



City of Sherwood Pedestrian Connector Project

Report to the Oregon Legislative Assembly

January 10, 2020

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Background

The City of Sherwood is poised to grow. Recent expansions of the Metro Region's Urban Growth Boundary (UGB) near Sherwood will provide room for thousands of new homes. One of these UGB expansion areas is located on the west side of OR 99W across the highway from the city center and the majority of the City's existing homes and popular destinations. In fall 2020 a new high school will open within this new neighborhood area near the intersection of Oregon Highway 99W at SW Elwert Road and SW Kruger Road (figure 1). By 2035, this new high school will serve 2,400 students.

In the City of Sherwood, OR 99W divides neighborhoods, the YMCA, city parks, the current high school (which will serve as the future middle school), and elementary schools from the future Sherwood High School opening in 2020. Oregon 99W is a high-volume, high-speed, freight corridor, state highway used both as a local connector and as a thoroughfare for those traveling between the Oregon Coast, Yamhill County, and the Portland Metro Area.

The primary pedestrian and bicycle crossing directly across from the new Sherwood High School is at SW Sunset Boulevard, crossing OR 99W. The crossing at OR 99W and SW Sunset Boulevard is an at-grade crossing across six lanes of traffic (including turn lanes).

Based on the current configuration and near-term transportation improvements constructed near the new Sherwood High School, state and local officials seek to ensure safety and accessibility for students and community members crossing OR 99W to access the new Sherwood High School.

Figure 1: Intersections at OR 99W



Source: Oregon Statewide Imagery Program (OSIP) – Oregon Imagery Framework Implementation Team, Western Oregon OSIP 2018

Legislative Direction

During the 2019 legislative session, the Oregon Legislative Assembly provided direction to the Oregon Department of Transportation (ODOT) to study this project and report on its results during the 2020 legislative session. The direction, included via budget note in HB 5050 (2019), provides:

The Oregon Department of Transportation, in coordination with the City of Sherwood, shall report to the Joint Committee on Ways and Means on the results of the City of Sherwood's Pedestrian Connector Project implementation and related feasibility study and submit a funding request for the balance of project costs in February 2020.

In July 2019 the City of Sherwood contracted with DKS Associates to conduct the Sherwood OR 99W Pedestrian Crossing Study to examine the feasibility of constructing a crossing at or near the intersection of OR 99W and SW Sunset Boulevard. The study was completed in September 2019 (attachment A).

Process

Upon conclusion sine die of the 2019 legislative session, ODOT and the City of Sherwood began meeting to coordinate and complete the directed work.

An initial meeting was held in July 2019; the meeting included:

- State Representative Courtney Neron;
- representatives from ODOT (Director's Office and Region 1 staff); and
- representatives from City of Sherwood (Mayor, City Manager, and Public Works staff).

Following the initial meeting, ODOT, City of Sherwood, and Washington County technical staff met bi-weekly for the months of July and August. In September 2019, DKS Associates completed the feasibility analysis and the crossing options were presented to the Sherwood City Council during a work session. Representative Neron, ODOT, City of Sherwood, and the Sherwood School District met again in early November 2019 to discuss the final feasibility study.

At the direction of the City of Sherwood, DKS Associates studied multiple pedestrian crossing options including at-grade crossings, pedestrian bridges, and a pedestrian tunnel. The study initially considered five crossing locations and three crossing concepts/types: crossings at SW Sunset Boulevard, Sherwood Open Space Trail, SW Vandolah Lane, SW Pinehurst Drive, SW Meinecke Road; all crossings were considered at-grade (street level), above-grade (bridge options), and below-grade (tunnel options). The study also included case studies of other pedestrian bridges and planning-level cost estimates, to provide additional context and frame of reference for the estimates provided as potential solutions.

Crossing Options

The study evaluated five possible crossing locations of OR 99W that connected neighborhoods north and south of the highway. Crossing options were based on and evaluated against the following goals:

- Safety improvement (eliminate or reduce conflicts between vehicles and people walking, biking, and rolling);
- Desirability to use the crossing by minimizing out of direction travel;
- Accessibility (ensure crossing opportunities for people of all abilities);
- Current and future connectivity (integrate the crossing with existing and planned trail network in Sherwood across OR 99W);
- Cost efficiency; and
- Creating an opportunity to welcome people to Sherwood through design features.

Preliminary evaluation eliminated the SW Pinehurst Drive and SW Meinecke Road locations in recognition that both spots were too far east (thereby significantly reducing the likelihood/desirability of use) and had additional barriers such as substantial right-of-way acquisition. A crossing near the Sunset Boulevard intersection provided the most benefit and addressed the crossing goals of safety, connectivity, and beauty along with improving community livability.

Two primary crossing options were considered: an above-grade crossing (pedestrian bridge) and a below-grade crossing (pedestrian tunnel). At-grade improvements are currently planned at the Sunset Boulevard intersection as part the Washington County roadway improvement project; therefore, the study did not further explore at-grade crossings.

At-grade crossing/Pedestrian bridge

The DKS study provided preliminary estimates for the pedestrian bridge options ranging from \$16 million - \$19 million.

- Option 1: Install a bridge over OR 99W with ramped approaches at both ends (\$19 million)
- Option 2: Install a bridge over OR 99W with elevators and stairs at both ends (\$16 million)

Both options above assumed on-site construction (as opposed to a pre-fabricated bridge span). Two alignments were used for the cost estimates: one just north of the Sunset intersection and one further north on the edge of the YMCA property. Both options

span the highway, Elwert Road, and have western landings adjacent to the Sherwood High School property. Shorter bridges were briefly studied, but would likely cost over \$12 million and still require pedestrian delays, out of direction travel, and at-grade crossings of roadways.

The study found that Option 1 with the ramped approaches may be favorable over Option 2, despite the initial higher cost. Direct access and perceived or actual accessibility issues were evaluated as a factor for pedestrian use. Option 1 with the ramped approaches may not have the same accessibility issues as Option 2 with stairs and elevators. The cost for Option 2 did not include ongoing elevator maintenance costs.

Below-grade crossing/Pedestrian tunnel

Due to a high potential cost without significantly higher benefits, this option was eliminated from further evaluation. Additionally, the study found that a pedestrian tunnel did not compare well against a pedestrian bridge as it did not minimize the environmental impact or pedestrian travel time, the utility impacts were unknown, and a tunnel option presented potential security risks.

Next Steps

Recognizing the priority in ensuring safe crossings in this area, Washington County has planned improvements already underway (figure 2):

- Alignment of two crosswalks across OR 99W
 - o Installation of new pedestrian signal push buttons and signals
 - o Adjustment of signal operations to separate signal phases for left-turning vehicles and pedestrians (removes left-turning vehicles from crosswalk when pedestrians are walking)
- Placement of pedestrian signal push buttons and a concrete refuge in the middle of OR 99W
 - o Provides pedestrians a safer place to pause if they cannot fully cross the highway during a single walk phase (signals will be timed to allow for a single-phase crossing)
- Meeting American with Disabilities Act Standards
- Realignment of local streets and a roundabout at the Elwert/Kruger intersection

The plans described above were developed prior to the siting or development of the new Sherwood High School and therefore did not account for the increase in pedestrians (students) in the area resulting from the new Sherwood High School.

Figure 2: Washington County improvements



Source: Oregon Department of Transportation, 2020

In addition to Washington County's planned improvements, the City of Sherwood may consider construction of an above-grade crossing presented in the DKS study, or may consider construction of a crossing option not identified in the DKS study. The DKS study estimates total project costs of \$16 million - \$19 million, assuming on-site construction of an above-grade crossing. Since completion of the DKS study in September 2019, the City has performed preliminary analysis to determine the feasibility and cost of using a prefabricated structure as the primary crossing; this estimate, including design and construction, is \$10 million - \$11.5 million.

In addition to the \$2 million provided by HB 5050 (2019), the City of Sherwood has identified \$3 million in local funds toward project costs and ultimate construction. The City is actively working to identify other funds to contribute; potential funding sources could include leveraging existing bonds, grant opportunities, and utility fees. The City is also exploring the possibility of a community facilities bond. The City is conducting polling to determine if there would be support to fund up to \$2.5 million to go towards a pedestrian bridge; however that funding is not certain at this time. With the \$2 million provided in HB 5050 and the additional \$3 million identified by the City, the estimated need is \$5 million – \$6.5 million. This additional investment would provide certainty to move forward with project design, engineering, and ultimate construction.

When sufficient funding is available, the City of Sherwood will begin preliminary engineering on the pedestrian bridge over OR 99W. The City will fully deliver the design and construction of this new bridge in coordination with ODOT to ensure the bridge meets state, federal, and AASHTO standards.

While the City of Sherwood continues development of an above-grade crossing over 99W near Sunset Boulevard, ODOT could explore an additional enhanced, at-grade pedestrian crossing across OR 99W north of Sunset Boulevard. Further study and coordination between ODOT, Washington County, and the City of Sherwood is needed before locations and crossing types can be evaluated. A crossing of OR 99W in this vicinity would likely require two signals, one in each direction of the highway and related connection work at either side. The improvements may be similar to those that Washington County is currently constructing at the Elwert/Kruger/Sunset intersections. Costs for a two signal option generally range from \$2.5 million to \$4 million, plus any associated right-of-way costs.

