
Project Study Report

Submitted to
Chelan-Douglas Transportation Council

September 15, 2022

SR 28 Corridor Study

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EXECUTIVE SUMMARY

State Route 28 (SR 28) is a key regional highway in Central Washington that connects urban centers such as Wenatchee, Quincy, and Ephrata. This study uses three components to evaluate SR 28 improvement concepts, costs, and traffic demands. First, this study evaluates the segment of SR 28 between East Wenatchee and Rock Island, specifically from 3rd Street SE to Battermann Road. The Chelan-Douglas Transportation Council (CDTC) and the Washington State Department of Transportation (WSDOT) anticipate significant traffic growth for this segment of SR 28 due to the planned economic expansion of Chelan, Douglas, and Grant Counties combined with local growth in the East Wenatchee and Rock Island urban growth areas (UGAs). Second, this study estimates high-level costs for a roadway expansion of SR 28 to four continuous lanes between Rock Island and Quincy and of SR 281 from Quincy to Interstate 90 (I-90). Third, this assessment includes a market analysis by Leland Consulting Group, which evaluates the development potential and associated traffic volumes for the land surrounding the study areas.

SR 28: East Wenatchee to Rock Island Segment

There are two primary goals for this portion of the study: first, to assess the existing study area performance with respect to mobility, safety, access, active transportation needs, and other relevant factors and second, to evaluate three future SR 28 design concepts to understand how well each design concept addresses existing and anticipated issues or opportunities within the study area. This study does not recommend a preferred corridor design concept. The aim of this phase of analysis is to compile and present the relevant data for local jurisdictions to consider and evaluate in their process of selecting a preferred design concept.

Methodology

Existing Conditions Evaluation

The study team evaluated several elements of the existing study area, including existing travel patterns, access permissions, safety performance, active transportation facilities, transit infrastructure, right-of-way, and environmental constraints.

Community and Stakeholder Engagement

This study included coordination between the project team and local agency and citizen representatives through Stakeholder Advisory Group (SAG) meetings, as well as coordination between the project team and the public through a project website, virtual presentations, media announcements, and in-person events. These interactions helped shape elements of the three design concepts under consideration and serve as an important building block for future coordination efforts.

Corridor Design Concept Development and Evaluation

The study team evaluated three concepts that cover a range of driver experiences for the segment of SR 28 between 3rd Street SE and Batterman Road as shown in Figures 1, 2, and 3. These three design concepts include different elements for items such as intersection control, parallel roadways, access management, and active transportation facilities.

1. High-speed, two-lane SR 28
2. High-speed, four-lane SR 28

3. Intermediate-speed, three-lane SR 28

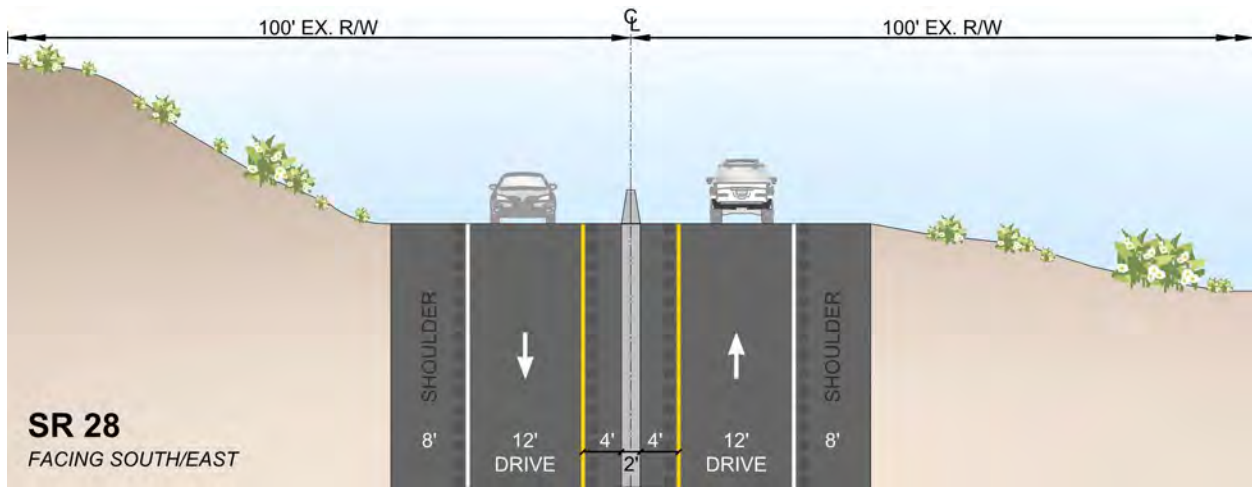


Figure 1. High-Speed, Two-Lane SR 28 Typical Section.

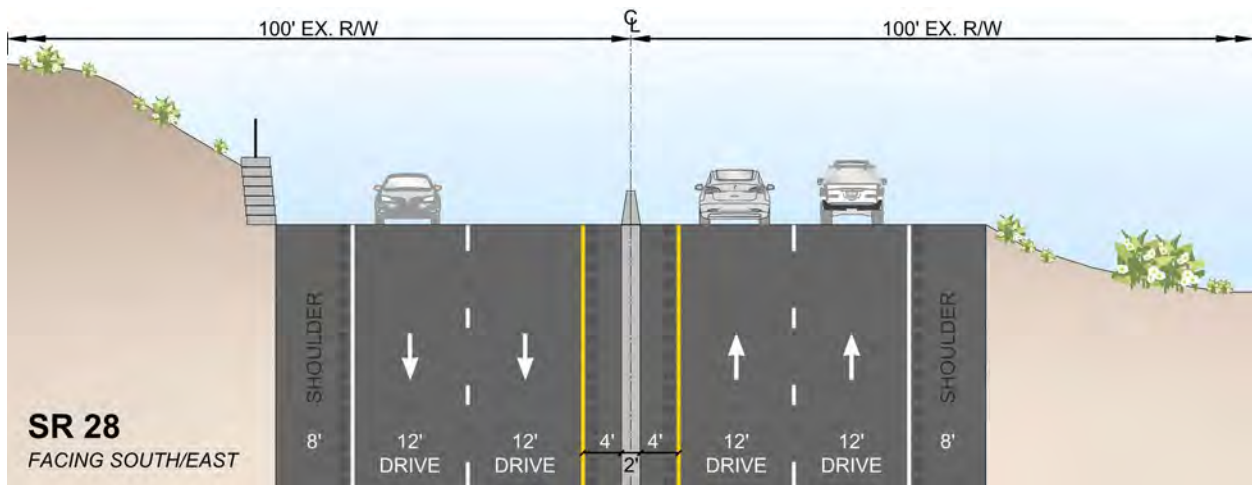


Figure 2. High-Speed, Four-Lane SR 28 Typical Section.

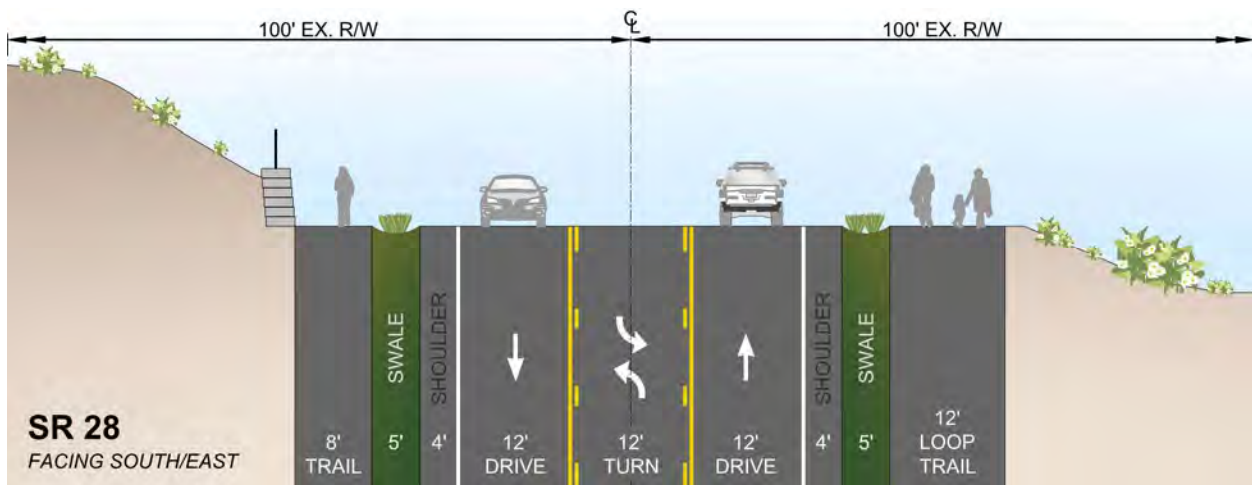


Figure 3. Intermediate-Speed, Three-Lane SR 28 Typical Section.

The study evaluated each design concept using elements to compare against one another for each corridor configuration. Table 1 summarizes key elements of each design concept, including configuration elements, anticipated safety performance, traffic operations metrics, active transportation facilities, and other factors.

Table 1. Design Concept Comparison Table.

Element	High-Speed, Two-Lane SR 28	High-Speed, Four-Lane SR 28	Intermediate-Speed, Three-Lane SR 28
Typical Configuration			
SR 28 vehicle lanes	One lane per direction	Two lanes per direction	One lane per direction with continuous center turn lane
Loop Trail location (extension south of Hydro Park)	Generally follows SR 28 alignment on west side of highway south of S Nile Avenue, with some deviation	Generally follows SR 28 alignment on west side of highway south of S Nile Avenue, with some deviation	Follows SR 28 alignment on west side of highway
Rock Island Road connection	Included	Included	Not included
SR 28 non-motorized (bike/ped) facilities	River side: Loop Trail extension east of Hydro Park	River side: Loop Trail extension east of Hydro Park	Land side: sidewalk River side: Loop Trail extension east of Hydro Park
Posted speed limit	60 miles per hour (mph)	60 mph	40 mph
Safety and Access			
General predicted crash rate	30.1 crashes per year	34.3	41.6
General rate compared to existing	34% reduction	24% reduction	8.4% reduction
Injury/fatal predicted crash rate	9.0 crashes per year	10.9	13.1
Injury/fatal rate compared to existing	39% reduction	26% reduction	11% reduction
General access classification	Partial Control Limited Access	Partial Control Limited Access	Partial Control Limited Access
Access control devices	Concrete jersey barrier or median	Concrete jersey barrier or median	None
Property access changes compared to existing	Consolidate some existing driveway access points to nearby intersection locations via frontage roads	None	None
Changes in number of intersections/accesses compared to existing	6 fewer	2 fewer	No change

Element	High-Speed, Two-Lane SR 28	High-Speed, Four-Lane SR 28	Intermediate-Speed, Three-Lane SR 28
Preliminary SR 28 intersection changes	Five new roundabouts Left-turn restrictions at stop-controlled intersections Closure of SR 28 and Rock Island Road intersections	Five new roundabouts Left-turn restrictions at stop-controlled intersections Closure of SR 28 and Rock Island Road intersections	Three new roundabouts
SR 28 conflict point changes compared to existing	288 fewer (75% reduction)	282 fewer (74% reduction)	107 fewer (28% reduction)
Vehicle Mobility¹			
Corridor travel time	SR 28: 9.5 minutes Rock Island Road (RIR): 12.5 minutes Battermann Road: 8 minutes	SR 28: 8.5 minutes RIR: 12.5 minutes Battermann Road: 8 minutes	SR 28: 18 minutes Battermann Road: 10 minutes
Average speed	SR 28: 53 mph RIR: 33 mph Battermann Road: 47 mph	SR 28: 59 mph RIR: 33 mph Battermann Road: 47 mph	SR 28: 27 mph Battermann Road: 45 mph
Maximum volume/capacity ratio	SR 28: 0.83 RIR: 0.40 Battermann Road: 0.28	SR 28: 0.21 RIR: 0.35 Battermann Road: 0.17	SR 28: 0.96 Battermann Road: 0.47
Delay (time difference between congested and free-flow trips)	SR 28: 1 minute RIR: 0.5 minutes Battermann Road: < 0.25 minutes	SR 28: < 0.25 minutes RIR: 0.5 minutes Battermann Road: < 0.25 minutes	SR 28: 6.5 minutes Battermann Road: 0.5 minutes
Property access changes compared to existing	Consolidate some existing driveway access points to nearby intersection locations via frontage roads	None	None
Preliminary SR 28 intersection changes	Five new roundabouts Left-turn restrictions at stop-controlled intersections Closure of SR 28 and Rock Island Road intersections	Five new roundabouts Left-turn restrictions at stop-controlled intersections Closure of SR 28 and Rock Island Road intersections	Three new roundabouts
Ped/Bike Mobility			

¹ Vehicle mobility metrics are for westbound/northbound travel and based on the following extents: SR 28 between Battermann Road and 3rd Street SE, Rock Island Road between Douglas Street and 3rd Street SE, and Battermann Road (including 4th Street SE, Vanwell Street, and Grant Road) between SR 28 and S Union Avenue.

