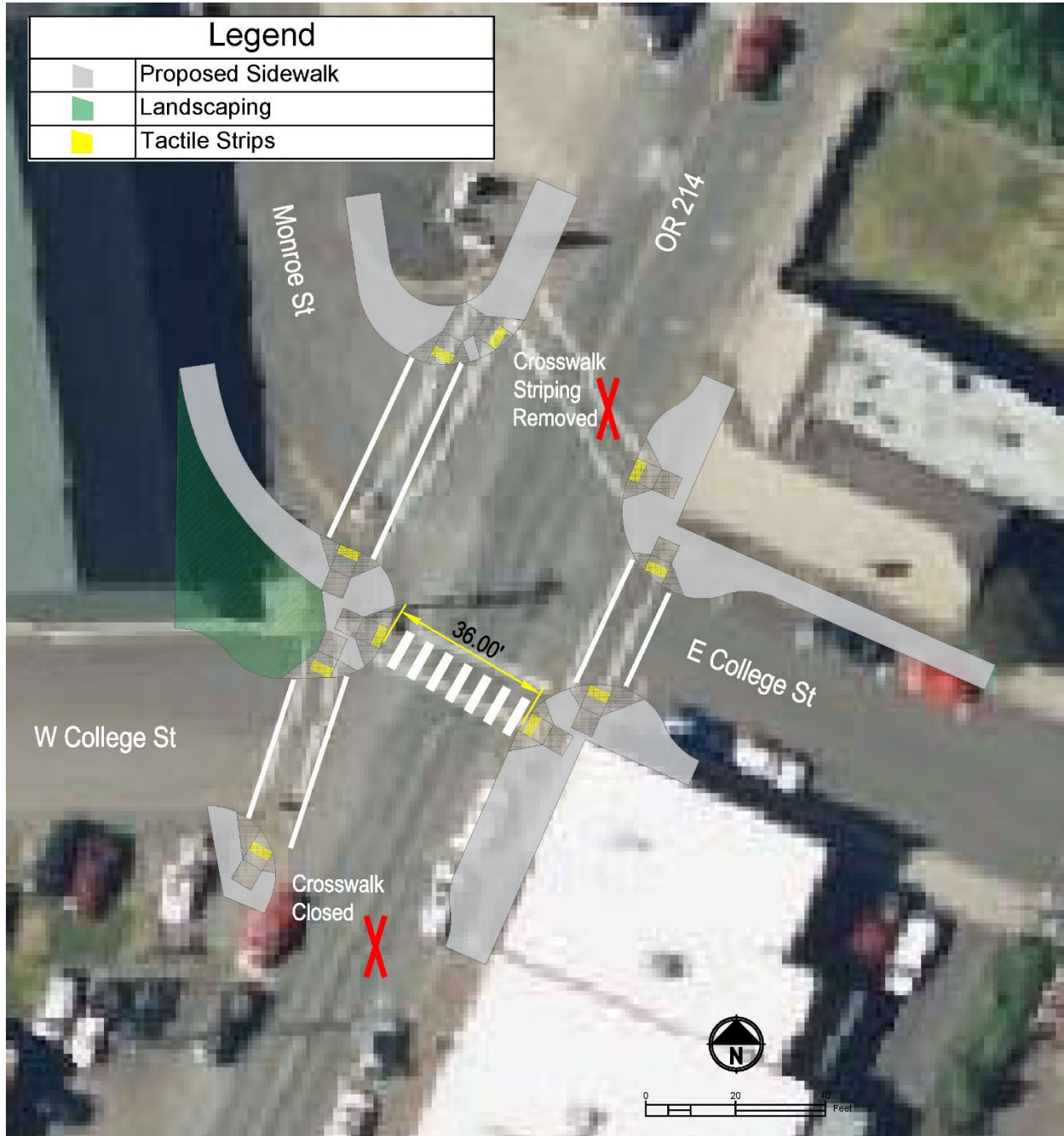


Figure 15. College Street / Monroe Street Intersection Design

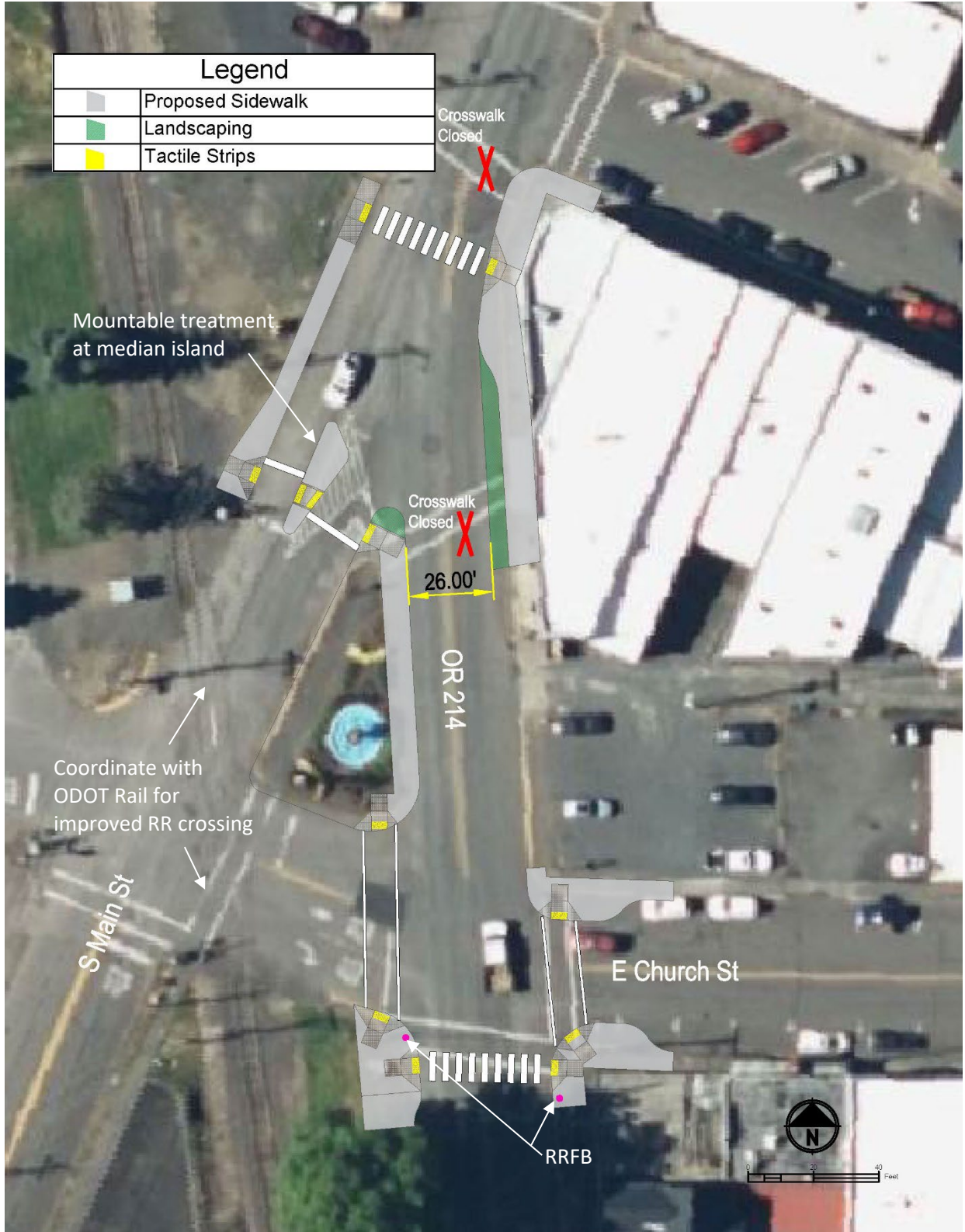


Figure 16. Tricky Triangle (Church Street / Charles Street) Intersection Design

3.4 Public Involvement

Throughout the UDV Study process, results from public outreach informed the development of the corridor design concepts. A summary of public outreach is provided below. The plan for public outreach is included in Appendix C: Public Involvement and Communications Plan.

Public Outreach Strategy

Table 10 describes the two major public engagement milestones, as well as the strategies and communication tools for each. The project team established the following goals to guide engagement strategies.