Conclusions

House Bill 5050 (2019) allocated \$2 million in lottery bond revenues for the purposes of this Pedestrian Connector Project. An estimate provided to the City of Sherwood by DKS Associates finds a new pedestrian bridge will likely cost between \$16 million – \$19 million. However the City is committed to finding more cost effective ways to construct the structure and estimates that the total cost could be \$10 million – \$11.5 million. The City of Sherwood, having identified about \$3 million in local funds, presents an additional need of \$5 million – \$6.5 million to fully design and construct this Project. If the City is able to secure future bonding revenues, the remaining need is reduced to \$3.5 million – \$4 million.

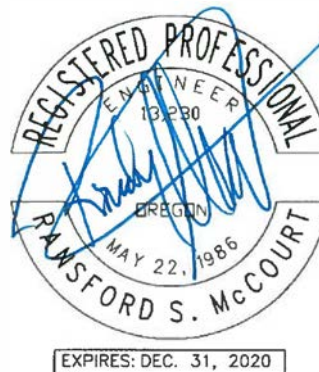
ODOT and the City of Sherwood look forward to continued partnership on this Project.

MEMORANDUM

DATE: September 17, 2019

TO: Julia Hajduk | City of Sherwood

FROM: Randy McCourt | OKS
Rochelle Starrett | OKS
Amanda Riley | OKS



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SUBJECT: Sherwood OR 99W Pedestrian Crossing Study

P19130-000

SUMMARY

The City of Sherwood has identified a community-driven need for improved pedestrian crossing opportunities across OR 99W as areas both north and south of OR 99W continue to develop. The new Sherwood High School (opening in 2020) and the potential UGB expansion to include Sherwood West are expected to significantly increase residential and commercial development to the north of OR 99W. At the same time, ongoing residential development within the Brookman Road area, the YMCA (including its potential expansion), and a new City skate park at the YMCA site will continue to attract individuals to the areas south of OR 99W. While these developments bring opportunities to expand Sherwood's growing trail network, this system is also divided due to the barrier that OR 99W creates to convenient, conflict-free pedestrian and bicycle crossing. This includes several planned trails that are expected to terminate near the intersection of OR 99W and SW Sunset Boulevard.

Currently, pedestrians can only cross OR 99W at-grade at SW Sunset Boulevard which delays pedestrians due to long crossing distances and wait times, exposes pedestrians to high vehicle volumes, and can suppress pedestrian demand in an area that could generate significant pedestrian activity by 2035 (the current planning horizon from the TSP and projects in Sherwood). Crossing enhancements were considered and evaluated for OR 99W based on the following principles:

- **Safety:** eliminate or reduce vehicle/pedestrian conflicts and pedestrian exposure
- **Desirability:** minimize out of direction travel for pedestrians
- **Accessibility:** provide crossing opportunities that provide for all pedestrians and bicyclists
- **Connectivity:** integrate the crossing with the existing and planned trail network to connect Sherwood across OR 99W
- **Beauty:** create an opportunity to welcome individuals to Sherwood through design or lighting features
- **Efficiency:** provide high benefits for the City of Sherwood at a cost commensurate with similar facilities

Both the crossing location (on OR 99W between SW Sunset Boulevard and SW Meinecke Parkway) and crossing type (pedestrian bridge, enhanced at-grade crossing, or pedestrian tunnel) were considered. A crossing near the intersection of SW Sunset Boulevard and OR 99W, located at the nexus of existing and planned trails, new development, the YMCA, and the future Sherwood High School proved the most desirable crossing location for pedestrians and bicyclist due to its proximity to existing and planned uses. Providing a pedestrian bridge at this location reduces exposure of pedestrians to high speed, high volume vehicle traffic at a wide intersection and minimizes their delay. In addition, the structure includes the potential for providing a community gateway feature. While this is an expensive community investment, providing this crossing opportunity creates an attractive community asset consistent with Sherwood's values of quality services, community livability and community pride.

EXISTING & FUTURE CONDITIONS

Sherwood has historically experienced rapid population growth and geographic expansion and anticipates significant growth potential in the future as adjacent urban reserve areas are brought into the urban growth boundary. Sherwood is comprised primarily of families with young children; 77% of households in Sherwood currently have children under the age of 18 years old.¹ Providing a network of safe biking and walking facilities as Sherwood develops is critical to support the City's desired quality of life. However, OR 99W currently creates a major barrier for multimodal connectivity in Sherwood with limited crossing opportunities. Crossing OR 99W today results in significant delays and high exposure to vehicles conflicts (volume and speed) for pedestrians. As Sherwood continues to grow to the south and west, other significant changes are expected near OR 99W, including:

- Two major residential developments, including portions of the Sherwood West and Brookman developments which are projected to include 5,500 households by 2038, increasing from 575 households currently²
- The new Sherwood High School will open in the fall of 2020 and will serve 2,400 students by 2035³
- A 13,000 square foot City Skate Park was just completed in Sherwood next to the existing YMCA on the southeast corner of SW Sunset Boulevard and OR 99W
- The Cedar Creek Trail, Chicken Creek Trail, and the Ice Age Tonquin Trail are currently planned to create a set of loop trails through Sherwood
- A planned roundabout and realignment of SW Elwert/Kruger Roads north of OR 99W and improvements along Elwert Road as part of a Washington County MSTIP project.⁴

¹ City of Sherwood. Sherwood Demographics: <https://www.sherwoodoregon.gov/planning/page/sherwood-demographics>

² ECONorthwest. *Sherwood Housing Needs Analysis 2018 to 2038*. December 2017

³ DKS Associates. *Sherwood high School UGB Expansions Transportation Study*. March 2017.

⁴ Washington County. Elwert-Kruger Intersection Project: <https://www.co.washington.or.us/LUT/News/elwert-kruger-oh.cfm>

Figure 1, below, summarizes the existing and future pedestrian generators within the study area.

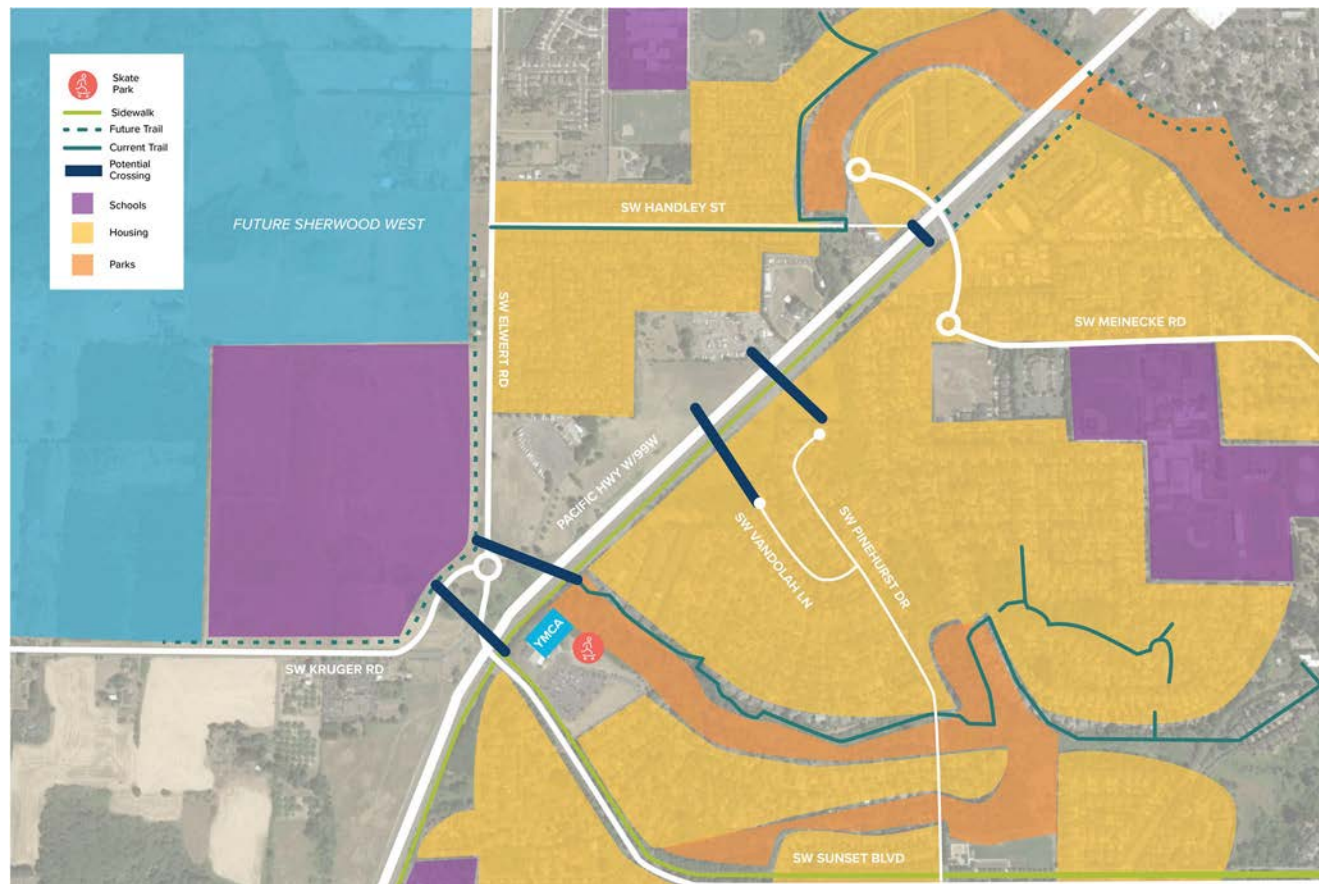


Figure 1: Existing and Planned Activity Generators and Potential Crossing Study Locations