Element	High-Speed, Two-Lane SR 28	High-Speed, Four-Lane SR 28	Intermediate-Speed, Three-Lane SR 28
Continuous routes between East Wenatchee and Rock Island	Loop Trail Rock Island Road sidewalks	Loop Trail Rock Island Road sidewalks	Loop Trail SR 28 paths
Level of traffic stress (LTS) for continuous routes	Loop Trail: Pedestrian (PLTS) 2, Bicycle (BLTS) 1 RIR sidewalks: PLTS 3 RIR bicycle lanes: BLTS 3	Loop Trail: PLTS 2, BLTS 1 RIR sidewalks: PLTS 3 RIR bicycle lanes: BLTS 3	Loop Trail: PLTS 2, BLTS 1 SR 28 paths: PLTS 2, BLTS 1
SR 28 crossing opportunities; control devices	Each roundabout (except at Boat Launch intersection); consider RRFB or PHB treatments at roundabouts or elsewhere	Each roundabout (except at Boat Launch intersection); consider PHB treatment at roundabouts or elsewhere	Each roundabout; consider RRFB or PHB treatments at roundabouts or elsewhere
LTS for SR 28 crossings	Roundabouts: LTS 1 or 2 Rectangular Rapid Flashing Beacons (RRFBs): LTS 2 Pedestrian Hybrid Beacons (PHBs): LTS 1	Roundabouts: LTS 2 PHBs: LTS 1	Roundabouts: LTS 1 or 2 RRFBs: LTS 2 PHBs: LTS 1
Other			
Environmental impacts	Potential filling of some of Putters Lake and Hammond Lake east of Rock Island to facilitate roadway widening	Potential filling of some of Putters Lake and Hammond Lake east of Rock Island to facilitate roadway widening	Potential filling of some of Putters Lake and Hammond Lake east of Rock Island to facilitate roadway widening
Right-of-way impacts	At corners of roundabout intersections For frontage roads in some locations For Rock Island Road connection	At corners of roundabout intersections For Rock Island Road connection	At corners of roundabout intersections
Development opportunities	Adjacent to new frontage roads parallel to SR 28	At existing driveway and intersection connections to SR 28	At existing driveway and intersection connections to SR 28
Transit routing	Link Transit could shift to connected RIR	Link Transit could shift to connected RIR	Route to be maintained via RIR and SR 28
Transit connections	Sidewalks provided on RIR provide first/last mile connection; score at PLTS 3	Sidewalks provided on RIR provide first/last mile connection; score at PLTS 3	Sidewalks provided on RIR provide first/last mile connection; score at PLTS 3
Opinion of project cost (Assume 2029 midpoint of construction)	SR 28: \$140 million Loop Trail extension: \$19 million RIR upgrade: \$98 million RIR connection: \$29 million Total: \$270–315 million	SR 28: \$258 million Loop Trail extension: \$19 million RIR upgrade: \$98 million RIR connection: \$29 million Total: \$385–445 million	SR 28: \$183 million Loop Trail extension: included above RIR upgrade: \$98 million RIR connection: not applicable Total: \$265–310 million

This study does not identify a preferred design concept for SR 28. The next steps for the SR 28 corridor are to decide on a vision and then confirm which elements are included in that vision and establish an implementation plan. There are multiple ways to select a vision including a CDTC Board resolution, coordinated decision-making process involving regional and local leaders, or the development of regional transportation planning policies and/or goals.

SR 28/281 Rock Island to I-90 Cost Analysis

The cost analysis for the SR 28 and SR 281 corridors in this phase of the study are summarized in Table 2. The assumptions for these calculations are listed in Appendix J. This opinion of cost information reflects widening each state route to four travel lanes but with narrower right-of-way widths. See Figure 4.

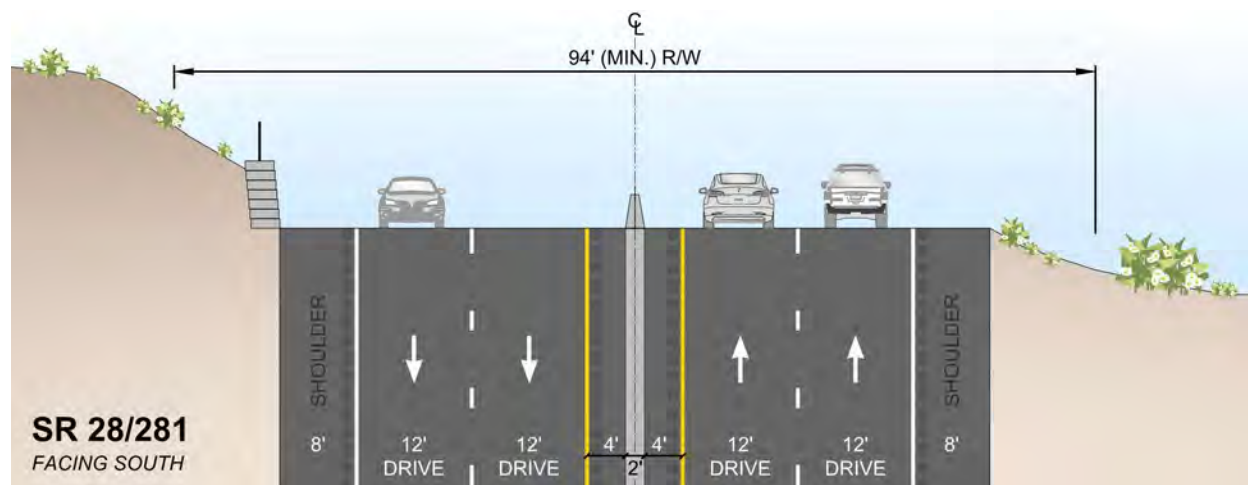


Figure 4. Rock Island to I-90 SR 28/281 Typical Section.

Table 2. SR 28/281 Rock Island and I-90 Opinion-of-Cost Summary (Millions).

Corridor	Total
SR 28, Rock Island to Quincy	\$750–865 million
SR 281, Quincy to I-90	\$330–380 million

On a per-mile basis, the SR 28 costs for the Rock Island to Quincy segment are higher than the SR 281 costs due to more complex topography, which triggers retaining walls and significant earthwork quantities in some locations.

The costs in Table 2 assume a midpoint of construction for each corridor of 2029. If an actual construction date is sooner than 2029, costs may be lower due to less compounding inflation. Conversely, if construction lags beyond 2029, costs will likely increase beyond the projected numbers in this study.

Market Analysis

Residential and commercial growth trends from recent years are generally expected to continue for the Wenatchee Valley and greater Quincy areas. Industrial growth is projected to accelerate, particularly in the greater Quincy area with a focus on data center developments. The industrial growth

will create a jobs-housing imbalance, leading to increased long-distance commute trips on state highways. If housing isn't provided at a rate necessary and appropriate to meet job growth in the Quincy urban growth area.

These growth patterns will cause traffic increases on SR 28 and other regional corridors. Growth is expected to align generally with prior CDTC traffic projections, which are the foundation for the traffic operations analysis and metrics included in this study.

1 INTRODUCTION

Background

State Route 28 (SR 28) is a key regional highway in Central Washington that connects urban centers such as Wenatchee, Quincy, and Ephrata. This study includes three components to evaluate SR 28 concepts, costs, and traffic demands. First, this study evaluates the segment of SR 28 between East Wenatchee and Rock Island. The Chelan-Douglas Transportation Council (CDTC) and Washington State Department of Transportation (WSDOT) anticipate significant traffic volume growth for this segment of SR 28 due to the planned economic expansion of Chelan, Douglas, and Grant Counties combined with local growth in the East Wenatchee and Rock Island urban growth areas (UGAs). The second emphasis area of this study estimates costs to create a four-lane section on SR 28/281 between Rock Island and I-90, see Chapter 6. The third emphasis area was a market analysis of the development potential and associated traffic volumes for the land surrounding the study areas by Leland Consulting Group. See Chapter 7.

This first study element focuses on potential SR 28 corridor design concepts between 3rd Street SE in East Wenatchee and Batterman Road in Rock Island. The design concepts considered anticipated trip demand as well as several other factors. This highway segment includes areas within and outside of UGAs, supports local and regional trips, and caters primarily to automotive needs. Several SR 28 intersections have above-average crash rates, and there are opportunities to revise vehicle access to the highway as well as improve pedestrian and bicycle—also known as “active transportation”—connectivity.

This study includes analysis of a variety of elements of the existing and future SR 28 configuration, plus selected significant roadways in the adjacent area. This Project Summary Report documents the study methodology, findings, and conclusions.

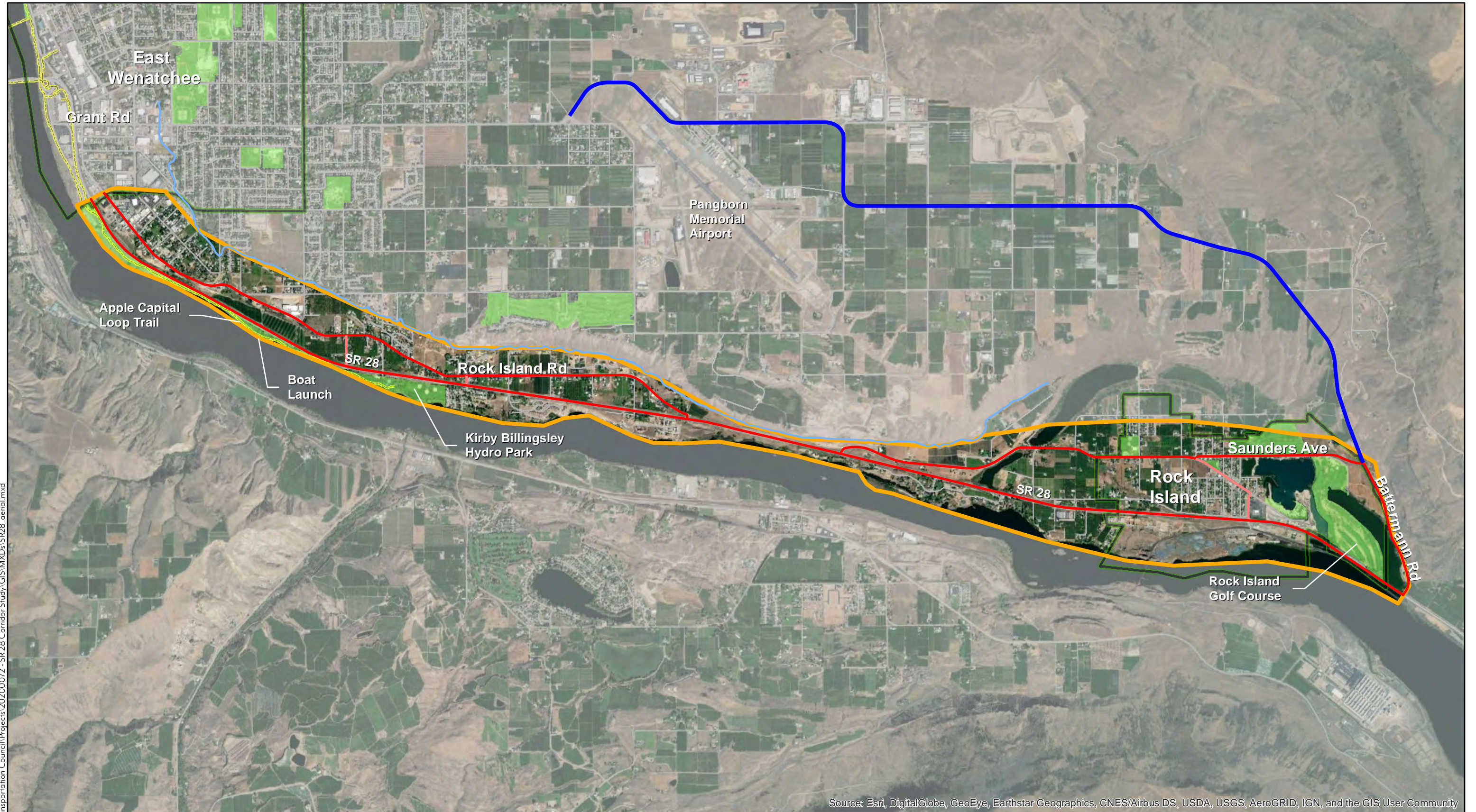
Study Goals

There are two primary goals for the East Wenatchee–Rock Island segment of the study: first, to assess the existing study area performance with respect to mobility, safety, access, active transportation needs, and other relevant factors and second, to evaluate three future SR 28 design concepts to understand how well each design concept addresses existing and anticipated issues or opportunities within the study area. This study does not recommend a preferred corridor design concept. The aim of this phase of analysis is to compile and present the relevant data for local jurisdictions to consider and evaluate in their process of selecting a preferred design concept.

Study Area

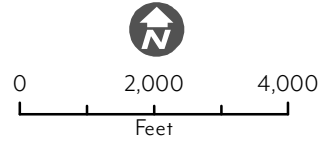
Figure 1-1 illustrates the limits of the East Wenatchee to Rock Island segment of this study. The study area includes four study corridors:

- SR 28 between 3rd Street SE in East Wenatchee and Battermann Road
- Rock Island Road between 3rd Street SE in East Wenatchee and SR 28
- Rock Island Road/Rock Island Avenue/Saunders Avenue between SR 28 and Battermann Road
- Battermann Road between Saunders Avenue and SR 28



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Legend			
	Study Area		City Limits
	Study Roads		Parks
	Other Study Roads		Apple Capital Loop Trail
			Canal
			Battersmann Road Corridor Mobility Analysis Limits

Figure 1-1.
Study Area.

SR 28 Corridor Study
Study Area

To avoid confusion between the two termini of Rock Island Road at SR 28, each roadway segment is labeled “west” or “south/east” throughout this report.

Note that in the WSDOT system, the segment of SR 28 at 3rd Street SE is considered the SR 28 Wenatchee Spur, while the SR 28 mainline is to the west closer to the Columbia River. The spur and mainline merge 0.09 miles south of 3rd Street SE. The SR 28 mainline segment north of this merge point is not included as a study segment for this evaluation. For simplicity, all references to “SR 28” in this report include the spur segment between 3rd Street SE and the merge point as well as the mainline segment between the merge point and Battermann Road.

Project Direction Notation

Within the study area, SR 28 is oriented both north-south and east-west. For consistency throughout this report, the overall SR 28 corridor is described as an east-west highway for all discussions of general corridor travel or locations as part of the East Wenatchee–Rock Island analysis. The one exception is at the intersection of SR 28 and SE 3rd Street, at which SE 3rd Street is described as an east-west cross street and SR 28 is discussed as a north-south highway.

Some project elements span the length of the SR 28 corridor, including where the state route changes orientations. For clarity in this report, descriptions of components on either side of the highway are listed as “river side” for elements to the south or west of SR 28 or “land side” for locations to the north or east.

Study Methodology

This study included six main elements, which are described briefly below and then in detail in the following chapters of this report.

Existing Conditions Evaluation

The study team evaluated several elements of the existing study area, including existing travel patterns, access permissions, safety performance, active transportation facilities, and transit infrastructure. The majority of this analysis is documented in this study’s Needs Evaluation Memorandum, which is Appendix A to this report. The study team also studied the existing roadway configuration, including right-of-way and environmental constraints.

Concept Development and Assessment

The study team evaluated three primary corridor design concepts for SR 28:

1. High-speed, two-lane SR 28
2. High-speed, four-lane SR 28
3. Intermediate-speed, three-lane SR 28

These three design concepts include different elements for items such as intersection control, parallel roadways, access management, and active transportation facilities. They also have differing footprints and costs. Perteet generated a conceptual exhibit illustrating each design concept as well as a planning-

level opinion of cost for each. These represent the corridor design concepts on a high level, but future refinement and assessments would be needed to confirm specific design details, such as individual intersection configurations.

Perteet also evaluated the performance and impacts of each corridor design concept using a variety of objective assessments. This report includes a comparison table to understand how each design concept differs on a variety of metrics.

Public Engagement

The project team engaged with the public at multiple stages of the study and through a variety of means. Throughout the study, CDTC hosted a project website where visitors could provide location-specific feedback using a mapping tool and explore the design concepts under study. This online tool had over 1,000 visitors who generated over 500 engagements (e.g. comments, likes) that the team considered.