- **Encourage the participation of all stakeholders** regardless of race, ethnicity, age, disability, income, or primary language by employing a mix of tools to reach the broadest audience possible.
- **Provide early and ongoing opportunities for stakeholders to ask questions, raise issues, or share concerns.** Outreach will occur at two main milestones, but ongoing opportunities to comment will be provided through a project website.
- **Considers how project outcomes affect the public and vulnerable populations.** The project will ensure fair treatment so that no group of people (racial, ethnic, or a socioeconomic group) bears a disproportionate share of the negative environmental consequences resulting from a program or policy, consistent with provisions from Title VI of the Civil Rights Act of 1964 and Executive Order 12898 (Environmental Justice).
- **Ensure that public feedback is considered in the decision-making process and in development of the UDV Study.** Public feedback on each step of the planning process will be incorporated into decision-making and reflected in relevant evaluation criteria to ensure the study reflects the public's needs and priorities.

Table 10. Engagement Activities Summary

	Milestone 1	Milestone 2
Purpose/Topic	Project introduction and needs identification.	Gather feedback on draft improvement concepts and priorities.
Timing	March/April 2022	September 2022
Primary Engagement Goals	<ul style="list-style-type: none"> • Introduce the UDV Study project and other upcoming STIP Fix-It projects to the community. • Share and gather feedback on corridor needs 	<ul style="list-style-type: none"> • Share and gather feedback on draft conceptual improvement options. • Gather feedback to help prioritize improvements.
Engagement Tools	<ul style="list-style-type: none"> • Meeting with staff from the City of Mt Angel. • Online open house and survey. • In-person outreach while distributing printed fact sheets and surveys to businesses and organizations along OR 214. 	<ul style="list-style-type: none"> • Meeting with staff from the City of Mt Angel. • In-person tabling event at The Next Friday. • Outreach to members of the Spanish-speaking community. • Online open house and survey.
Survey	<ul style="list-style-type: none"> • A project survey and a demographic survey were distributed in print and online. English and Spanish versions of the surveys were available in print and online. 	<ul style="list-style-type: none"> • A project survey and a demographic survey were distributed in print and online. English and Spanish versions of the surveys were available in print and online.
Communication Tools	<ul style="list-style-type: none"> • Website announcement. • Project fact sheet (in English and Spanish). 	<ul style="list-style-type: none"> • Updated website announcement • Updated project fact sheet (in English and Spanish).
Summary	<ul style="list-style-type: none"> • Milestone 1 feedback summary included in Appendix C: Opportunities and Needs Memo 	<ul style="list-style-type: none"> • Milestone 2 feedback summary included in Appendix D: Outreach Milestone 2 Summary

Outreach Results

The following list summarizes the themes heard in Outreach Milestones 1 and 2. For a full summary of engagement feedback, see Appendix B: Opportunity and Needs Memo (for Milestone 1) and Appendix D: Outreach Milestone 2 Summary (for Milestone 2).

Important Issues (Milestone 1)

- Driving behavior that makes it feel dangerous or difficult places to cross the street.
- Narrow, obstructed, or missing sidewalks.
- Tricky Triangle: Responses mention safety issues/concerns for people walking and for people driving.
- Driving behavior that makes cyclists feel unsafe and uncomfortable : Several community members expressed that they would like to walk or bike more, but often do not feel safe getting around town on foot.
- Poor pavement quality at the railroad crossing, for both driving, biking and walking. One respondent mentioned the difficulty of crossing the tracks with a stroller.

Important Needs (Milestone 1)

- Safer, less complex, intersections.
- Better pedestrian crossings and sidewalks: Respondents often mentioned a desire for safer places to cross the road. Marquam St and the Tricky Triangle were specifically mentioned as needing improved crossings.
- Need for improved signs and sight lines for visibility. Better pedestrian crossings, making the intersection an all-way stop, and replacing the intersection with a roundabout.
- Safer bike connections.
- Improved pavement quality.

Concept Feedback (Milestone 2)

- A mix of support and concern regarding bulbouts/curb extensions.
- Support of crossing/crosswalk improvements.
- Support for disability access and ADA compliance.
- Support of bike lanes and more biking options.
- Concerns about large vehicle access.
- Concerns about visibility issues, especially for people walking and cycling.