ISSUES FOR CONSIDERATION

OR 99W

OR 99W is a high-volume (42,600 vehicles per day), high-speed (45 mph), state highway with five lanes. During the morning and afternoon peaks the hourly volume on OR 99W is about 2,900 and 3,300^{5,6} vehicles per hour, respectively, and the ADT is anticipated to grow to 53,000 vehicles per day in 2035.

⁵ DKS Associates. *OR 99W & SW Elwert Road Traffic Counts*. Collected January 31st and February 1st, 2017.

⁶ DKS Associates. *OR 99W & SW Meinecke Parkway Traffic Counts*. Collected January 31st and February 1st, 2017.

Pedestrians must cross over 130 feet of OR 99W at the SW Sunset Boulevard intersection, exposing them to vehicle traffic for approximately 30-40 seconds as they cross. Additionally, pedestrians are subject to 30-150 seconds of delay waiting to cross OR 99W at the SW Sunset Boulevard signal. The total pedestrian crossings of OR 99W combined at Sunset and Meinecke are about 20 during the AM peak hour and approximately five during the PM peak hour while less than 5 bicyclists cross during the AM and PM peak hours.^{5,6} Few crossings of OR 99W occur at SW Sunset Boulevard today. Most of the pedestrian crossings of OR 99W occur SW Meinecke Parkway today.

The intersection of OR 99W/SW Sunset Boulevard is designated as a high rank, 95th percentile SPIS (safety priority index system) intersection by ODOT indicating a higher proportion of crashes compared to other state highways. Historical records have shown about 10-15 crashes per year at the intersection of SW Sunset Boulevard and OR 99W. Between 2012 and 2017, 55 crashes occurred at this intersection, and 29 crashes led to injuries. These crash trends are consistent with crash data prior to 2012.⁷ This segment of OR 99W corresponds to a transition from a rural highway to a suburban road. The SW Sunset Boulevard signal is the first signal as vehicles enter Sherwood, travelling east from Newberg. Red light running cameras with speed enforcement are currently installed at this location and in the past year over 15,000 citations for red light and/or speeding have been issued.

Currently, the intersection operates at a v/c ratio of 0.92 and LOS E during the PM peak. Under the 2035 build scenario, which includes the additional trips generated by Sherwood High School, the intersection is expected to operate at a v/c ratio of 1.02 and LOS F.³ Because of the long crossing times across OR 99W and the significant pedestrian movements for the future high school, the right turning traffic onto OR 99W will be affected. Additionally, the long crossing time of OR 99W for pedestrians (over 40 seconds) requires significant side street time to accommodate safe crossing of OR 99W, affecting the capacity of the intersection. These crossing distances are expected to increase in the future. For example, dual northbound left turn lanes are one recommendation at the intersection of OR 99W and Elwert Road to mitigate congestion at this intersection by 2035 (v/c ratio of 0.97 with mitigation).⁸ Additionally, while there are no plans for OR 99W widening, ODOT currently has right of way to expand OR 99W and would like to preserve forward compatibility in planning for three through lanes in each direction in the future, should that become needed.

Land Use and Catchment Area

Using the future high school as an attraction, there are approximately 1,500 households within a one-mile radius (about a 20-minute walk) of the SW Sunset Boulevard intersection today that could use the new pedestrian crossing. This would likely grow to 3,000 households in 2035 (the current planning horizon for projects in Sherwood). Similarly north of OR 99W, approximately 1,000 households today, or 3,500 households in 2035, could use the new pedestrian crossing to access the YMCA, new skate park, existing and planned trail system and downtown amenities in Old Town. Looking at various access, land use and demand factors it is estimated that there is potential in the

⁷ Between 2008 and 2012, Washington County recorded 58 crashes at this site, and 33 crashes led to injuries.

⁸ DKS Associates. *Sherwood High School Transportation Impact Study*. April 2018.

evening peak period (4-6 PM) for about 100-250 pedestrian crossings of OR 99W by 2020-2025, when many of the activities/developments in the area are completed and opened.⁹

In the future (2035), based on the potential demand for expanded UGB areas and residential and commercial development, there could be demand for an additional 50 more crossing trips of OR 99W in the evening peak period. This would come from development not immediately underway, approved or in consideration at this time (areas such as Sherwood West, Brookman and other vacant lands). This would be in the range of 150-300 potential peak period crossings.

However, without a convenient and safe crossing (perceived or real) this potential would not be achieved. For example, today, at the current high school site, there are about 20 pedestrians^{5,6} who cross OR 99W at SW Meinecke Road during the morning which provides the most direct access to the high school for existing residential areas north of OR 99W. Conversely, fewer than five pedestrians are observed at this same intersection during the PM peak after school has been released, and similarly low pedestrian volumes are observed at the intersection of OR 99W and SW Sunset Boulevard. While existing residential neighborhoods north of OR 99W are within walking distance of the current Sherwood High School, the low crossing volumes indicate very few students choose to walk which could be due to the significant barrier OR 99W creates for pedestrians.

Trail Connectivity

The City of Sherwood has an extensive trail/pedestrian/bicycle network today, which will be substantially expanded in the future. The sidewalks along SW Sunset Boulevard are landscape buffered over most of the corridor between OR 99W to SW Murdock Road, and there are bicycle lanes from OR 99W to SW Heatherwood Lane. To the south, SW Old Highway 99 West has landscape buffered sidewalks. The Sherwood Open Space Trail also runs behind several houses and along wetlands through Woodhaven Park. All three of these routes converge at the OR 99W/Sunset intersection (see Figure 2).

North of OR 99W, the Washington County MSTIP and Sherwood High School projects are building 12-foot walkways/trails along the perimeter of the new high school on SW Kruger Road, SW Elwert Road and SW Haide Road with landscape strips. The Sherwood West urban reserve area preliminary concept plan also shows new trails along Chicken Creek, dropping down to the high school site toward SW Haide Road.

In the future, the build out of the Ice Age Tonquin Trail, Cedar Creek Trail and Chicken Creek Trail systems provides a substantial network of looping pedestrians routes in Sherwood with links to the Tualatin River National Wildlife Refuge, seen in Figure 2. This looping trail system has a critical crossing need at OR 99W/Sunset Boulevard.

⁹ Potential pedestrian demand was estimated based on trip distribution developed for the Sherwood High School, ITE trip generation rates, and an assumed 20% mode share for walking which could be achievable if high-quality pedestrian facilities are provided. The presented trip estimates do not include recreational trail usage.