The project team also engaged individual stakeholders through personal conversations to learn specific corridor concerns. Individual stakeholders interviewed included residents, commuters, business owners, local agency leads, and orchard managers.

Other public engagement efforts included a virtual presentation to Wenatchee's local Community for the Advancement of Family Education (CAFÉ) "Un Buen Consejo" group as well as in-person attendance at a community event in South Wenatchee on August 3, 2021.

Stakeholder Advisory Group Meetings

Throughout the SR 28 East Wenatchee–Rock Island segment study period, Perteet and CDTC coordinated with a group of local agency staff and residents known as the "Stakeholder Advisory Group" (SAG). Perteet provided updates on the progress of the study at five SAG meetings, which provided stakeholders with an opportunity to comment on the study and guide future assessments.

Each of the five meetings focused on a unique element of the study. Meeting summaries are included in Appendix H to this report to serve as a record for future analysis efforts.

2 EXISTING CONDITIONS ASSESSMENT

This chapter summarizes the existing conditions of the SR 28 East Wenatchee–Rock Island corridor and the surrounding study area. See the Needs Evaluation Memorandum, which is Appendix A to this report, for additional detail.

Typical Cross Section and Configuration

SR 28

SR 28 throughout the study limits typically has one travel lane per direction without a separating median barrier. The posted speed limit is generally 60 miles per hour (mph). The highway widens for left-turn lanes at several intersections: S Lyle Avenue, S Mary Avenue, S Nile Avenue, Perry Avenue S, Rock Island Road (East), Riverside Place, and Rock Island Drive. At the western end of the corridor, SR 28 has a posted speed limit of 40 mph and three northbound approach lanes at the intersection with 3rd Street SE. At all other intersections, turning movements from the state route are made from the through lanes. Except for the SR 28 and 3rd Street SE intersection, which is signalized, all intersections along the corridor have minor-leg stop control.

SR 28 has one segment of a passing lane. It is in the westbound direction starting at the Rock Island Road (east) intersection and continuing for one-half mile. Other opportunities for passing exist at channelized passing-allowed centerlines (for either one or both directions) along multiple segments of the highway within the study limits. Rumble strips line each roadway edge line and the centerline of SR 28.

SR 28 does not include any sidewalks or bicycle lanes. However, there are two short segments of SR 28 where the Apple Capital Loop Trail (“Loop Trail”) runs parallel to the highway. See the Apple Capital Loop Trail section for further discussion.

Figure 2-1 shows the existing typical section for the SR 28 corridor.

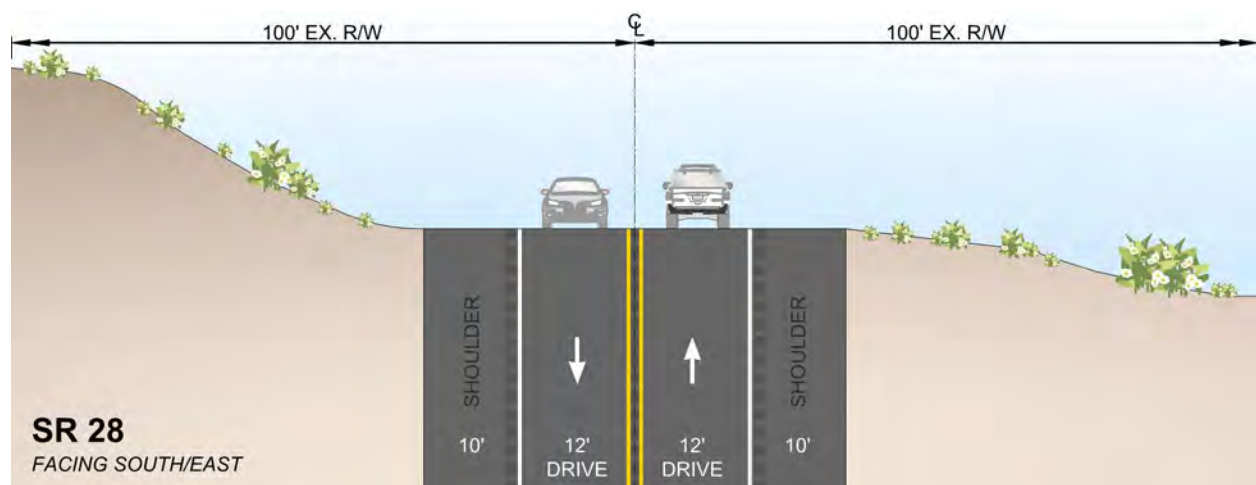


Figure 2-1. Typical SR 28 Cross Section.

Other Study Corridors

Within the study area, the Rock Island Road, Rock Island Road/Rock Island Avenue/Saunders Avenue, and Battermann Road corridors all include one travel lane per direction without any widening at intersections. All intersections have minor-leg stop control. Each corridor has shoulders, with the exception of some blocks along Saunders Avenue in Rock Island, which provide parking lanes instead. Those same spans of Saunders Avenue, as well as two blocks of Rock Island Avenue to the west, have sidewalks on one or both sides of the roadway. The remaining segments of these other corridors have no sidewalks, nor do any of them have bicycle lanes.

Apple Capital Loop Trail

The Loop Trail is a paved, regional trail that runs through the Wenatchee Valley and has a southern terminus at Hydro Park. This trail supports local and regional pedestrian and bicycle trips. The Loop Trail is typically 10 feet to 12 feet wide and runs between SR 28 and the Columbia River, with some segments that parallel the highway and others that parallel the river. In one trail segment, west of the boat launch intersection, the Loop Trail runs parallel to SR 28 and is separated from the highway shoulder by a concrete barrier. In all other segments of the corridor, the two facilities are separated by vegetation and often have different profiles, with the Loop Trail closer to the elevation of the Columbia River.

Traffic and Safety Data

Traffic volumes on SR 28 vary by location along the corridor. The highest-volume location is just east of the SR 28 spur/mainline merge point. This maximum average annual daily traffic (AADT) volume ranges from 12,000 to 13,000 vehicles per day (vpd) based on WSDOT data from 2019 and 2020. West of the merge point, the SR 28 spur volume was 8,700–9,900 vpd in the same years. Volumes at the southern end of the SR 28 corridor west of Battermann Road ranged from 8,500–9,700 vpd. The WSDOT data also showed that trucks comprise between 12% and 14% of the total traffic on SR 28.

Perteet used crash data since 2016 and methodology described in the *Highway Safety Manual* to quantify the safety performance for the study corridors. The full details of this evaluation are included in Appendices A and F. The primary metric that Perteet reviewed was number of crashes per year relative to the average crash rate for similar types of facilities (intersections or corridor segments). This analysis showed that the following locations had historical crash rates that exceeded averages for similar facilities:

- SR 28 at 3rd Street SE
- SR 28 at S Mary Avenue
- SR 28 at S Nile Avenue
- SR 28 at Rock Island Road (west)
- SR 28 at Nature Shores Drive
- SR 28 at Rock Island Drive
- SR 28 at Battermann Road

Since 2016, there were three crash events that included a total of four fatalities on SR 28 as well as three other crashes that resulted in serious injuries.

This study includes evaluations of pedestrian and bicycle facilities using the level of traffic stress (LTS) metric. Pedestrian LTS (PLTS) and bicycle LTS (BLTS) range from a score of 1 to 4. LTS 1 facilities have the lowest stress from adjacent vehicle traffic on active transportation users, whereas LTS 4 facilities have the highest stress levels. Today, LTS 1 or 2 facilities—which comprise the “low stress” network—exist in the study area only within Rock Island. See the Needs Evaluation Memorandum in Appendix A for additional details.

Critical Areas and Environmental Considerations

The study area includes a variety of sensitive environmental areas and related considerations that should be evaluated in detail once a preferred concept is selected. These include:

- Wetlands, including the Columbia River and lakes near Rock Island
- Riparian habitats and buffers per Fish and Wildlife Habitat Conservation Areas regulations
- State-priority and endangered fish species
- A wellhead protection area
- Steep slopes (i.e. greater than 40% slope)
- Cultural resources (archaeology)

Perteet summarized a preliminary evaluation of these considerations and consequences in an environmental assessment memorandum, which is included as Appendix B.

WSDOT Limited Access

The SR 28 study area is within WSDOT partial control limited access right-of-way. The limited access designation means that WSDOT has purchased the ingress and egress rights to SR 28 in this location from the adjacent parcels. When WSDOT purchased those access rights, the number, type, and use of access approaches of abutting property were frozen, and the specific rights and type of use were recorded on the property deed. The authority to alter the rights lies solely with WSDOT’s Director and State Design Engineer, Development Division (WSDOT Design Manual M 22-01.15, 503.04 Partial Control).

It is possible for private property owners to purchase access back from WSDOT; however, WSDOT is not obligated to sell it back and it is not their typical practice. If WSDOT did agree to sell the access back to a private property owner, the cost would likely be significant to the property owner and outweigh the financial benefits of developing a parcel. Essentially, this situation prevents any additional access points from being created in a partial control area. No new access points are proposed in any of the three design concepts evaluated in this study.

The two high-speed SR 28 design concepts do propose closing some existing private approaches. In order for this to occur, WSDOT would need to buy the access right from the abutting property owners where access is not moved to a frontage road still within WSDOT right of way.

There are also several at-grade intersections along SR 28, including those at S Mary Avenue and at S Nile Avenue. The at-grade intersections are public roads operated and maintained by Douglas County and the City of Rock Island. Existing at-grade intersections within limited access areas can be modified with

WSDOT approval. As private parcels develop, they can connect to local public roads with fewer restrictions than via WSDOT limited access right-of-way.

3 CORRIDOR DESIGN CONCEPTS

Introduction

This chapter details the three corridor design concepts that the study team developed and evaluated at a conceptual level, including key design decisions, assumptions, and planning-level costs. At the end of this chapter, the three concepts are compared in tabular format for various design elements.

The study team evaluated three concepts for SR 28 (East Wenatchee–Rock Island segment) that cover a range of characteristics:

1. High-speed, two-lane SR 28
2. High-speed, four-lane SR 28
3. Intermediate-speed, three-lane SR 28

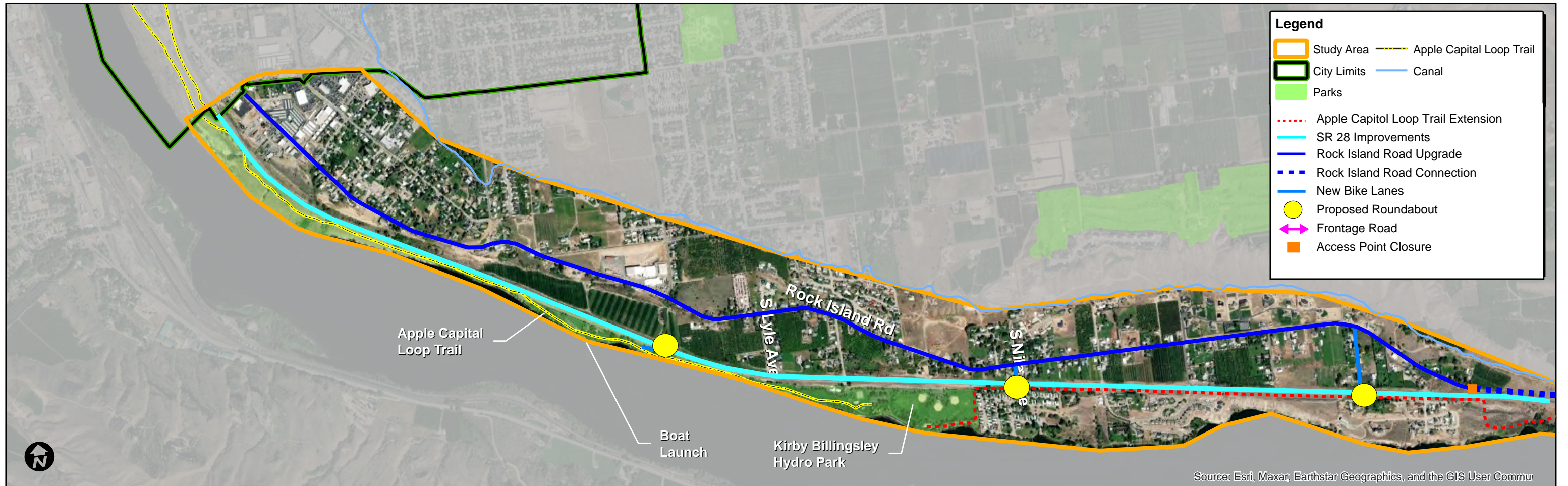
For all three design concepts, the study team used assumptions about some items such as intersection control that require future assessments to finalize the design. These items are addressed below, and next steps for the project are included in Chapter 8.

Conceptual exhibits are shown for each concept below and planning-level opinions of cost for the three design concepts can be found in Appendices C through E.

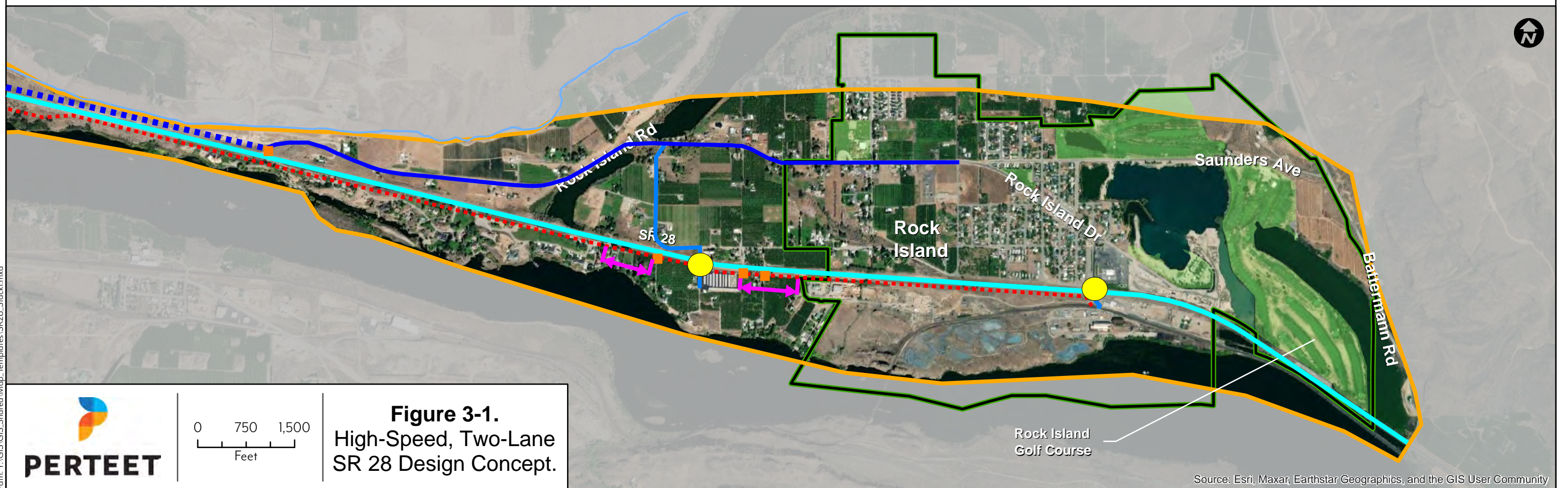
High-Speed, Two-Lane SR 28

The high-speed, two-lane concept for SR 28 is focused on maintaining the existing high-speed design of the highway with changes aimed at safety performance improvements and access control measures. The concept would have a posted speed of 60 mph. This design concept reduces the number of access points along SR 28 and, where access points remain open, generally revises turning movement permissions to prohibit left-turn movements. Since some access points would become right-in/right-out only with replacement u-turns facilitated via roundabouts, the roundabouts would be spaced no more than one mile apart along SR 28.