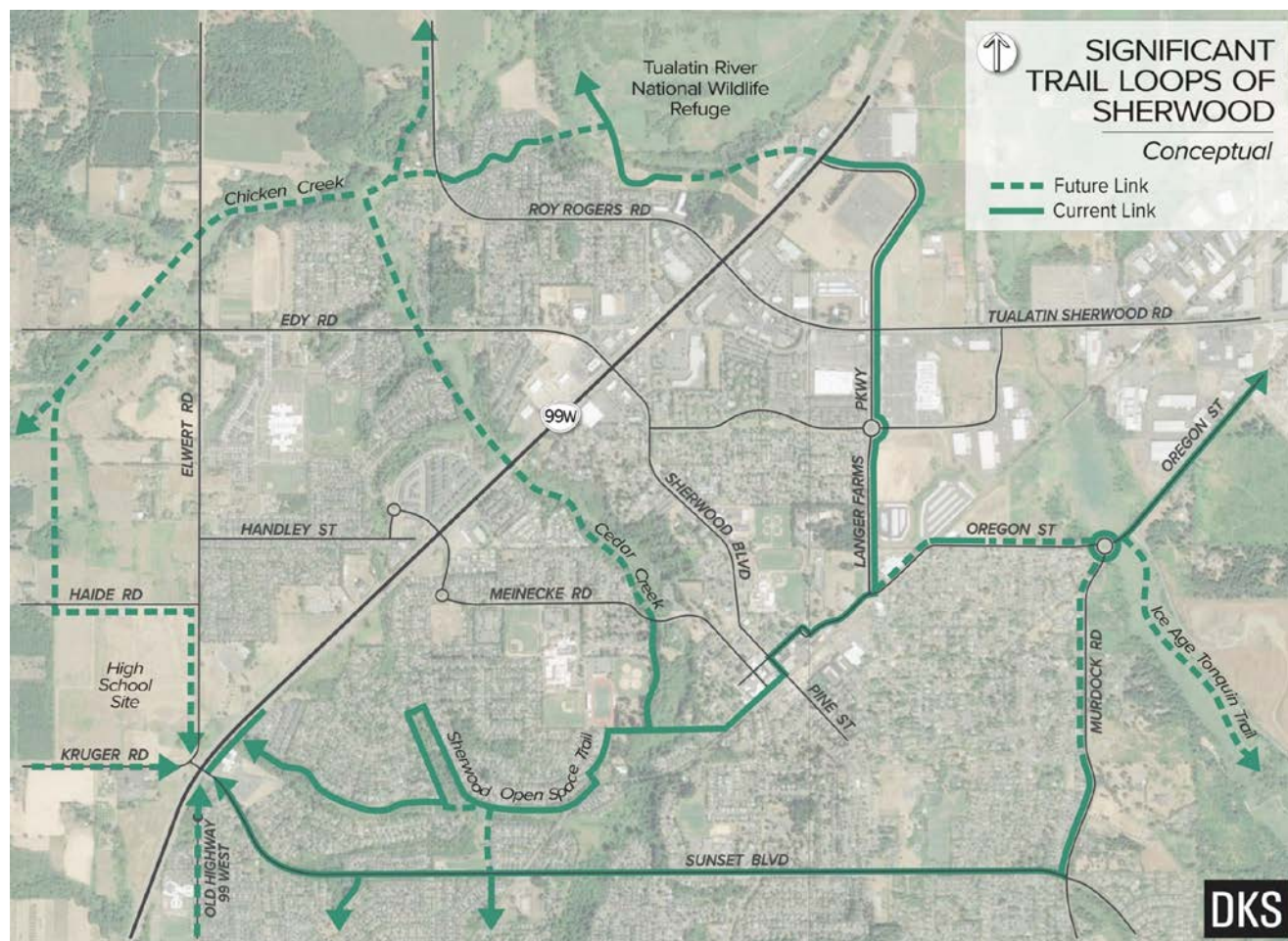


Figure 2: Existing and Planned Trail Network in Sherwood

MSTIP SW Elwert Road Reconstruction

The on-going construction on SW Elwert Road combined with the Sherwood High School site development work will result in a substantially different roadway context than exists today. The Washington County Major Streets Transportation Improvement Program (MSTIP) project in the area will realign SW Elwert Road, build a new roundabout and enhance pedestrian and bicycle facilities. Figure 3 shows key elements of the roadway work that will need to be considered with the development of an enhanced pedestrian crossing near OR 99W. These include the following:

- The removal or need for sidewalks facilities south of the roundabout on SW Elwert Road between the Elwert/Kruger roundabout and OR 99W (shown in pink)
- The design of the water quality feature between SW Kruger Road and SW Elwert Road such that pedestrian passage toward OR 99W is not conducive (shown in light green)
- The use of the proposed 12-foot sidewalk/trail on the north side of SW Kruger (shown in dark green) and the non-provision of sidewalks on the south side of SW Kruger adjacent to the water quality feature

- The potential closure of pedestrian crossings of OR 99W at SW Sunset Boulevard (shown in blue) if an enhanced crossing at SW Sunset Boulevard is provided

The decisions about each of these facilities requires coordination between the agencies.

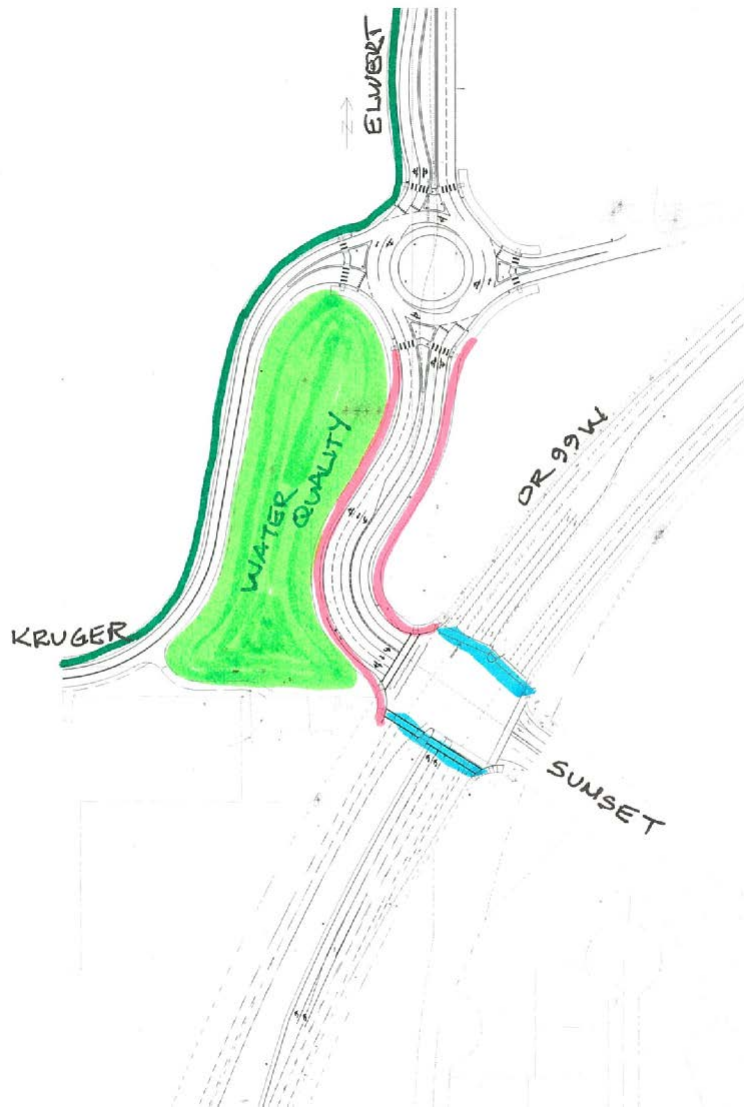


Figure 3: Elwert MSTIP Project Issues for Agency Consideration

ALTERNATIVES

Broadly looking at possible crossings of OR 99W, five locations have potential to connect to the neighborhoods north and south of OR 99W (providing a connection to a public street rather than a private residential lot). These exist at SW Sunset Boulevard, the Sherwood Open Space Trail terminus at OR 99W, SW Vandolah Lane (utilizing an end of a cul-de-sac), SW Pinehurst Drive (utilizing an end of a cul-de-sac) or SW Meinecke Road.

Both Pinehurst and Meinecke are far to the east, not interconnected to trail systems, require substantial right-of-way (ROW) acquisitions to land a pedestrian crossing, and create out of direction travel reducing potential usage. These options also require substantial connecting links to destinations to the west (more ROW) which drive up their costs to complete, so these options were dropped. Additionally, a component of the Cedar Creek trail already considers a grade separated crossing of OR 99W roughly a mile east of the OR 99W/Sunset intersection.

That leaves Sunset, Sherwood Open Space Trail, and Vandolah (Figure 4) as possible locations for a pedestrian crossing of 99W. These locations were screened based on anticipated pedestrian use, out of direction travel required, ease of navigation, likely right of way needed, and environmental constraints such as topography, wetlands or utilities. This screening is summarized below in Table 1.

Based on this preliminary screening, providing an enhanced pedestrian crossing in the vicinity of SW Sunset Boulevard intersection provides the most benefits with least potential impacts. Looking at the crossing position at SW Sunset Boulevard, crossing on the east leg of the intersection has advantages related to signal visibility, shortest span distance, pedestrian links to the YMCA, skate park and Sherwood Open Space Trail. This location addresses four primary goals for enhancing pedestrian crossings of OR 99W:

- Improved safety
- Maximize connectivity of legacy, future and proposed trail, walking, and biking network
- Improve the livability of the community
- Provide opportunities for a recognizable and visible gateway “entry to Sherwood”



Figure 4. Proposed Crossing Locations (Google Earth Image)

Table 1: Crossing Location Screening

<i>Evaluation Criteria</i>	<i>SW Sunset Boulevard (Intersection)</i>	<i>Sherwood Open Space Trail</i>	<i>SW Vandolah Lane</i>
Maximizes Pedestrian Demand	Good Located close to existing and planned pedestrian generators	Good Located close to existing and planned pedestrian generators	Poor Located close to few existing and planned pedestrian generators
Minimizes Out of Direction Travel	Good In line with current path of travel	Neutral Some out of direction travel for users from Brookman and Sunset	Poor Out of direction travel for most users
Ease of Navigation	Good Location visible to all users – cross all streets	Neutral Location visible to all users - only crosses OR 99W	Poor Location visible primarily to limited neighborhood users
Minimizes Right of Way Required	Good Minimal ROW	Good Little ROW	Poor ROW purchase required
Minimizes Environmental Impact	Good No identified constraints	Poor Existing wetlands, habitat and topography	Neutral Existing wetlands
Minimize Utility Impacts	Neutral Major transmission lines on north side of OR 99W	Neutral Major transmission lines on north side of OR 99W	Neutral Major transmission lines on north side of OR 99W

Different crossing types, including a pedestrian bridge, an enhanced at-grade crossing, or an underpass were also compared (Table 2). These alternatives were evaluated on their potential safety benefits, estimated cost, pedestrian travel time, traffic impacts, utility conflicts, and environmental impacts.

Based on this screening evaluation, the most promising alignment appears to be one near SW Sunset Boulevard that includes in-line ramping (to the north along SW Elwert and to the south along OR 99W). While the span is longer, the in-line approach ramping is more compact. Key factors for this finding include:

- The best access to serve existing/future uses and growth areas in Sherwood with an opportunity to phase construction;
- Potential for a safe, conflict free pedestrian crossing of all three roads in the area: 99W, Elwert Road and Kruger Road;
- Few environmental impacts compared to other crossing locations and types;

Table 2: Crossing Type Screening

<i>Evaluation Criteria</i>	<i>Pedestrian Bridge</i>	<i>Enhanced At-Grade Crossing</i>	<i>Pedestrian Underpass</i>
Minimizes Cost	Poor (1) Significant infrastructure investment	Good (3) Minimal infrastructure investment	Very Poor (0) Highest infrastructure investment
Maximizes Safety of Pedestrians	Very Good (4) Separates pedestrians and vehicles with in-line path	Neutral (2) Retains existing crosswalks	Good (3) Separates pedestrians and vehicles; creates security issues
Minimizes Number of Exposure Points	Very Good (4) Passes over OR 99W, Elwert and Kruger	Very Poor (0) Must cross OR 99W, Elwert and future Kruger	Neutral (2) Passes under OR 99W but crosses Elwert and possibly Kruger
Minimizes Pedestrian Travel Time¹⁰	Neutral (2) 830 feet 3.5 minutes	Very Poor (0) 770 feet 3.5 to 6.5 minutes ¹¹	Poor (1) 1,050 feet 4.5 minutes
Minimizes Impact to Freight and Vehicle Traffic	Very Good (4)¹² No vehicle impacts with crosswalk closure	Poor (1) Impact to OR 99W with more peds and clearance time	Good (3) No OR 99W impact but Elwert impact
Minimizes Utility Impacts	Poor (1) Existing overhead utilities	Very Good (4) Maintains existing utilities	Unknown (1)
Minimizes Environmental Impact	Neutral (2) Some potential tree removal	Good (3) No identified constraints	Poor (1) Susceptible to flooding Work in wetlands
Other Notable Features	Can create a community gateway above OR 99W		Can present a security and/or surveillance issue

¹⁰ Estimated by expected 4 feet per second walk speed and the distance from a starting point at the SE corner of OR 99W/SW Sunset Boulevard (near YMCA) to immediately north of the proposed SW Elwert/Kruger roundabout (west side).

¹¹ At-grade crossing time added to travel time for traffic signal delay which creates uncertainty for pedestrian travel. Source data: DKS Associates. *OR99W and SW Sunset Boulevard Crossing Time*. Collected July 16th, 2019

¹² Pedestrian bridge alternative would be designed to clearance standards identified by ODOT for freight

- No right-of-way needs as publicly owned lands exist along this alignment (City, ODOT, Sherwood School District);
- Reduction of impacts (e.g. vehicle delay) to state highway signal operations by minimizing the number pedestrian calls and associated long clearance times which gives more green time to vehicles travelling on OR 99W and fewer right turn/pedestrian conflicts;
- Minimal out of direction travel with sloped ramps that address ADA needs; and
- The opportunity for a community gateway over OR 99W (e.g. a “welcome to Sherwood” sign) and/or over the proposed Elwert Road/Kruger Road roundabout (e.g. a Sherwood High School Bowmen archer/arrow theme), as seen in Figure 5.



Figure 5: Approaches to Pedestrian Bridge Community Artwork (Clockwise from Upper Left): Structural Aesthetics, Metal Cutouts, Community Name, and Lighting

In reviewing the possible alignments for approach ramps, some could have a significant effect on the cost of a potential overcrossing near Sunset Boulevard. For example, if the southern approach ramp were placed parallel to Sunset Boulevard it would extend over 700 feet south due to the falling grade of Sunset Boulevard and the need to maintain ADA ramp slopes (extending beyond SW Woodhaven). Additionally, the space between the approach ramp and the potential expanded YMCA would be constrained. This led to consideration of three other options for the southern approach ramp:

- Switch back ramp (impacts the direct path and travel time for pedestrians)
- Elevator (impacts use by bicyclist and involves operational/maintenance costs)
- Approach ramp parallel to OR 99W north of the YMCA and an overcrossing further east (falling roadway grade on OR 99W helps shorten the total ramp length, the ramp could be

behind tree line rather than directly blocking view of YMCA, and is further from OR 99W/Sunset intersection traffic signal).

Aligning the southern ramp parallel to OR 99W minimizes the total ramp distance since the falling roadway grade along OR 99W reduces the overall distance needed to meet the preferred clearance heights provided by ODOT. Additionally, this ramp positioning minimizes the overall out of direction travel for pedestrians when compared to a ramp parallel to SW Sunset Boulevard (up to 200 feet shorter) and can utilize the existing trees as a buffer from OR 99W. See Figure 6, Option 1, Ramp B.

The landing on the north side of 99W was also reviewed. An option that only crosses OR 99W was initially investigated and not advanced as no direct path could be established with approach ramps that would not significantly increase out of direction travel (and would include multiple surface street pedestrian crossings in the roundabout, impacting traffic operations). Design guidance on overcrossings is that pedestrians will not utilize them if a more direct route is available¹³. An OR 99W crossing would have a horseshoe shape (out of direction travel) or elevators (operations/maintenance and bicycle issues), likely creating a desire for pedestrian to continue using the surface crossing. Spanning OR 99W, SW Elwert, and SW Kruger eliminates the potential for pedestrian conflicts and provides a direct route to the high school site.

A shorter overcrossing option was evaluated that would position the landing near the new high school baseball fields embankment. This would likely require either a long ramp, a ramp onto the school site or an elevator. None are desirable. A landing further north near the roundabout extends the structure length but allows for approach ramps which could be integrated into grading of the school site to reduce their length and structure costs.

Aligning the northern approach ramp to the south was also investigated (See Figure 6, Option 1, Ramp A alternative). This approach ramp could connect to the path between the future high school baseball and soccer field but would be out of direction for in-line public bicycle users along Elwert. An approach ramp to the north could utilize the proposed high school site grading for a water quality service road and provide both in-line public use (through a direct tie-in to sidewalks along Elwert Road) and links to the high school. This northern ramp alignment appears to be the most desirable (See Figure 6, Option 1, Ramp A)

COMPARABLE PEDESTRIAN BRIDGES

Existing and planned construction of pedestrian bridges elsewhere provide examples of the scale and nature of projects of this type and help us understand how differences in design can affect the overall project costs and usage. Table 3 provides comparable pedestrian bridges throughout Oregon and a recently opened pedestrian bridge in Charlottesville, Virginia (included since it was constructed recently with a new skate park). Characteristics of these selected pedestrian bridges, including their location, length, total cost, and number of crossings are highlighted.

¹³ www.walkinginfo.org; <http://www.walkinginfo.org/engineering/crossings-overpasses.cfm>