Figure 3-1 shows a summary map of the proposed elements for this design concept.



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

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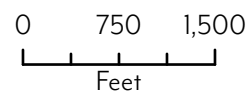


Figure 3-1.
High-Speed, Two-Lane
SR 28 Design Concept.

Source: Douglas County GIS, ESRI

Configuration

The general configuration of this design concept includes one travel lane per direction for SR 28 with a concrete barrier dividing the two directions of travel to reduce opposing-direction crash likelihood and control access at most driveways and cross streets. The high-speed, two-lane design concept includes an extension of the Apple Capital Loop Trail from its current terminus at Hydro Park to the Rock Island waterfront area. It also includes a revision to Rock Island Road through a connection between the west and east segments of that facility, which would create a continuous alternative vehicle, transit, bicycle, and pedestrian route. SR 28 retains a typical posted speed limit of 60 mph with this design concept.

Typical SR 28 Cross Section

As a two-lane design concept, SR 28 provides one travel lane per direction with shoulders on both the left (inside) and right (outside) sides of each lane. Instead of the current painted centerline for the highway, this design concept includes a physical divider between directions of travel. The study team assumes a jersey barrier divider treatment, though wider treatments such as a median could be considered with an expanded footprint.

The typical section is shown in Figure 3-2. This reflects an assumed 4-foot-wide inside shoulder and 8-foot-wide outside shoulder. This figure illustrates the sections of the highway where the Loop Trail follows a separate, non-parallel alignment to SR 28. Figure 3-3 shows the section view for SR 28 for the segments where the Loop Trail runs adjacent as well as where new frontage roads are located within existing right-of-way to consolidate access. See the discussions below for more information on these elements.

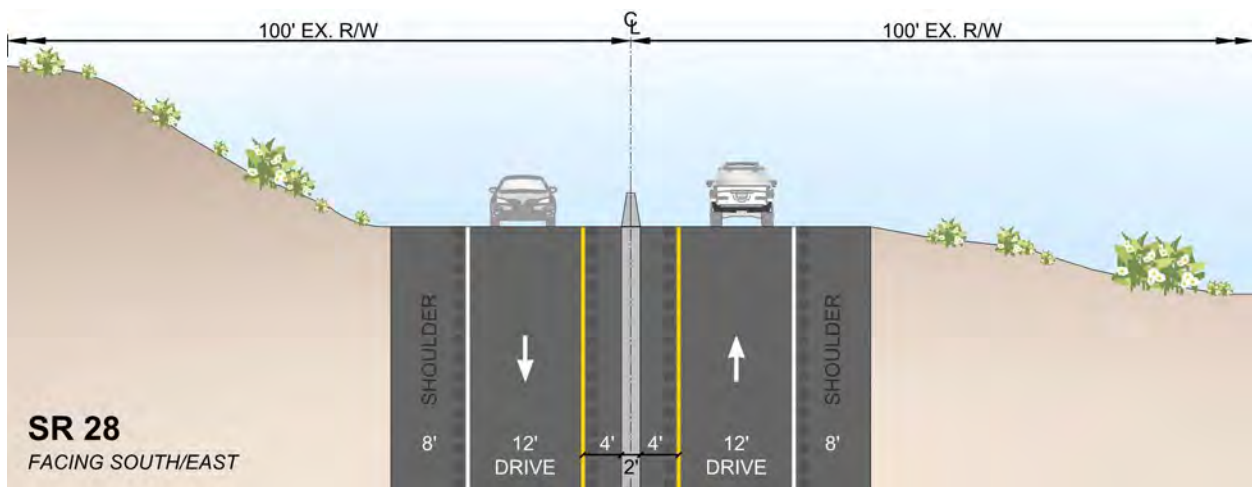


Figure 3-2. High-Speed, Two-Lane SR 28 Typical Section.

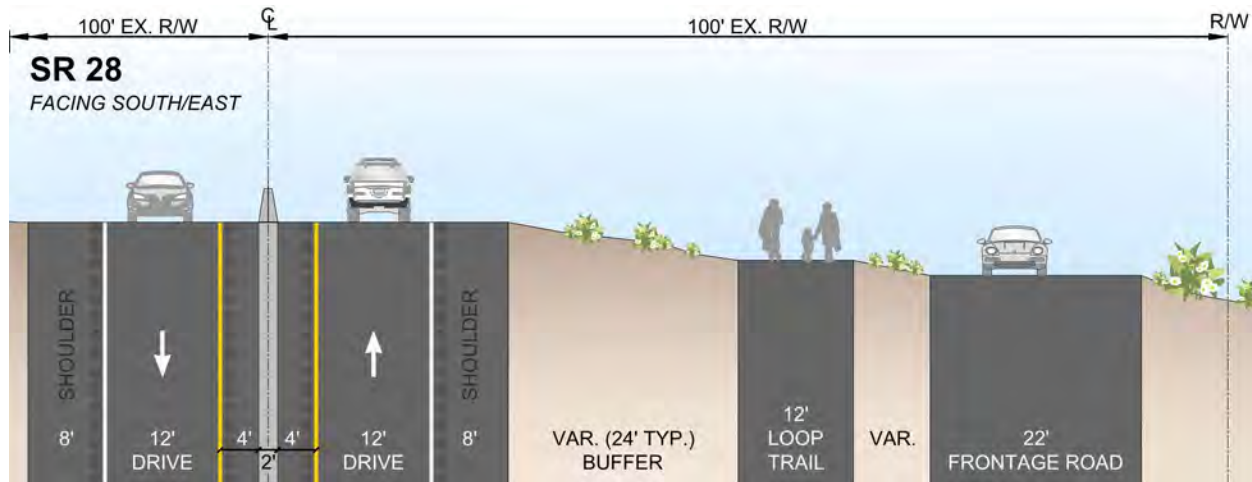


Figure 3-3. High-Speed, Two-Lane SR 28 Typical Section, Including Parallel Loop Trail and Frontage Road.

As Figure 3-3 shows, the Loop Trail is separated from the SR 28 shoulder by an assumed buffer that is typically 24 feet wide. This buffer distance provides the opportunity for the Loop Trail to follow alternate horizontal alignments and vertical profiles than the adjacent state route, which may be necessary due to the topography closer to the Columbia River. Buffer distances should be refined in future study evaluations and roadside barrier treatments such as guardrails could be considered to modify buffer widths.

SR 28 Access Changes

There are two primary access modifications included with this two-lane design concept. First, the highway includes the center barrier discussed above and shown in Figures 3-2 and 3-3. This barrier restricts left-turn movements to and from cross streets and driveways. This forces movements at these access points to use a right-in/right-out (RIRO) configuration in most cases. Roundabouts at select intersections within the study area provide left-turn access and u-turn opportunities for movements displaced by the barrier treatment. Second, some access points are removed from the highway and consolidated to other access breaks using frontage roads, as illustrated in Figure 3-3. In the western half of the study area, the S Perry Avenue access is closed in this design concept while the access point to the east at Akamai Way remains open. All properties in this area access SR 28 via Akamai Way under this design concept. At the eastern end of the study area, these frontage roads eliminate the existing intersections of Columbia Cove Lane S at SR 28 and Loon Lane at SR 28.

Modifications to Other Roadways

The high-speed, two-lane design concept includes modifications to roads other than SR 28 within the study limits.

First, this design concept includes a connected and upgraded Rock Island Road corridor. The limits of this upgrade are 3rd Street SE in East Wenatchee to Douglas Street in Rock Island. The upgraded roadway features elements from the Douglas County Department of Transportation and Land Services Roadway Standards for an urban-area arterial roadway, including continuous sidewalks (on one side) and bicycle lanes (both sides). At intersections, the configuration includes a new center left-turn lane. See Figures 3-4 and 3-5 for typical section views. Figure 3-4 is applicable to the western half of the corridor, west of

the Rock Island Road Connection (see below for details). Figure 3-5 is applicable for the Connection and further east to Douglas Street.

Existing right-of-way (ROW) widths for Rock Island Road are either 40 feet, 50 feet, or 60 feet. The Douglas County standard for a typical three-lane corridor is between 60 and 70 feet of ROW, but in areas where the center turn lane is not used, the ROW width is decreased by 11 feet. The result is that some strip acquisitions are required to facilitate this widening, generally near intersections.

Today, Rock Island Road is discontinuous, with the two segments of Rock Island Road terminating at t-intersections with SR 28. This design concept connects these two segments into one continuous corridor and eliminates the intersections with SR 28. Rock Island Road drivers can access SR 28 at S Union Avenue or Riverside Place, if needed. Based on CDTC traffic modeling, some local trips use this connected Rock Island Road facility instead of SR 28 to travel between the urban areas. Laterally, the connection is located between the Wenatchee Reclamation Ditch and SR 28.

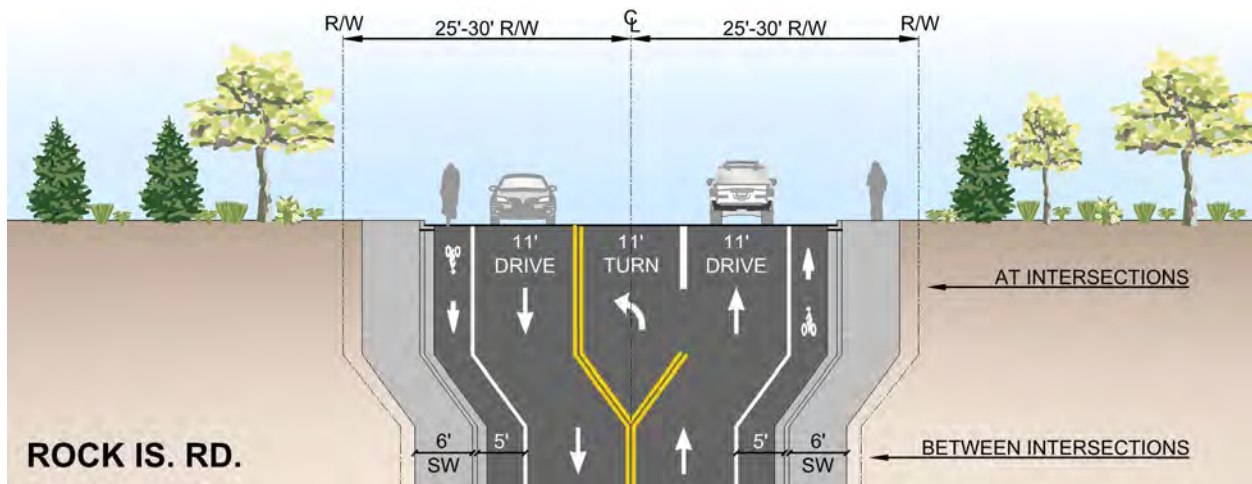


Figure 3-4. Rock Island Road Typical Section (West).

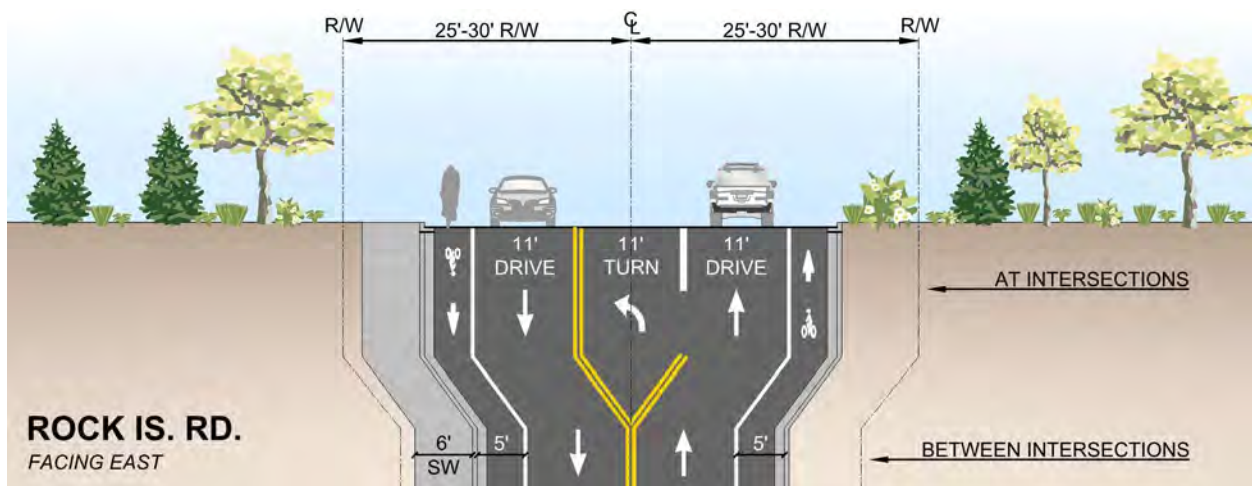


Figure 3-5. Rock Island Road Typical Section (East).

Second, the high-speed, two-lane SR 28 design concept adds bicycle lanes between Rock Island Road and SR 28 on several county roads. These new bicycle lanes increase route connectivity between the

upgraded Rock Island Road facility and the Loop Trail, via roundabout treatments on the state highway. New bicycle lanes are added to the following corridors with this design concept:

- S Nile Avenue between Rock Island Road and SR 28
- S Union Avenue between Rock Island Road and SR 28
- Riverside Place/Riverside Drive between Rock Island Road and SR 28

The study team assumes that these bike lane additions will include widening roadway pavements by 5 feet to add the facilities without any additional upgrades to Douglas County road standards.