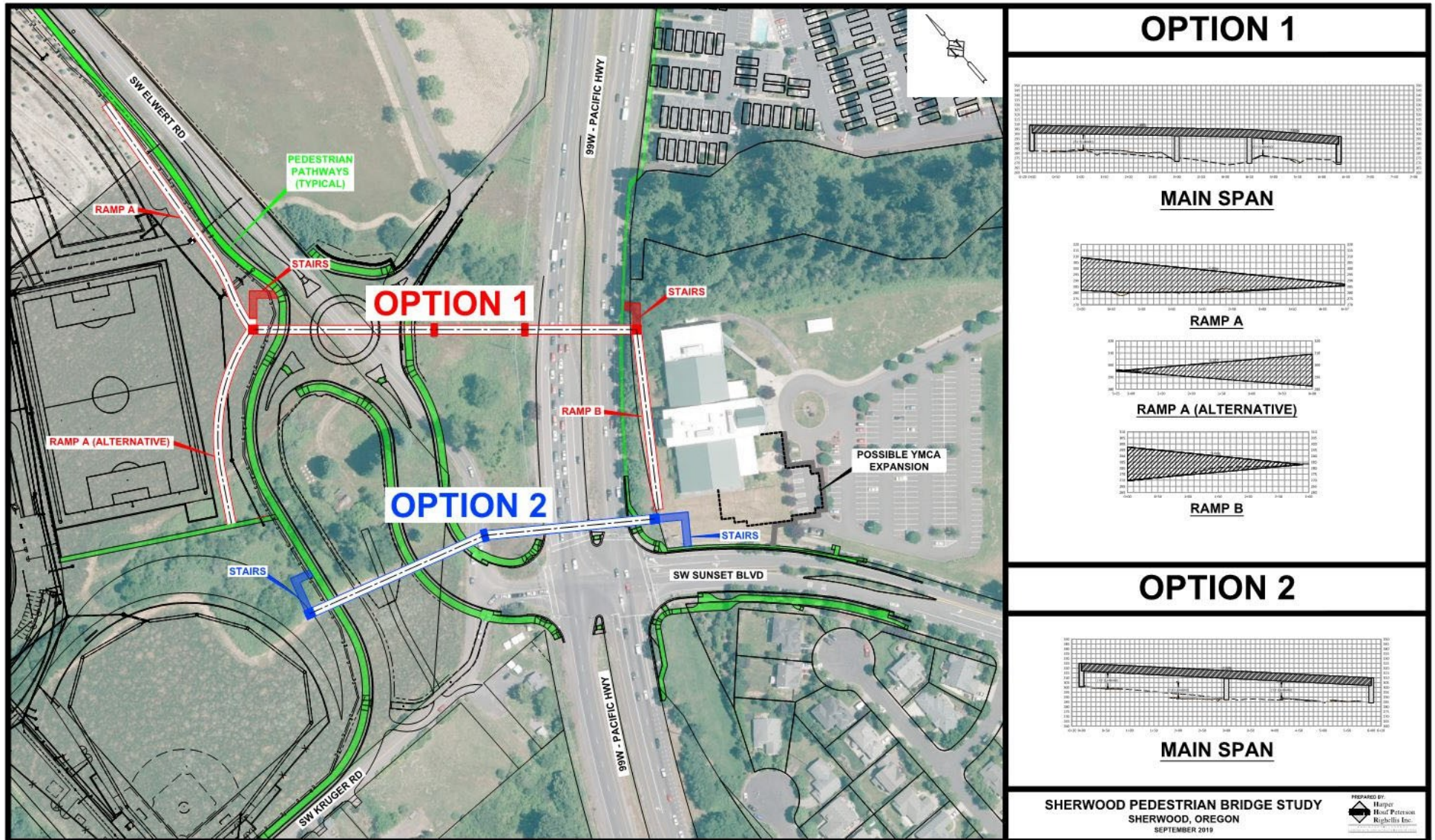


Figure 6: Alignments Used for Cost Estimates of Pedestrian Overcrossing

Table 3. Summary of Pedestrian Bridges

Bridge	City	Span (ft)	Final Cost (millions, 2019 dollars) ¹⁴	Opening Year	Barrier	Total PM Peak (4-6 PM) Crossings
<u>Gibbs Street</u>	Portland	700	\$15.9	2012	I-5	280 ¹⁵
<i>Kruse Way</i>	Lake Oswego	250	--	2001	I-5	<5 ¹⁵
<u>Springwater Trail</u>	Portland	300	\$2.0	2006	McLoughlin Blvd (99E)	245 ¹⁵
<u>Delta Ponds</u>	Eugene	760	\$6.9	2010	Delta Hwy, wetlands	35 ¹⁶
<u>Minto Island</u>	Salem	305	\$10.6	2017	Willamette River	160 ¹⁷
<u>Lafayette Street</u>	Portland	185	\$4.3	2015	Railroad	190 ¹⁵
<u>Sullivan's Gulch/7th Avenue</u>	Portland	465	\$13.5 (estimated)	2021	I-84, Railroad	--
<u>McIntire Park</u>	Charlottesville, VA	125	\$2.5	2019	Railroad	155 ¹⁸
<i>Sunset Transit Center</i>	Beaverton	300	\$2.2	1998	US 26	
<i>Parkrose Transit Center</i>	Portland	175	\$1	2001	I-205 N/B	

These bridges highlight a couple key factors to consider with pedestrian bridges: costs and use. There is a wide range of project costs (\$1M to \$16M). This can be attributed to the span length, approach ramping, environmental needs, right-of-way and accessibility. Using a factor of the number of span feet that can be built per \$M – that factor ranges from 29 feet/\$M (Gibbs Street Bridge) to 175 feet/\$M (Parkrose Transit Center/Flashbird Bridge). The average was 85 feet/\$M. The more recent bridges appeared to average around 40 feet/\$M. The key factor for the lower cost bridges is age (older bridges were less expensive, maybe due to economy/bidding and different seismic/ADA needs) and the lack of approach ramping (less expensive). For example, re-grading to meet ADA standards was approximately one-third of the project cost for the McIntire Park pedestrian bridge. Often, there were cases where the difference between the early estimated cost and final cost of the pedestrian bridge exceeded four million dollars. This appears to occur due to not fully assessing the impacts of right of way, length of the bridge, and the need for approach ramp structures in early planning.

¹⁴ All cost estimates factored to 2019 dollars using RSMeans Historical Cost Indices.

¹⁵ DKS Associates. *Pedestrian Bridge Counts*. Collected July 23rd, 2019.

¹⁶ Central Lane MPO. *Bicycle Counts in Central Lane MPO Area*. Accessed July 30th, 2019. Note: County only estimates bicycle traffic

¹⁷ EcoCounter. *Minto North Pedestrian Bridge Counts*. August 30th, 2017.

¹⁸ City of Charlottesville. *Personal Communication, McIntire Park Pedestrian Bridge*. July 29th, 2019.

A crossing of OR99W/SW Elwert Road/SW Kruger Road might span 600-750 feet and be 14 feet wide. For reference, using the more recent bridge average of about 40 span feet per million dollars and assuming a 750-foot span, the rough cost might be in the \$18M territory. The addition of other access features (stairs and ramps) affects costs. Further investigation into cost was undertaken to address the context of the OR 99W crossing (see section below).

Second, for well-placed pedestrian bridges, pedestrian demand can be between 100 and 300 trips during the PM peak period. This demand is typically seen in locations where the pedestrian bridge minimizes out of direction travel and has good, direct access to adjacent community uses, destinations and amenities which can attract pedestrians. Without these features, a pedestrian bridge will likely be under-utilized with little pedestrian traffic (for example the I-5/Kruse Way Bridge).

In terms of use, a possible pedestrian bridge at SW Sunset Boulevard creates several opportunities to achieve similar demand patterns of the successful pedestrian bridges. After assessing the residential area, destinations and accessibility, it is likely 100-300 peak period crossings would be possible as this site has:

- In-line pedestrian routes to minimize out of direction travel
- Several nearby trip generators that would benefit from a conflict free crossing (new high school, other nearby schools and parks, YMCA, skate park and adjoining residential uses)
- Future land development nearby in Sherwood West and Brookman

Use of the pedestrian overcrossings can also be affected by perceived or actual accessibility issues. For example, using non-direct approaches (switchback ramps, stairs, elevators) can result in pedestrians attempting to use the at-grade crossing. Additionally, elevators can be perceived to have security issues, creates a barrier for bicyclists, imposes dwell time, and have other operational/maintenance issues. Closing at-grade crossings at this location could reinforce demand for a pedestrian overcrossing by eliminating alternative crossing locations. A fully accessible pedestrian bridge (with ramps) could allow consideration of closing crosswalks on OR 99W at SW Sunset Boulevard and closing of the north crosswalk at the intersection of OR 99W/SW Sunset Boulevard. This will require further coordination and agreements with the key agencies (ODOT, Washington County and the City of Sherwood) as well as outreach with adjacent property owners.

COST AND PHASING

The construction cost of a pedestrian bridge involves many factors that are not fully defined at this conceptual planning state. Key unknowns include utilities, span type/length, wall needs, environmental needs, and phasing. Two of the pedestrian bridges identified in the prior section were investigated at greater depth to assess the roles of these factors in project cost variability (Minto Island and McIntire Park, refer to attached case studies). A key cost control aspect of the concept design is the ability to design the 750-foot span in three sections as smaller spans (across OR 99W,

across Elwert, and across Kruger).¹⁹ Another cost control element is right-of-way. The proposed alignment expects to utilize all publicly available right-of-way (city owned land at the YMCA and between Old Highway 99 West Road and SW Sunset Boulevard, school owned land at the north end, ODOT owned land around OR 99W).

Conceptual Cost Estimates

Approach ramps are expected to be one of the most significant costs for this crossing location. While it effectively addresses the pedestrian desire for direct path, using approach ramps also increases the total cost. Due to the existing topography and length required to meet ADA standards, two options were considered. The first option includes approach ramps connecting to the OR 99W pedestrian overcrossing. A second, lower cost option was identified utilizing elevators. This second option utilizes the shortest span that would cross OR 99, SW Elwert and SW Kruger.

A preliminary concept cost estimate was prepared for the SW Sunset Boulevard crossing option with the option to use either approach ramps or elevators as part of the crossing. Figure 6 shows the two options that were assessed for preliminary costs. The cost estimates, summarized in Table 4, include the construction costs for the bridge span, piers, platforms, approach ramps/elevators, stairs, and connecting pathways for the bridge; ancillary construction costs (e.g. mobilization and traffic control); contingency; and design phase services. The preliminary conceptual construction cost estimates are provided in the appendix (costs provided for Option 1, Option 2 and a short horseshoe crossing of OR 99W).

Two order of magnitude cost estimate were assessed for retaining the at-grade crossing and creating an underpass of OR 99W. The existing crossing might be enhanced with driver feedback signs (which display vehicle speeds), leading pedestrian indications and median improvements (roughly \$100,000 to \$250,000 (this would likely impact traffic operation). The underpass was assumed to follow the existing drainage under OR 99W that is north of the YMCA and include ramping systems (roughly \$25-35M).

The overpass cost estimates also include design and construction costs that are expected to be independent of the selected bridge approach configuration, including utility relocations, design, and construction services. In any pedestrian crossing concept, there would be a need for additional pathways to tie in to existing or planned sidewalks at the future Sherwood High School, neighborhoods, Sherwood Open Space Trail and YMCA which are included in this estimate. Costs to buy right of way were not included for either option since it is assumed that this project will be constructed within the existing, publicly-held right-of-way (City, ODOT, Sherwood School District);

¹⁹ While a shorter span bridge that just crosses OR 99W was also investigated, it was not advanced in concept planning as it had significant disadvantages (delays to pedestrians, added conflicts crossing a 45 mph arterial with substantial costs). Preliminary cost estimates (seen in the Appendix as Option 3) suggest that this bridge would still cost at least 12 million dollars (assuming a 180 foot span) but adds over 500 of out of direction travel compared to Option 1, nearly three minutes plus traffic delay at the roundabout, reducing utility to trail users.

Table 4. Cost Estimates* for Sherwood Pedestrian Bridge

<i>Description</i>	<i>Option 1 – Ramps</i>	<i>Option 2 - Elevators</i>
Bridge span	\$3,472,000	\$3,360,000
Pier supports	\$200,000	\$100,000
20'x20' Landing platforms	\$400,000	\$400,000
Approach ramps	\$2,400,000	\$0
Stairs	\$500,000	\$500,000
Elevators	\$0	\$1,400,000
Subtotal Structure Costs	\$6,972,000	\$5,760,000
General Construction Costs	\$2,090,000	\$1,897,000
Contingency (30%)	\$2,718,000	\$2,297,000
Design/Construction Services Costs	\$4,720,000	\$4,000,000
Escalation*	\$3,100,000	\$2,628,000
Total Cost	\$19,600,000	\$16,582,000

*-Note that earlier cost data did not include year of expenditure escalation (assumed to be five years at 3.5%)

however, the cost estimate does include right of way services which are included for any description revisions needed during the design. The cost estimates provided in Table 4 are based on an approximately 750' bridge span (if ramps are used) or a 600' bridge span (with elevators). These spans are sufficient to allow for a future expansion of OR 99W and includes the 17'6" of clearance requested by ODOT.²⁰ This estimate assumes a 14' width which allows for a 12' clear walkway with 1' clearance to either side for the railing or other decorative features. An average of high and low design/construction services was utilized. These numbers provides adequate resources for programing and budgeting, including escalation.

This estimate does not consider the operations and maintenance costs associated with using elevators which could be \$10-15,000 each year. When the ongoing maintenance costs are included, the total cost of installing elevators would be further increased by \$300-450,000²¹ (beyond this estimate).

²⁰ The minimum clearance for NHS Non-High Routes is 17'0" from ODOT Highway Design Manual section 4.5, Figure 4.6 and section 320.030.2 of the Washington County Road Design and Construction Standards. However, ODOT has requested additional clearance to allow for future overlays.

²¹ Using \$10-15,000 per year at 4% over 20 years.

Project Phasing

The overcrossing of OR 99W would be the base project, however there are opportunities to expand the project to include additional connections. As a minimum, the crossing would need to include approach ramps or elevators to address ADA access needs. Other ancillary features could be broken into phases to address additional crossing aspects beyond the crossing of the highway. The cost estimate includes basic elements like stairways, an initial crossing structure, and ramps, along with other associated construction costs; these items are the minimum necessary elements to complete a crossing of OR 9W/Elwert/Kruger. Additional ramps or stairs could be added as the surrounding community develops to increase pedestrian access. By strategically placing the crossing at the SW Sunset Boulevard intersection, additional access elements could be added as stairs or additional crossings to:

- Stairs for Sherwood Open Space Trail/YMCA/Skate Park
- Stairs toward SW Kruger Road to the west
- Sidewalk trail improvements from Old Highway 99 West to the SW corner of OR 99W/Sunset
- Sidewalk widening along OR 99W across the drainageway leading to Sherwood Open Space Trail

All identified ramps and stairs are summarized conceptually below in Figure 7, representing a maximum-build design. In this example, the additional sidewalk and stairs could be phased so they could be added later (deferred) as demand grows. This allows funding to be programmatically developed over time with future developments. The identified ramps and stairs summarized in Figure 7 are only conceptual in nature and the final location of the ramps and stairs would be determined based upon a preferred project selection with the City of Sherwood.

FUTURE PROJECT FUNDING OPPORTUNITIES

Funding for this project likely will involve a range of funding sources. Outside funding (non-city based) typically can have constraints and administrative procedures (for example federal funding) and should be investigated prior to decision to use such funding sources. Commonly having strong local funding commitment (match) makes competing for or attracting outside funding more successful. For this project the following sources might be considered, including but not limited to:

- Local funds/bonding
- Sherwood High School (ROW)
- Safe Routes to School Grant Program (State, Metro, County)
- Lottery funds (State)
- Regional Trails Grant Program (Metro)
- MSTIP (County)
- System development charges and development contributions
- ODOT All Roads Transportation Safety Program (State)
- Other State grant programs
- Regional Transportation Bond 2020 or other Metro Regional funds (Metro)



Figure 7: Conceptual SW Sunset Boulevard Pedestrian Bridge

When considering project funding the assessment of year of expenditure (unknown at this time) should include factoring for inflation from the 2019 base year estimates provided. Based upon historic trends, cost escalation of 3.5% per year should be considered. While short term escalation can be higher or lower depending upon economy and market workload, the 3.5% escalation provides a reasonable factor for inflation (representative factors: two years = 1.07, five years = 1.19, seven years = 1.27, ten years = 1.41). A five-year escalation to year of expenditure was added for budgeting purposes.

AREAS FOR FURTHER STUDY

- Greater exploration of design details associated with utilities (need for undergrounding), right-of-way, environmental and site constraints.
- Type, size and location (TS&L) study for the structure to better define the pedestrian overcrossing, potential materials and pricing. Budgeting should consider year of expenditure.
- Coordination between ODOT, Washington County and City of Sherwood is needed on the final decision to include sidewalks on both sides of SW Elwert Road from SW Kruger to OR 99W and the crosswalks of OR 99W at SW Sunset Boulevard. The removal of these facilities in lieu of the proposed overcrossing or their limited provision is subject to agreement among the agencies and should be coordinated with the design of the water quality feature between Kruger and Elwert to direct pedestrians towards their appropriate crossing location. This could involve a temporary (asphalt concrete) sidewalk on one side of SW Elwert Road (east side) in lieu of concrete sidewalks on both sides of the street until the overcrossing is completed.
- ODOT crosswalk closure requests and approvals would be required if the crosswalks of OR 99W at SW Sunset Boulevard were closed in lieu of the new pedestrian overcrossing.
- Need for creating a sidewalk link through public right-of-way from the northern end cul-de-sac of Old Highway 99 West to the southwest corner of OR 99W/SW Sunset Boulevard (about 325 feet). Also investigating the replacement of the sidewalk on the east side of SW Sunset Boulevard (currently the existing six-foot sidewalk would become curb tight as part of the MSTIP project) as a widened sidewalk (10 to 12 feet) with a landscape stripe from OR 99W to Woodhaven (about 300 to 600 feet). Both of these would require immediate coordination between the city and county on the MSTIP Elwert Roundabout project to define sidewalks that should be either included or removed (see above) and how to best address the implementation of these facilities. Additional coordination with on-going planning for an expansion of the YMCA should be done to establish the edge of the roadway right-of-way along SW Sunset Boulevard, which is considering parking lot modifications.
- Collaboration with YMCA expansion design to integrate sidewalk trail linkages around the site, assess visual changes and linkages to the future overcrossing
- Specific details at the corners of OR 99W/SW Sunset Boulevard require further investigation/design to make sure the future sidewalk alignments encourage the crossing of OR 99W on the overcrossing (not at-grade) and the circulation around and to the front door of the YMCA.
- Assessment of sight distances issues associated with the OR 99W/SW Sunset Boulevard traffic signal.
- Environmental studies of adjacent drainage areas.
- Need for widening the five-foot curb-tight sidewalk on the south side of OR 99W up to 12 feet wide adjacent to the drainage area (immediately south of Sherwood Open Space Trail).
- Consideration of cost reduction strategies that could be applicable to this project such as streamlining of interagency coordination, procurement practices (design/build) and ways to shorten approach ramps through grading.