Intersection Treatments

The study team assumes that upgraded, full-access intersections in this design concept will typically have roundabout treatments as opposed to stop-controlled or signalized configurations. This assumption is based on the safety performance record of roundabouts and recent experience with intersection upgrades in the North Central Region. This assumption should be vetted with traffic modeling and intersection control evaluations at future study stages.

This design concept reflects this assumption of new roundabouts at the following intersections:

- SR 28 at Hydro Park's boat launch driveway
- SR 28 at S Nile Avenue
- SR 28 at S Union Avenue
- SR 28 at Riverside Place
- SR 28 at Rock Island Drive

The roundabouts are spaced approximately 1 mile apart, conforming to WSDOT guidance for intersection spacing on partially limited access facilities and providing regular u-turn opportunities for access points impacted by the center barrier treatment on the highway.

The conceptual exhibits in the appendices to this report show roundabouts designed for WB-67 truck turning movements per guidance from *NCHRP Report 672: Roundabouts: An Informational Guide – Second Edition*.

As noted above, all other intersections operate with right-in/right-out turn permissions, with two exceptions. At the west end of the study area, the SR 28 and 3rd Street SE retains signal control. And at the east end, the SR 28 and Battermann Road intersection retains full access for a t-intersection. This design concept includes three assumed turn pockets: two existing right-turn pockets along SR 28 at S Mary Avenue and one new left-turn pocket for eastbound SR 28 trips to Battermann Road. Otherwise, all other turns occur from the through travel lanes.

Active Transportation Elements

This design concept includes two primary pedestrian and bicycle corridors. First, as noted above, it extends the Loop Trail from Hydro Park to the Rock Island waterfront, providing a continuous route for regional active transportation trips. The second corridor within this design concept is the connected Rock Island Road corridor, which includes bicycle lanes and sidewalks as illustrated in Figures 3-4 and 3-5.

Perteet evaluated level of traffic stress for these new facilities using the Oregon Department of Transportation (ODOT) methodology presented in their *Analysis and Procedures Manual Version 2*, Chapter 14. This methodology reflects roadway characteristics such as vehicle speed, vehicle volume, facility widths, and other configuration elements like crossing types. Perteet assessed the pedestrian level of traffic stress (PLTS) and bicycle level of traffic stress (BLTS) for continuous active transportation corridors—which are the Apple Capital Loop Trail and Rock Island Road corridors for this design concept—plus crossings of SR 28. Table 3-1 summarizes the LTS evaluation for the high-speed, two-lane design concept. Note that level of traffic stress is typically based on the most stressful element of a facility, even if that configuration is not the typical experience for a majority of a route.

Note that Table 3-1 includes multiple crossing evaluations. At this stage of the study, the project team assumes crossing locations will have roundabout treatments. However, alternative crossing treatments may be explored during future study phases. Table 3-1 includes some of these crossing options for consideration. In analyzing all crossings, Perteet assumed that BLTS is equal to PLTS, since bikes cross in shared crosswalks with pedestrians for the lowest-stress option in this design concept.

Table 3-1. High-Speed, Two-Lane SR 28 Level of Traffic Stress Summary.

Facility	PLTS	BLTS
Continuous Routes		
Apple Capital Loop Trail	2	1
Rock Island Road Sidewalks/Bicycle Lanes	3	3
SR 28 Crossing Types		
Roundabouts	1 or 2	
Rectangular Rapid Flashing Beacons (RRFBs)	2	
Pedestrian Hybrid Beacons (PHBs)	1	

The LTS value for roundabouts in Table 3-1 is listed as a range between LTS 1 and 2 because the score is determined based on the width of the splitter islands, which will be determined in the final design stage.

The PLTS 2 score for the Loop Trail reflects the typical configuration of the trail following the alignment and profile of the highway, even with a wide buffer distance and vertical barrier separating the facilities. The high travel speeds on the state route lead to this score. In zones where the Loop Trail has an independent alignment—particularly where the trail is at a lower elevation than the traffic and its effects are minimized—a PLTS score of 1 may be more appropriate. Either way, the extended Apple Capital Loop Trail registers as part of the low-stress pedestrian network in this design concept.

Traffic and Safety Performance

Traffic Operations

CDTC modeled the high-speed, two-lane SR 28 using the agency’s travel demand model (TDM) for the 2045 P.M. Peak Hour. This traffic model distributes trips throughout the Wenatchee Valley and generates traffic metrics such as delay, speed, and travel times for segments and corridors. For this project, CDTC focused on analyses related to three corridors within the study area: SR 28, Rock Island Road, and Battermann Road/4th Street SE/Vanwell Street/Grant Road. Because trips headed westbound toward Wenatchee through the study area are the dominant movement in the P.M. Peak, the analysis shown below covers only that direction of travel. The boundaries for the three corridor analyses are:

- SR 28 from Battermann Road to 3rd Street SE
- Rock Island Road from Rock Island Drive to 3rd Street SE
- Battermann Road/4th Street SE/Vanwell Street/Grant Road from SR 28 to S Union Avenue

Table 3-2 shows the TDM output metrics for this evaluation. Note that these outputs are at a high level and the project team recommends more detailed assessments as part of future study phases.

Table 3-2. High-Speed, Two-Lane SR 28 Traffic Metrics.

Corridor	Travel Time (minutes)	Delay (minutes)	Max. v/c Ratio	Average Speed (mph)
SR 28	9.5	1	0.83	53
Rock Island Road	12.5	0.5	0.40	33
Battermann Road	8	< 0.25	0.28	47

The delay values here represent increased travel times due to congestion from other vehicles, in other words the difference between a free-flowing operation and the actual performance with full traffic loading on each roadway segment. Volume-to-capacity ratio (v/c) is a theoretical measurement of demand (volume) relative to supply (capacity) for roadways, with numbers closer to 0 having less congestion and demand exceeding supply at or greater than 1.0.

Predicted Safety Performance

This design concept leads to fewer likely crashes than the existing condition due to the modifications to number of access points and type of access throughout SR 28 within the study area. These changes reduce the overall number of conflict points, which are the locations where two vehicles may overlap due to crossing, turning, merging, or diverging behaviors. These behaviors constitute the majority of crash events on roadway systems, though other crash types such as run-off-the-road events, sideswipes, and head-on crashes with one driver crossing a centerline (but not turning) do occur. Figure 3-6 illustrates the conflict points diagrams for standard full-access, RIRO, and roundabout intersections².

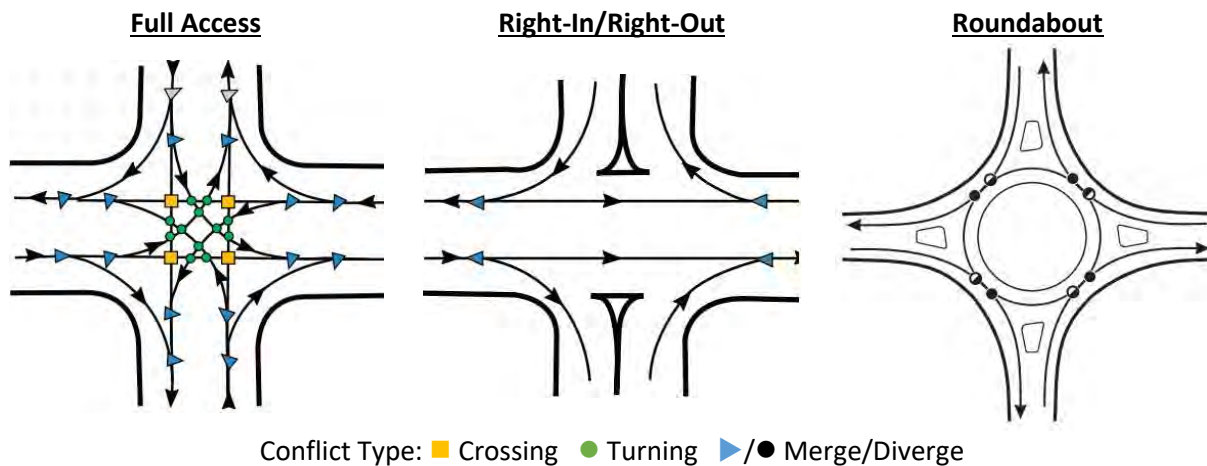


Figure 3-6. Intersection Conflict Point Diagrams.

² Image source: Minnesota Department of Transportation, *Minnesota’s Best Practices and Policies for Safety Strategies on Highways and Local Roads*. September 2011.

For a four-leg intersection, full access has a total of 32 conflict points, whereas a RIRO configuration has 4 and a roundabout has 8. For a three-leg intersection, the number of conflict points are 9, 2, and 6, respectively. Beyond the raw number of points, the RIRO and roundabout conflict types tend to lead to less severe crashes, because diverging conflicts (typically rear-end crash events) often have fewer injuries and fatalities than crossing or turning conflicts. The intersection changes in the high-speed, two-lane SR 28 design concept remove 288 of the existing 383 intersection conflict points on SR 28, a 75% reduction.

This design concept also includes the center roadway barrier, which restricts opportunities for crashes involving one vehicle crossing the centerline.

Pertee evaluated the anticipated safety performance of the entire study area using a *Highway Safety Manual* calculation. This analysis accounts for segment and intersection configurations, traffic volumes, speeds, and access by comparing those factors to other, similar facilities to predict crash rates for a given concept. Table 3-3 summarizes the anticipated safety performance for this design concept. For reference, the same analysis on the existing configuration for the study area predicts 45.4 crashes per year in total, including 14.7 crashes per year with fatalities or serious injuries.

Table 3-3. High-Speed, Two-Lane SR 28 Predicted Safety Metrics (crashes per year).

Element	All Crashes	Fatal/Serious Injury Subset
Segments (excluding intersections)		
SR 28: 3rd Street SE to Battermann Road	16.5	4.0
Battermann Road: SR 28 to Saunders Avenue	0.2	0.1
Rock Island Road Corridors	5.2	1.8
Intersections		
SR 28 at 3rd Street SE	1.3	0.4
Other SR 28 Intersections (combined)	5.6	2.2
Rock Island Road Intersections (combined; excluding with SR 28)	1.3	0.5
Other Intersections (combined)	0	0
Segment and Intersection Total	30.1	9.0

See Appendix F for a table of predicted safety performance for each individual segment and intersection.

Environmental and Property Impacts

Environmental Impacts

At this planning stage, the full extent of possible environmental impacts is not fully known. See Appendix B for more discussion. The high-speed, two-lane SR 28 design concept includes some widening on SR 28 to install the center barrier and interior shoulders. This roadway expansion may encroach on the adjacent lakes south of Rock Island, including Putters Lake and Hammond Lake. Some filling of these lakes may be necessary to construct the SR 28 improvements. The extension of the Loop Trail and construction of frontage roads may impact sensitive areas.

Appendix B outlines the federal, state, and local environmental assessments and permits that any design concept is likely subject to (pending funding sources).

Property Impacts

This design concept has right of way acquisitions in three general areas:

- At roundabout intersection corners
- Near frontage road and cross street intersections
- Along the upgraded Rock Island Road corridor

The extent of property impacts due to roundabouts can be refined at future planning phases once each roundabout is further engineered. Corner impacts may be avoidable, though the study team assumes some corner acquisition is typically necessary for each roundabout due to the large footprint to accommodate freight. Similarly, the frontage road impacts are likely, but can be better understood in future phases. One challenge with locating the frontage roads is balancing the property impacts on the southern ROW line with providing sufficient distance between the frontage roads and SR 28 at the connected cross streets.

Strip right-of-way acquisitions are necessary along the Rock Island Road corridor to expand the roadway footprint per the typical section shown in Figures 3-4 and 3-5. As noted above, existing ROW width varies between 40 feet and 60 feet on that corridor today, with the majority of the length at 40 or 50 feet. Additionally, this Rock Island Road upgrade will establish sidewalks, which may trigger driveway reconstruction and other temporary construction activities along parcels, even where permanent ROW acquisition is not necessary.

Planning-Level Opinion of Cost

Table 3-4 summarizes a calculation of planning-level costs for this design concept, including the modifications to SR 28, Rock Island Road, and the other corridors in the study area as described above. The by-phase costs are listed as midpoint costs, whereas the total is listed as a likely range for overall costs.

The following key notes and assumptions apply to these cost estimates:

- The basemap for the design is based on aerial imagery and GIS mapping (including GIS right-of-way).
- Right-of-way acquisition quantities are calculated by assuming a 10-foot strip (5 feet per side) of right-of-way is needed along the length of the planned improvements for Rock Island Road where three vehicle lanes are provided. No right-of-way acquisition is assumed where only two vehicle lanes are provided. Temporary construction easement quantities are calculated by assuming a 6-foot easement is needed along the length of the improvements for each side of Rock Island Road. For SR 28, a small amount of right-of-way is needed at planned roundabouts. The acquisition area is negligible at this stage of planning; however, the cost of administration to acquire a portion of each parcel is included.
- Proposed wall locations for each design concept are based upon the location of the proposed cut/fill limits based on a 4H:1V side slope for SR 28 and 2H:1V for Rock Island Road: if the proposed cut/fill line is outside of the existing right-of-way, it is assumed that a wall will be constructed to stay within right of way.
- SR 28 pavement widening includes removing and replacing existing shoulders with full-depth roadway paving.

- For widening areas, the proposed full-depth pavement section includes 0.67 feet of hot mix asphalt (HMA) over 0.75 feet of crushed surfacing.
- For new shoulders, the proposed pavement section includes 0.5 feet HMA over 0.75 feet crushed surfacing.
- Environmental costs include permitting in final design, construction compliance, wetland (buffer) mitigation, and temporary water pollution and erosion control.
- Drainage system costs assume ditches along SR 28 and frontage roads and new conveyance systems with detention vaults for the upgraded Rock Island Road.
- Proposed illumination improvements consist of adding lighting to five intersections along SR 28, for each design concept.
- Construction contingency: 30% of construction costs; to cover additional project costs to be identified during final design.
- Construction engineering and administration: 20% of construction subtotal, including mobilization.
- Preliminary engineering phase, including administration: 20% of construction total.
- All costs presented include inflation for design in 2025, ROW acquisition in 2027, and construction in 2029.

Table 3-4. High-Speed, Two-Lane SR 28 Opinion-of-Cost Summary, by Element (Millions).