APPENDIX

Attachment A

Sherwood OR 99W Pedestrian Crossing Study
Case Studies for Minto and McIntire Pedestrian Bridges
Prepared By: Harper Houf Peterson Righellis, Inc.
Job No. SHR-17
September 3, 2019

	Minto Island (Salem)	McIntire Park (Charlottesville)	Sherwood - Option 1	Sherwood - Option 2
Span	305	127	750	600
Obstruction	Waterway	Railroad	Highway	Highway
Pedestrian Travel Width (ft)	12	10	12	12
Railings	6'?	6'	6'-10'	6'-10'
Bridge Aesthetics	High	Low	Middle	Middle
Total Project Cost	\$10,000,000	\$2,500,000	\$16,271,000	\$11,265,000
Key Non-Bridge Components	Wetland impacts, 720' pedestrian facilities, park- like setting & monument art on one side	Estimated 1/3 of project cost to re-grade one side for ADA, significant wall/ approach required on one side.	Utility Relocation, Approach Ramps, Stairs	Utility Relocation, Elevators, Stairs
Bridge Cost/Ft	\$32,786.89	\$19,685.04	\$21,694.67	\$18,775.00

Attachment A

McIntire Park Pedestrian Bridge (Charlottesville, VA)

This bridge cost approximately \$2,500,000 and spans 127 feet; approximately **\$19,685 per foot**. The bridge was constructed in order to provide a safe crossing over the Norfolk Southern Railway that was separating the west and east sides of McIntire Park. The bridge now provides access for bicyclists and pedestrians and was constructed congruently with a new skate park at the park. Per the City's Parks & Trails Planner, approximately 33% of the cost (or \$825,000) was incurred by the re-grading of one side of the bridge to make it ADA compliant. As shown below, the materials appear to be simple (presumably steel and concrete), and the design values functionality over aesthetics. I also used the City of Charlottesville's GIS page to look at the contours on either side of the train tracks – it looks like the western side is fairly flat and the eastern side is much steeper, so there was likely some grading that had to occur on the eastern side of the park.



Attachment A

Minto Island Pedestrian Bridge (Salem, OR)

This bridge cost approximately \$10,000,000 and spans 305 feet; approximately **\$32,787 per foot**. The bridge was constructed in order to connect multiple natural areas and regions of Salem that were previously bisected by the Willamette Slough. The bridge now provides a pedestrian connection between 1,300 acres of park land and established 20 miles of dedicated bike/pedestrian paths. Due to the bridge's location in relation to the Willamette River/Willamette Slough, there are wetlands (identified by the NWI) on the Minto Island side of the bridge. It is possible that these wetlands increased costs, particularly if any delineation or additional review processes were necessary. Also, the bridge design is fairly grandiose, which presumably increased costs for both design and materials. Due to the site's location along the Willamette Slough banks, there are steep grades on each side of the water into which the bridge foundations were constructed (as shown in the picture below). This likely required significant grading and/or structural design that doesn't appear to have been necessary for the McIntire Park bridge. The pedestrian facility extends quite far on either side of the bridge (about 220 feet on the island side of the bridge and 500 feet of elevated/curved pedestrian facility on the mainland side of the bridge) which likely added significant costs. It is unclear to me as to whether or not these additional pedestrian facilities were included in the overall \$10m project cost, but, if they were, they certainly contributed to the high cost of the project.



Attachment A

SHR-17

Sherwood OR 99W Pedestrian Crossing Study - Planning Level Cost Estimate

Option 1 Alignment (ramps) and Option 2 Alignment (elevators)

Prepared by Harper Houf Peterson Righellis, Inc.

September 19, 2019

Major Structure Costs

Description	Unit Cost	Option 1 - Ramps		Option 2 - Elevators	
		Quantity	Total Cost	Quantity	Total Cost
Bridge Span (Feet)		620		600	
Bridge Span (Sq Ft)	\$ 400	8,680	\$ 3,472,000	8,400	\$ 3,360,000
Pier Supports (EA)	\$ 100,000	2	\$ 200,000	1	\$ 100,000
20'x20' Platforms (EA)	\$ 200,000	2	\$ 400,000	2	\$ 400,000
Ramp Structures (LS, A+B)	\$ 2,400,000	1	\$ 2,400,000		\$ -
Stairs (EA)	\$ 250,000	2	\$ 500,000	2	\$ 500,000
Elevators (EA)	\$ 700,000		\$ -	2	\$ 1,400,000
Major Structure Subtotal			\$ 6,972,000		\$ 5,760,000

Miscellaneous Construction Costs

Mobilization	10%	\$ 697,200	10%	\$ 576,000
Traffic Control	5%	\$ 348,600	5%	\$ 288,000
Erosion Control	1%	\$ 69,720	1%	\$ 57,600
Stormwater Management	LS	\$ 100,000	LS	\$ 100,000
Lighting	LS	\$ 125,000	LS	\$ 125,000
Landscaping / Irrigation	LS	\$ 200,000	LS	\$ 200,000
Non-Reimbursable Utility Relocation	LS	\$ 250,000	LS	\$ 250,000
Miscellaneous	LS	\$ 300,000	LS	\$ 300,000
Miscellaneous Construction Subtotal		\$ 2,090,520		\$ 1,896,600

Subtotal Construction Cost \$ 9,062,520 \$ 7,656,600

Contingency 30% \$ 2,718,756 30% \$ 2,296,980

Total Construction Cost	\$ 11,800,000	\$ 10,000,000
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Project Management / Design (Low)					
Design Phase Services (Low)	15%	\$ 1,770,000	15%	\$ 1,500,000	
Construction Services (Low)	10%	\$ 1,180,000	10%	\$ 1,000,000	
Design Phase Subtotal (Low)		\$ 2,950,000		\$ 2,500,000	
Total (Construction + Design)		\$ 14,750,000		\$ 12,500,000	
Escalation (5 years at 3.5%/year)	19%	\$ 2,768,373	19%	\$ 2,346,079	

Project Management / Design (High)					
Design Phase Services (High)	30%	\$ 3,540,000	30%	\$ 3,000,000	
Construction Services (High)	25%	\$ 2,950,000	25%	\$ 2,500,000	
Design Phase Subtotal (High)		\$ 6,490,000		\$ 5,500,000	
Total (Construction + Design)		\$ 18,290,000		\$ 15,500,000	
Escalation (5 years at 3.5%/year)	19%	\$ 3,432,783	19%	\$ 2,909,138	

Total Project Estimate (Low)	\$ 17,500,000	\$ 14,800,000
Total Project Estimate (High)	\$ 21,700,000	\$ 18,400,000

Attachment A

SHR-17

Sherwood OR 99W Pedestrian Crossing Study - Planning Level Cost Estimate Option 3: Short Horseshoe Bridge Concept

Prepared by Harper Houf Peterson Righellis, Inc.

September 19, 2019

Major Structure Costs

Description	Unit Cost	Option 3 - Short Bridge	
		Quantity	Total Cost
Bridge Span (Length)		180	
Bridge Span (Area)	\$ 400	2,520	\$ 1,008,000
Pier Supports (EA)	\$ 100,000		\$ -
20'x20' Platforms (EA)	\$ 200,000	2	\$ 400,000
Ramp Structures (LS, A+B)	\$ 2,400,000	1	\$ 2,400,000
Stairs (EA)	\$ 250,000	2	\$ 500,000
Elevators (EA)	\$ 700,000		\$ -
Major Structure Subtotal			\$ 4,308,000

Miscellaneous Construction Costs

Mobilization	10%	\$ 430,800
Traffic Control	5%	\$ 215,400
Erosion Control	1%	\$ 43,080
Stormwater Management	LS	\$ 80,000
Lighting	LS	\$ 80,000
Landscaping / Irrigation	LS	\$ 150,000
Non-Reimbursable Utility Relocation	LS	\$ 250,000
Miscellaneous	LS	\$ 200,000
Miscellaneous Construction Subtotal		\$ 1,449,280

Subtotal Construction Cost \$ 5,757,280

Contingency 30% \$ 1,727,184

Total Construction Cost	\$ 7,500,000
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Project Management / Design (Low)

Design Phase Services (Low)	15%	\$ 1,125,000
Construction Services (Low)	10%	\$ 750,000
PM / Design Subtotal (Low)		\$ 1,875,000
Total (Construction + Design)		\$ 9,375,000
Escalation (5 years at 3.5%/year)	19%	\$ 1,759,559

Project Management / Design (High)

Design Phase Services (High)	30%	\$ 2,250,000
Construction Services (High)	25%	\$ 1,875,000
PM / Design Subtotal (High)		\$ 4,125,000
Total (Construction + Design)		\$ 11,625,000
Escalation (5 years at 3.5%/year)	19%	\$ 2,181,853

Total Project Estimate (Low) \$	11,100,000
Total Project Estimate (High) \$	13,800,000