Design concept	SR 28	Loop Trail Extension	RIR Upgrade	RIR Connection	Total
High-speed, two-lane	\$140	\$19	\$98	\$29	\$270–315

Alternative Design Opportunities

There are several design elements that the project team considered as possible modifications to the high-speed, two-lane design concept that are not reflected in the attached concept exhibit or baseline opinion of cost (see Table 3-3). These include the following elements:

S Mary Avenue Undercrossing

The SR 28 and S Mary Avenue intersection is the main entrance to Hydro Park, which is a significant regional destination for recreation. This two-lane design concept enforces right-in/right-out operations at this intersection, with roundabouts to the north and south. To expand direct access to the park, it may be possible to modify this design concept to include an undercrossing for vehicles and/or active transportation uses across SR 28. A vehicle undercrossing would likely eliminate the existing intersection at SR 28 and S Mary Avenue, forcing all movements to and from Hydro Park to use S Mary Avenue then Rock Island Road, which would shift some local travel patterns. This modification could alleviate peak-demand traffic patterns related to park, such as sporting events.

The design team evaluated the vertical geometry required for this change, and it appears likely to be infeasible. However, more refined analyses based on survey data could yield different prospects.

Additional Frontage Roads

The two-lane design concept includes frontage roads along the south side of SR 28 in three locations. Additional roads could be added to this design concept, which would further reduce the number of

intersections/driveways and lower conflict points on the highway. The tradeoffs would be increased project costs and potential right-of-way impacts. However, there is an opportunity for developers to construct these additional roads if redevelopment occurs near SR 28.

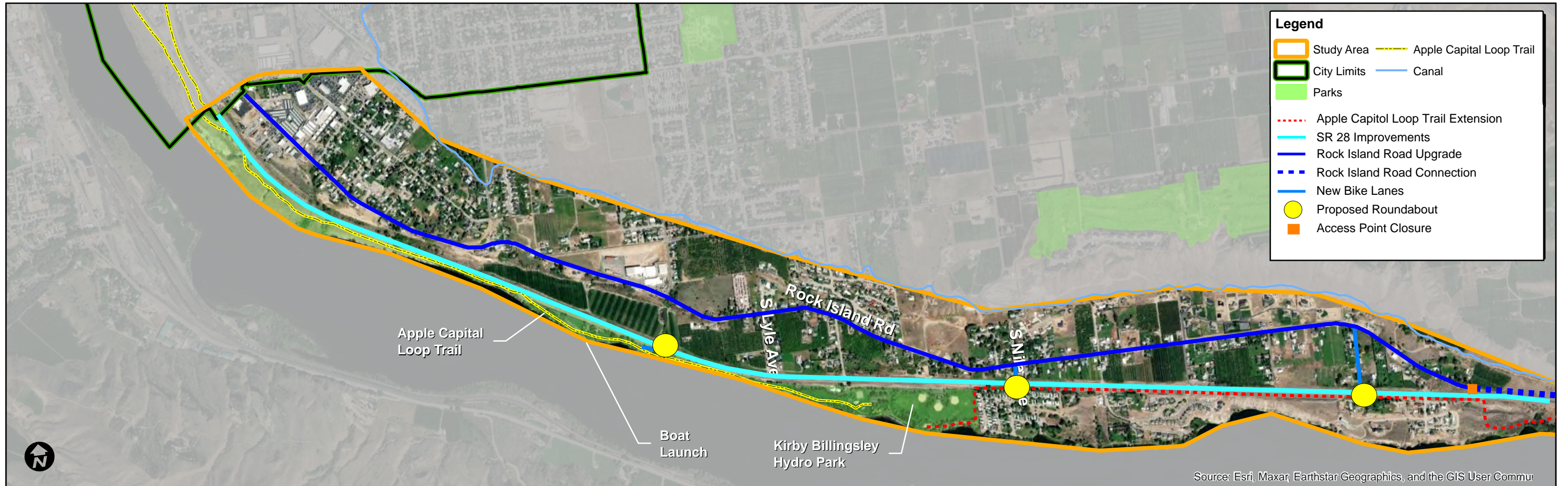
Modified Intersection Controls

As noted above, the intersection controls included in this design concept are based on assumptions by the project team at this phase of the study. These selections have not been confirmed through traffic analysis or detailed engineering. This could be modified with different numbers of roundabouts, different locations, or alternate types of intersection control.

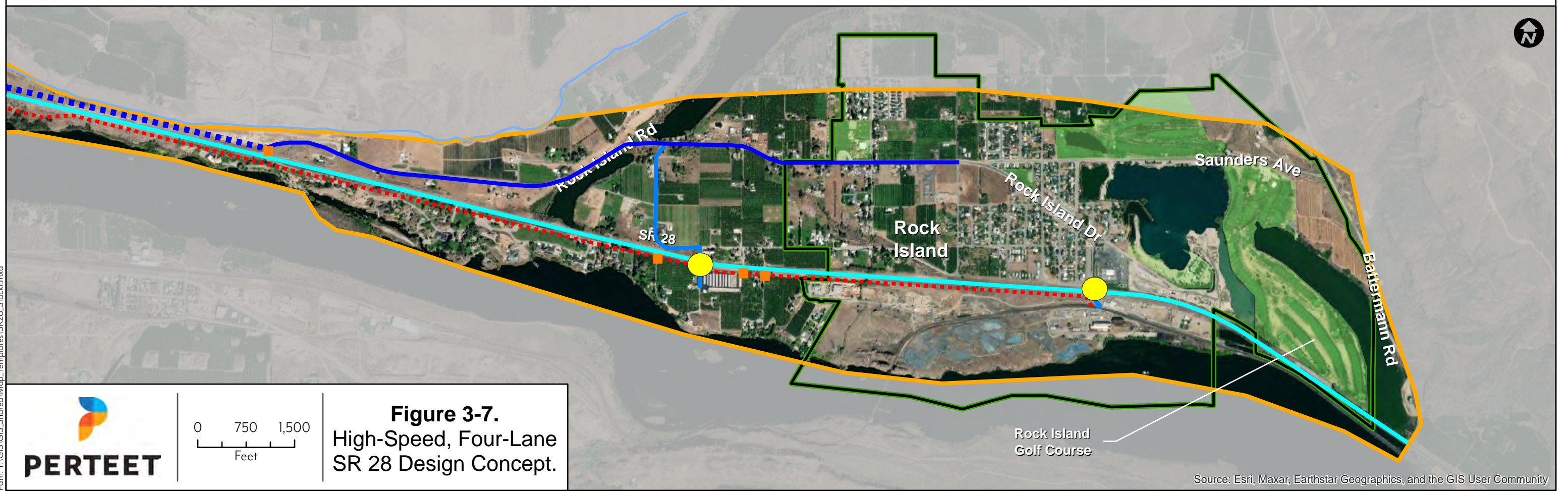
High-Speed, Four-Lane SR 28

The second design concept for SR 28 is focused on maintaining the existing high-speed operations of the highway with additional vehicle capacity through travel lane additions and safety performance enhancements similar to the other high-speed design concept. The concept would have a posted speed of 60 mph. The primary difference between the first two SR 28 design concepts is the number of lanes provided on the state route.

Figure 3-7 shows a summary exhibit of the proposed element for this design concept.



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

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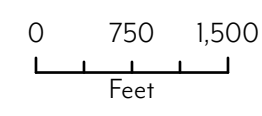


Figure 3-7.
High-Speed, Four-Lane
SR 28 Design Concept.

Source: Douglas County GIS; ESRI

The study team evaluated this design concept similar to the first design concept. See the discussions above for details on the analysis methodology.

Configuration

The general configuration for this design concept includes two travel lanes per direction for SR 28 with a concrete barrier dividing the two directions of travel to reduce opposing-direction crash likelihood and control access at most driveways and cross streets. This design concept includes an extension of the Apple Capital Loop Trail from its current terminus at Hydro Park to the Rock Island waterfront area. It also includes a revision to Rock Island Road through a connection between the west and east segments of that facility, which would create a continuous alternative vehicle, bicycle, and pedestrian route. SR 28 retains a typical posted speed limit of 60 mph with this design concept.

Typical SR 28 Cross Section

This four-lane design concept provides the same SR 28 typical section as the two-lane design concept in Figure 3-2, but with an additional 12-foot-wide drive lane in both directions of the state route. See Figure 3-8.

Under this high-speed, four-lane design concept, the Loop Trail is typically separated from the river-side SR 28 shoulder by a 12-foot-wide buffer. See Figure 3-9. As with the other high-speed design concept, this provides flexibility for the trail to follow an independent profile and, if needed, alignment.

This four-lane design concept does not assume frontage road installations to consolidate existing intersections or driveways. Those are discussed below as potential modifications to this design concept.

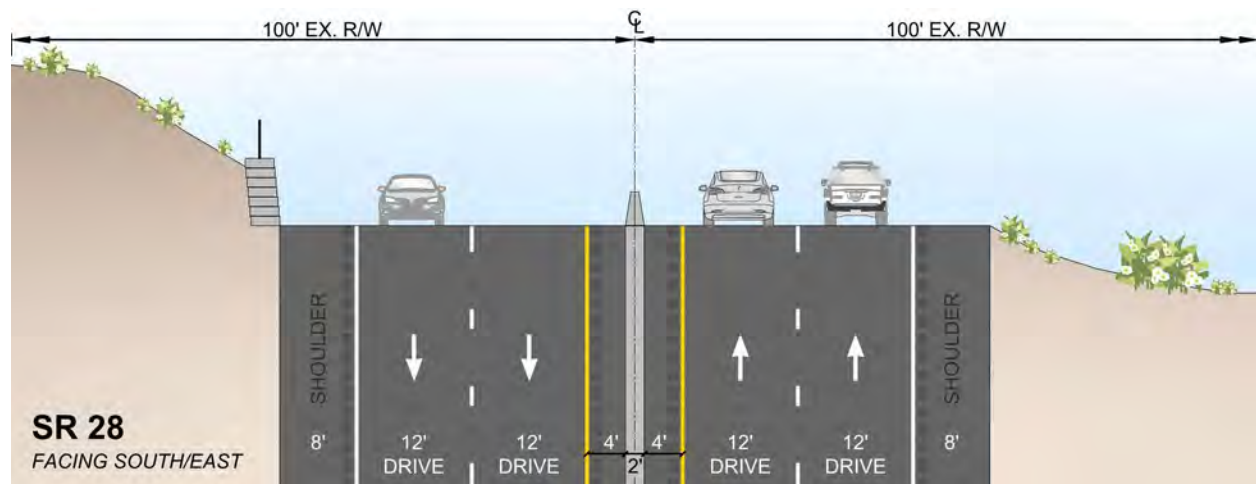


Figure 3-8. High-Speed, Four-Lane SR 28 Typical Section.

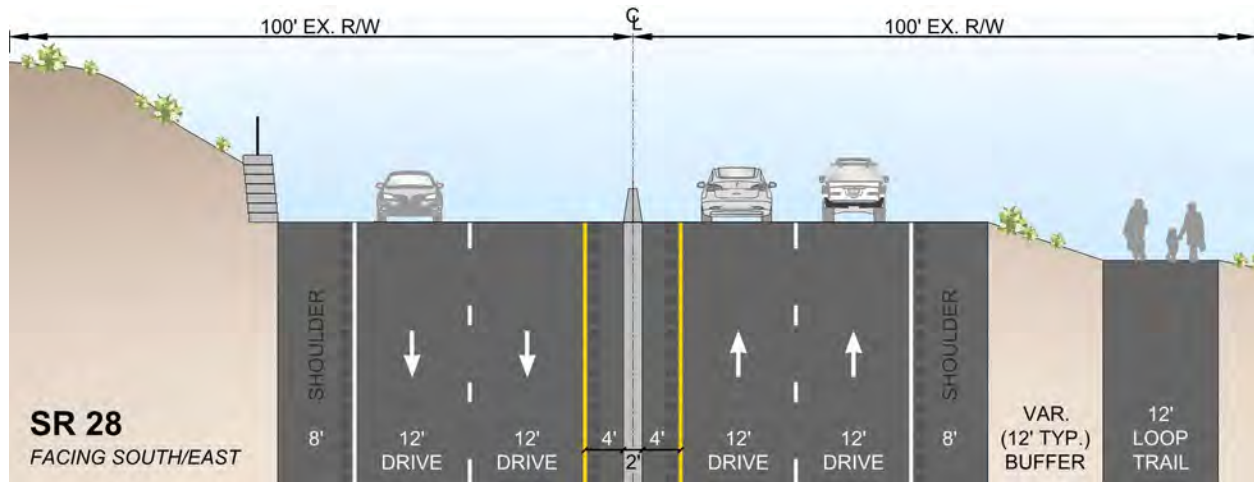


Figure 3-9. High-Speed, Four-Lane SR 28 Typical Section, Including Parallel Loop Trail.

SR 28 Access Changes

This design concept includes the same center barrier treatment included in the other high-speed design concept. This barrier forces most intersections along SR 28 to operate with RIRO permissions.

This four-lane design concept includes the upgraded and connected Rock Island Road corridor and removes the two existing SR 28 and Rock Island Road intersections. Otherwise, all other access that exists today is retained with this design concept.

Modifications to Other Roadways

This design concept includes the same modifications to Rock Island Road and the county roads between Rock Island Road and SR 28 as described with the first design concept, above. These elements provide the same benefit to operations in both design concepts.

Intersection Treatments

This design concept includes the same intersection modifications as the two-lane design concept, with the same locations for assumed roundabouts and turn pockets. Note that the roundabouts for this four-lane design concept are all assumed to be multi-lane roundabouts with two approach and departure lanes on the SR 28 legs and one approach and departure lane on cross streets. Therefore, these intersections have larger footprints in this design concept because of the extra circulating lane required.

Active Transportation Elements

The same pedestrian and bicycle facility elements are included in both high-speed design concepts, including the extended Loop Trail to Rock Island, typically within the SR 28 right-of-way. This leads to the same LTS evaluations for the continuous facilities in the first design concept.

There are differences, however, in the LTS results for the SR 28 crossings, because the number of lanes is larger in this design concept. This leads to two differences as compared to the two-lane results. First, roundabout crossings include two lanes per stage, which scores as LTS 2. Second, RRFB treatments are not recommended for consideration on high-speed corridors with multiple lanes per crossing stage, so that element is not shown in Table 3-5.

Table 3-5. High-Speed, Four-Lane SR 28 Level of Traffic Stress Summary.

Facility	PLTS	BLTS
Continuous Routes		
Apple Capital Loop Trail	2	1
Rock Island Road Sidewalks/Bicycle Lanes	3	3
SR 28 Crossing Types		
Roundabouts		2
Pedestrian Hybrid Beacons (PHBs)		1

Traffic and Safety Performance

Traffic Operations

Table 3-6 summarizes the CDTC TDM metric outputs for the four-lane design concept, using the same procedures and analysis described above for the first design concept.

Table 3-6. High-Speed, Four-Lane SR 28 Traffic Metrics.

Corridor	Travel Time (minutes)	Delay (minutes)	Max. v/c Ratio	Average Speed (mph)
SR 28	8.5	< 0.25	0.21	59
Rock Island Road	12.5	0.5	0.35	33
Battermann Road	8	< 0.25	0.17	47

Predicted Safety Performance

The four-lane design concept includes many of the safety-related elements included in the two-lane design concept, including reductions in number of access and conflict points. However, not as many access points are removed with this design concept, so the total reduction is 282 conflict points on SR 28, a 74% decrease compared to existing.

Table 3-7 shows the predicted safety performance of the four-lane design concept per the *Highway Safety Manual* methodology outlined above.

Table 3-7. High-Speed, Four-Lane Predicted Safety Metrics (crashes per year).

Element	All Crashes	Fatal/Serious Injury Subset
Segments (excluding intersections)		
SR 28: 3rd Street SE to Battermann Road	19.5	5.4
Battermann Road: SR 28 to Saunders Avenue	0.2	0.1
Rock Island Road Corridors	5.2	1.8
Intersections		
SR 28 at 3rd Street SE	1.3	0.4
Other SR 28 Intersections (combined)	6.8	2.7
Rock Island Road Intersections (combined; excluding with SR 28)	1.3	0.5
Other Intersections (combined)	0	0
Segment and Intersection Total	34.3	10.9

Environmental and Property Impacts

Environmental Impacts

This design concept may have larger environmental impacts than the two-lane design concept due to the more extensive corridor widening for SR 28, particularly in the laterally constrained areas between the lakes surrounding Rock Island and the Columbia River. The widening activity may require filling at the edges of Putters Lake and Hammond Lake, which would be subject to environmental review and assessment. Note that these lakes are also designated as wetlands.

Property Impacts

This design concept has right-of-way acquisitions in two general areas:

- At roundabout intersection corners
- Along the upgraded Rock Island Road corridor

The extent of property impacts due to roundabouts can be refined at future planning phases once each roundabout is further engineered. With this four-lane design concept, the roundabouts are larger than in the two-lane design concept, leading to increased right-of-way needs at intersection corners.

Strip right-of-way acquisitions are necessary along the Rock Island Road corridor to expand the roadway footprint, with impacts the same as required for the two-lane design concept.

Planning-Level Opinion of Cost

Table 3-8 summarizes a calculation of planning-level costs for the high-speed, four-lane SR 28 design concept, including the modifications to SR 28, Rock Island Road, and the other corridors in the study area as described above. The assumptions and notes for the planning-level costs listed above for the two-lane design concept also apply here.

Table 3-8. High-Speed, Four-Lane SR 28 Opinion-of-Cost Summary, by Phase (Millions).

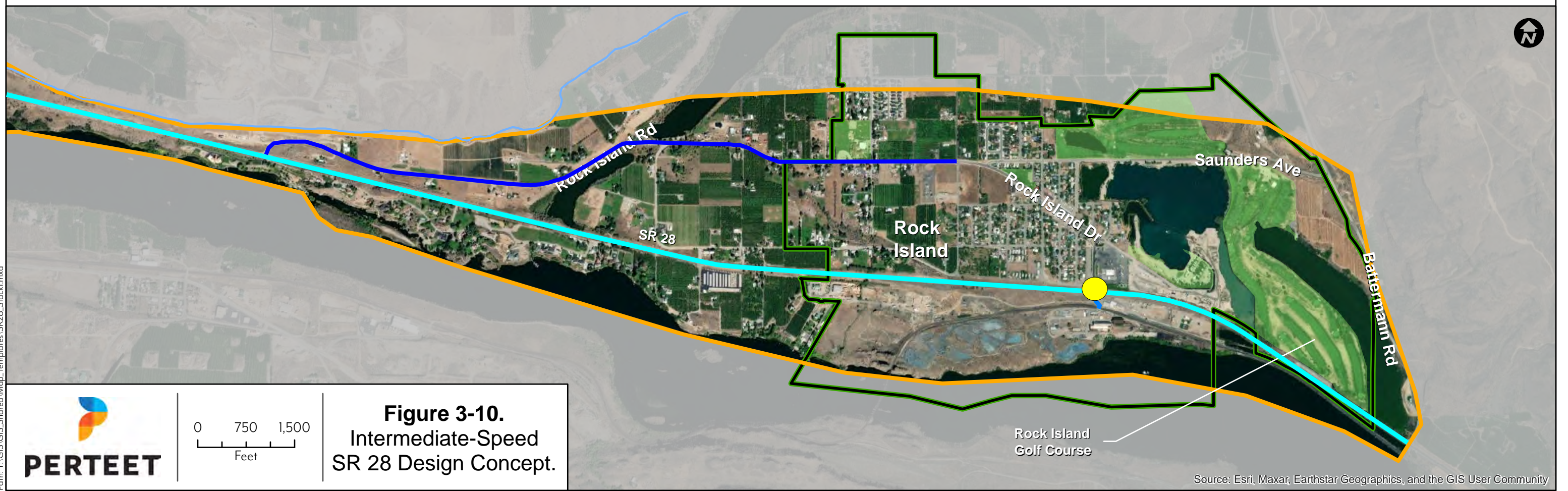
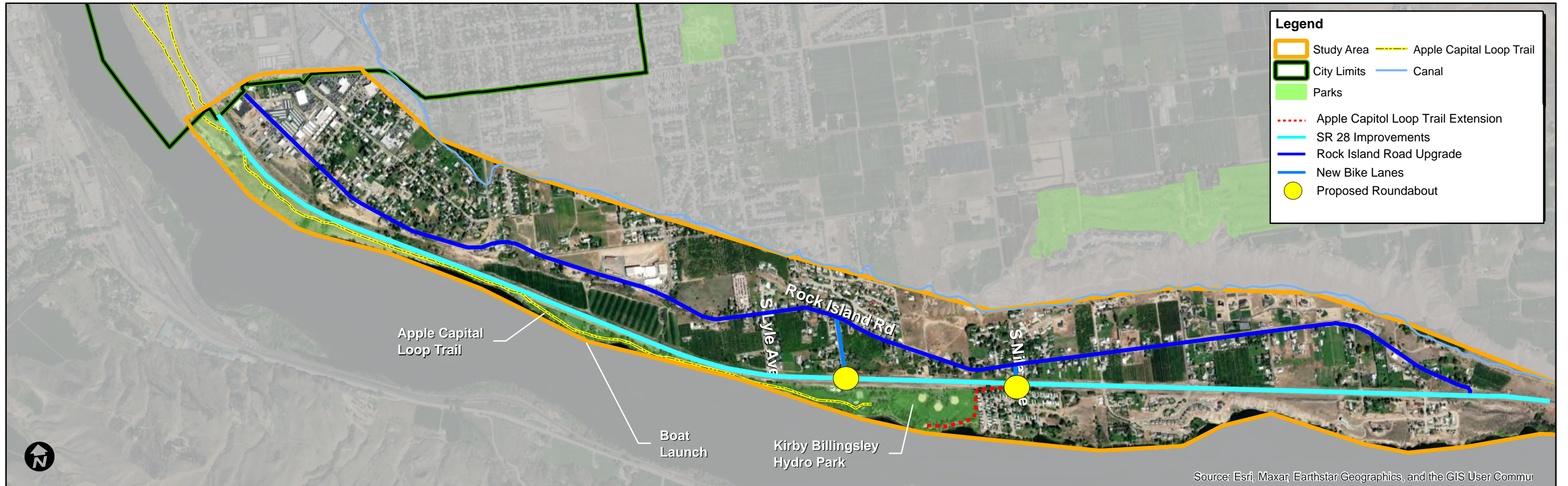
Design concept	SR 28	Loop Trail Extension	RIR Upgrade	RIR Connection	Total
High-speed, four-lane	\$258	\$19	\$98	\$29	\$385–445

Alternative Design Opportunities

The four-lane design concept may be able to include the S Mary Avenue undercrossing design or modified intersection controls, same as the two-lane design concept. Additionally, this four-lane design concept could include frontage roads to connect parcels on either the river side or land side of SR 28. As noted, the baseline concept for this design concept does not include any frontage roads.

Intermediate-Speed, Three-Lane SR 28

The third SR 28 design concept lowers the posted speed limit of the highway to 40 mph and adds a center turn lane with active transportation facilities along the corridor. See Figure 3-10 for a summary map.



Path: Y:\GIS\GIS_Shared\Map_Templates\SR28_Stock1.mxd

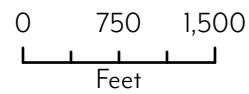


Figure 3-10.
Intermediate-Speed
SR 28 Design Concept.

Whereas the first two design concepts focus on high-speed traffic operations with safety changes via access control and consolidation, this three-lane design concept builds a multi-modal highway with full local access.

The study team used the same evaluation procedures for this design concept as the prior two. See the discussions above for details on the analysis methodology.

Configuration

The general configuration for this design concept includes one travel lane per direction for the majority of SR 28 within the study limits. A center turn lane is also included, which is channelized either as a two-way left-turn lane or a one-way left-turn lane depending on the location in the corridor and adjacent access points and spacing. Outside the general purpose lanes, each direction includes a shoulder, swale/landscape zone, and a trail/pathway. Between the east end of Hydro Park and Rock Island Drive, the pathway on the river side of SR 28 is the extension of the Loop Trail, so it is 12 feet wide. Elsewhere, the other paths are 8 feet wide.

Because SR 28 provides active transportation facilities in this design concept, one of the main benefits for a connected Rock Island Road corridor is reduced, and that connection is not included in this design concept. However, this intermediate-speed design concept does include upgrading Rock Island Road to the same standards shown in Figures 3-4 and 3-5 for the existing segments to provide multi-modal connectivity and network enhancements.

Typical SR 28 Cross Section

There are two typical SR 28 cross sections for the three-lane design concept, with the only difference between the two sections being the active transportation facility width and designation on the river side of the highway. Figure 3-11 shows the section that is used between the east end of Hydro Park and Rock Island Drive. This includes the Loop Trail as a parallel facility to the state route. Note that whereas the high-speed design concepts had a sizable buffer between the roadway and the Loop Trail, which allowed for potential profile or alignment deviations with the Loop Trail, the facility is connected to the profile of the highway under this intermediate-speed design concept.

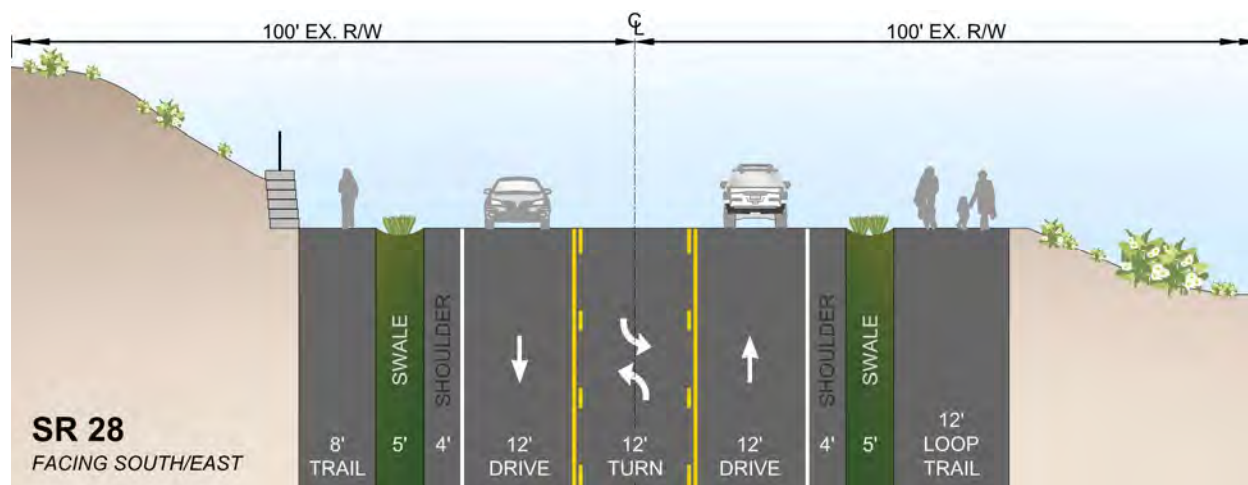


Figure 3-11. Intermediate-Speed, Three-Lane SR 28 Typical Section, South of Hydro Park.

Figure 3-12 shows the cross section for the remainder of the corridor, which provides an 8-foot-wide asphalt surface for pedestrian and potential bike uses on both sides of SR 28.

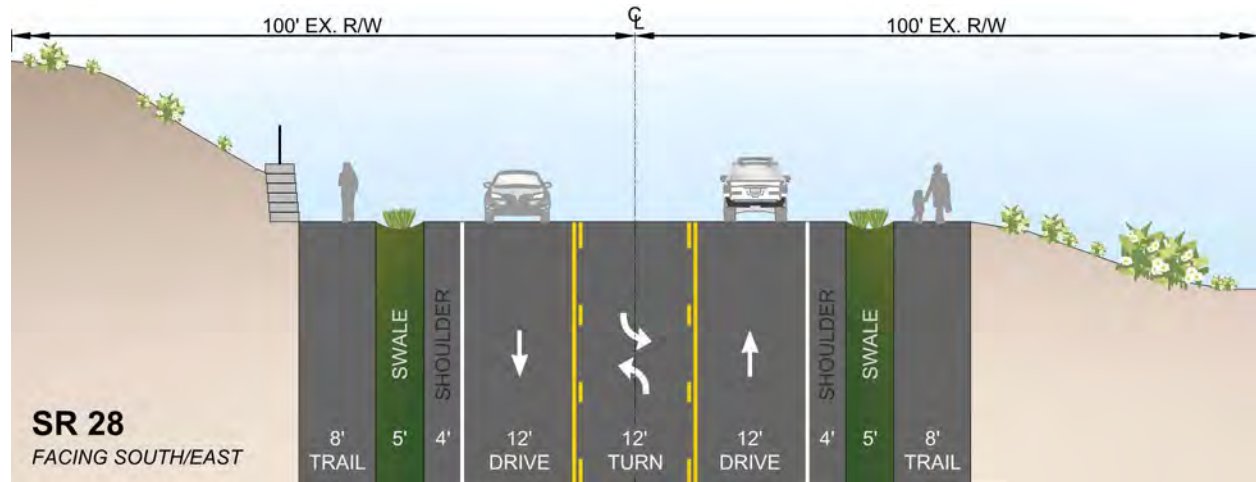


Figure 3-12. Intermediate-Speed, Three-Lane SR 28 Typical Section, North of Hydro Park.

SR 28 Access Changes

This design concept preserves existing access for all cross streets and driveways with SR 28. This includes allowing all turning movements at access points.

Modifications to Other Roadways

Like the high-speed design concepts, this intermediate-speed design concept upgrades the Rock Island Road segments to County standards, including sidewalks and bike lanes. However, unlike the other design concepts, this three-lane design concept preserves the existing disconnect in Rock Island Road.

This third design concept includes the new bike lanes along S Nile Avenue and S Union Avenue that are included in the other two corridor design concepts. This provides an improved bicycle network for users accessing the Loop Trail on the west side of SR 28.

Intersection Treatments

This design concept includes roundabouts at the following intersections:

- SR 28 at S Mary Avenue
- SR 28 at S Nile Avenue
- SR 28 at Rock Island Drive

All non-roundabout intersections operate with full access, with the center turn lane facilitating left-turn movements from a separate lane than the through traffic uses.

This design concept preserves the existing right-turn pockets at SR 28 and S Perry Avenue and at SR 28 and Battermann Road. Plus, this design concept adds new eastbound right-turn pockets at the boat launch driveway and at Nature Shores Drive as well as a new eastbound left-turn pocket at Battermann Road for safety enhancements.

Active Transportation Elements

The study area includes two continuous pedestrian and bicycle corridors under this design concept. First, the extended Apple Capital Loop Trail, which performs with the same LTS as the other design concepts. Second, the asphalt pathways adjacent to SR 28. These two facilities have the same LTS evaluations of PLTS 2 and BLTS 1. While the Rock Island Road upgrades lead to the same PLTS and BLTS 3 scores as in the other design concepts along that route, the Rock Island Road corridor is discontinuous in this three-lane design concept and therefore will likely not support as much regional active transportation use.

Table 3-9. Intermediate-Speed, Three-Lane SR 28 Level of Traffic Stress Summary.

Facility	PLTS	BLTS
Continuous Routes		
Apple Capital Loop Trail	2	1
SR 28 Pathways	2	1
SR 28 Crossing Types		
Roundabouts	1 or 2	
Rectangular Rapid Flashing Beacons (RRFBs)	2	
Pedestrian Hybrid Beacons (PHBs)	1	

Traffic and Safety Performance

Traffic Operations

Table 3-10 summarizes the CDTC TDM metric outputs for the third design concept, using the same procedures and analysis described for the other design concepts. Note that Table 3-3 does not include values for the Rock Island Road corridor since that facility is not connected in this design concept configuration.

Table 3-10. Intermediate-Speed, Three-Lane SR 28 Traffic Metrics.

Corridor	Travel Time (minutes)	Delay (minutes)	Max. v/c Ratio	Average Speed (mph)
SR 28	18	6.5	0.96	27
Rock Island Road	n/a	n/a	n/a	n/a
Battermann Road	10	0.5	0.47	45

Predicted Safety Performance

This design concept is predicted to have safety performance improvements compared to existing operations due to new roundabouts and otherwise moving left-turn movements to separate lanes. The addition of a center lane on SR 28 also increases the lateral distance between most opposing direction movements, which reduces head-on crash likelihood on the highway segments.

Because all intersections remain open and all turns are permitted under this design concept, the reduction in conflict points is less than for the other two design concepts at 107 fewer points than existing, a 28% reduction.

Table 3-11 shows the predicted safety performance of the intermediate-speed design concept per the *Highway Safety Manual* methodology outlined above.

Table 3-11. Intermediate-Speed, Three-Lane SR 28 Predicted Safety Metrics (crashes per year).

Element	All Crashes	Fatal/Serious Injury Subset
Segments (excluding intersections)		
SR 28: 3rd Street SE to Battermann Road	26.6	7.2
Battermann Road: SR 28 to Saunders Avenue	0.2	0.1
Rock Island Road Corridors	5.2	1.8
Intersections		
SR 28 at 3rd Street SE	1.3	0.4
Other SR 28 Intersections (combined)	7.0	3.1
Rock Island Road Intersections (combined; excluding with SR 28)	1.3	0.5
Other Intersections (combined)	0	0
Segment and Intersection Total	41.6	13.1

Environmental and Property Impacts

Environmental Impacts

Similar to the four-lane design concept, this three-lane design concept includes widening SR 28 in the constrained areas near Putters Lake and Hammond Lake. This activity may require filling at the edges of these lakes, triggering environmental reviews and assessments of those actions.

Property Impacts

This design concept has right of way acquisitions in two general areas:

- At roundabout intersection corners
- Along the upgraded Rock Island Road corridor

The extent of property impacts due to roundabouts can be refined at future planning phases once each roundabout is further engineered. The roundabouts in the two- and three-lane design concepts are of similar size and have similar impacts.

Strip right-of-way acquisitions are necessary along the Rock Island Road corridor to expand the roadway footprint, with impacts similar to the other two design concepts.

Planning-Level Opinion of Cost

Table 3-12 summarizes a calculation of planning-level costs for the intermediate-speed design concept, including the modifications to SR 28, Rock Island Road, and the other corridors in the study area as described above. The assumptions and notes for the planning-level costs with the high-speed design concepts are also applicable here.

Table 3-12. Intermediate-Speed, Three-Lane SR 28 Opinion-of-Cost Summary, by Phase (Millions).

Design concept	SR 28	Loop Trail Extension	RIR Upgrade	RIR Connection	Total
Intermediate-speed, three-lane	\$183	Included in SR 28 cost	\$98	Not applicable	\$265–310

Alternative Design Opportunities

The intermediate-speed design concept may be able to include the S Mary Avenue undercrossing design or modified intersection controls, same as the other two design concepts. Additionally, this design concept could include frontage roads to connect parcels on either the west side or east side of SR 28. As noted, the baseline concept for this design concept does not include any frontage roads.

Design Concept Comparison

Table 3-13 presents a comparison between the three alternative design concepts under study for the SR 28 corridor between East Wenatchee and Rock Island. This information builds upon Perteet's analysis of needs, corridor concepts, and opinions of cost. The table includes relevant areas of comparison between each design concept, including configuration elements, anticipated safety performance, traffic operations metrics, active transportation facilities, and other factors.

Table 3-13. Design Concept Comparison Table.

Element	High-Speed, Two-Lane SR 28	High-Speed, Four-Lane SR 28	Intermediate-Speed, Three-Lane SR 28
Typical Configuration			
SR 28 vehicle lanes	One lane per direction	Two lanes per direction	One lane per direction with continuous center turn lane
Loop Trail location (extension south of Hydro Park)	Generally follows SR 28 alignment on west side of highway south of S Nile Avenue, with some deviation	Generally follows SR 28 alignment on west side of highway south of S Nile Avenue, with some deviation	Follows SR 28 alignment on west side of highway
Rock Island Road connection	Included	Included	Not included
SR 28 non-motorized facilities	River side: Loop Trail extension east of Hydro Park	River side: Loop Trail extension east of Hydro Park	Land side: sidewalk River side: Loop Trail extension east of Hydro Park
Posted speed limit	60 miles per hour	60 mph	40 mph
Safety and Access			
General predicted crash rate	30.1 crashes per year	34.3	41.6
General rate compared to existing	34% reduction	24% reduction	8.4% reduction
Injury/fatal predicted crash rate	9.0 crashes per year	10.9	13.1
Injury/fatal rate compared to existing	39% reduction	26% reduction	11% reduction
General access classification	Partial Control Limited Access	Partial Control Limited Access	Partial Control Limited Access
Access control devices	Concrete jersey barrier or median	Concrete jersey barrier or median	None
Property access changes compared to existing	Consolidate some existing driveway access points to nearby intersection locations via frontage roads	None	None
Changes in number of intersections/accesses compared to existing	6 fewer	2 fewer	No change

Element	High-Speed, Two-Lane SR 28	High-Speed, Four-Lane SR 28	Intermediate-Speed, Three-Lane SR 28
Preliminary SR 28 intersection changes	Five new roundabouts Left-turn restrictions at stop-controlled intersections Closure of SR 28 and Rock Island Road intersections	Five new roundabouts Left-turn restrictions at stop-controlled intersections Closure of SR 28 and Rock Island Road intersections	Three new roundabouts
SR 28 conflict point changes compared to existing	288 fewer (75% reduction)	282 fewer (74% reduction)	107 fewer (28% reduction)
Vehicle Mobility³			
Corridor travel time	SR 28: 9.5 minutes RIR: 12.5 minutes Battermann Road: 8 minutes	SR 28: 8.5 minutes RIR: 12.5 minutes Battermann Road: 8 minutes	SR 28: 18 minutes Battermann Road: 10 minutes
Average speed	SR 28: 53 mph RIR: 33 mph Battermann Road: 47 mph	SR 28: 59 mph RIR: 33 mph Battermann Road: 47 mph	SR 28: 27 mph Battermann Road: 45 mph
Maximum volume/capacity ratio	SR 28: 0.83 RIR: 0.40 Battermann Road: 0.28	SR 28: 0.21 RIR: 0.35 Battermann Road: 0.17	SR 28: 0.96 Battermann Road: 0.47
Delay (time difference between congested and free-flow trips)	SR 28: 1 minute RIR: 0.5 minutes Battermann Road: < 0.25 minutes	SR 28: < 0.25 minutes RIR: 0.5 minutes Battermann Road: < 0.25 minutes	SR 28: 6.5 minutes Battermann Road: 0.5 minutes
Property access changes compared to existing	Consolidate some existing driveway access points to nearby intersection locations via frontage roads	None	None
Preliminary SR 28 intersection changes	Five new roundabouts Left-turn restrictions at stop-controlled intersections Closure of SR 28 and Rock Island Road intersections	Five new roundabouts Left-turn restrictions at stop-controlled intersections Closure of SR 28 and Rock Island Road intersections	Three new roundabouts
Ped/Bike Mobility			

³ Vehicle mobility metrics are for westbound/northbound travel and based on the following extents: SR 28 between Battermann Road and 3rd Street SE, Rock Island Road between Douglas Street and 3rd Street SE, and Battermann Road (including 4th Street SE, Vanwell Street, and Grant Road) between SR 28 and S Union Avenue.

Element	High-Speed, Two-Lane SR 28	High-Speed, Four-Lane SR 28	Intermediate-Speed, Three-Lane SR 28
Continuous routes between East Wenatchee and Rock Island	Loop Trail Rock Island Road sidewalks	Loop Trail Rock Island Road sidewalks	Loop Trail SR 28 paths
Level of traffic stress for continuous routes	Loop Trail: PLTS 2, BLTS 1 RIR sidewalks: PLTS 3 RIR bicycle lanes: BLTS 3	Loop Trail: PLTS 2, BLTS 1 RIR sidewalks: PLTS 3 RIR bicycle lanes: BLTS 3	Loop Trail: PLTS 2, BLTS 1 SR 28 paths: PLTS 2, BLTS 1
SR 28 crossing opportunities; control devices	Each roundabout (except at Boat Launch intersection); consider RRFB or PHB treatments at roundabouts or elsewhere	Each roundabout (except at Boat Launch intersection); consider PHB treatment at roundabouts or elsewhere	Each roundabout; consider RRFB or PHB treatments at roundabouts or elsewhere
LTS for SR 28 crossings	Roundabouts: LTS 1 or 2 RRFBs: LTS 2 PHBs: LTS 1	Roundabouts: LTS 2 PHBs: LTS 1	Roundabouts: LTS 1 or 2 RRFBs: LTS 2 PHBs: LTS 1
Other			
Environmental impacts	Potential filling of some of Putters Lake and Hammond Lake east of Rock Island to facilitate roadway widening	Potential filling of some of Putters Lake and Hammond Lake east of Rock Island to facilitate roadway widening	Potential filling of some of Putters Lake and Hammond Lake east of Rock Island to facilitate roadway widening
Right-of-way impacts	At corners of roundabout intersections For frontage roads in some locations For Rock Island Road connection	At corners of roundabout intersections For Rock Island Road connection	At corners of roundabout intersections
Development opportunities	Adjacent to new frontage roads parallel to SR 28	At existing driveway and intersection connections to SR 28	At existing driveway and intersection connections to SR 28
Transit routing	Link Transit could shift to connected RIR	Link Transit could shift to connected RIR	Route to be maintained via RIR and SR 28
Transit connections	Sidewalks provided on RIR provide first/last mile connection; score at PLTS 3	Sidewalks provided on RIR provide first/last mile connection; score at PLTS 3	Sidewalks provided on RIR provide first/last mile connection; score at PLTS 3
Opinion of project cost (Assume 2029 midpoint of construction)	SR 28: \$140 million Loop Trail extension: \$19 million RIR upgrade: \$98 million RIR connection: \$29 million Total: \$270–315 million	SR 28: \$258 million Loop Trail extension: \$19 million RIR upgrade: \$98 million RIR connection: \$29 million Total: \$385–445 million	SR 28: \$183 million Loop Trail extension: included above RIR upgrade: \$98 million RIR connection: not applicable Total: \$265–310 million

4 COMMUNITY ENGAGEMENT

Understanding community observations, concerns, and desires for travel within the corridor study area was a key element of this SR 28 study. To assess those areas, the project team built a community engagement program to learn about current user experiences, opportunities for improvement, and feedback on concepts throughout the study.

The community engagement program for this study included multiple elements in a variety of formats, aimed at encouraging participation and removing barriers to access. The project team sought input from local residents in the East Wenatchee and Rock Island areas as well as feedback from commuters or other users of the SR 28 corridor. This chapter details the community engagement program and feedback the project team received during the process.

The study team used the following outreach tools, platforms, and events for this study:

- Flyers
- News publications
- Agency social media posts
- Project website with information and interactive elements
- Virtual (online) office hours
- In-person community events
- Individual stakeholder interviews

Perteet and CDTC recognized the importance of receiving feedback from all corridor users, including the Spanish-speaking community. Therefore, all written materials were produced with both Spanish and English text and translation services were available at most in-person or virtual events.

Outreach Opportunities

Notifications

Perteet developed notification materials and collaborated with the stakeholder advisory group (see Chapter 5) to publish messages from agency platforms. The intent of notifications was to provide information about the SR 28 study as well as provide details regarding opportunities to provide feedback.

Flyers

The project team utilized the graphics created for social media posts and printed the information as project flyers. The team coordinated with Chelan County PUD to hang flyers at Hydro Park in the study area, and they also hung flyers at several local Rock Island and East Wenatchee businesses such as BJ's Shell and Safeway.

News Publications

One local news outlet for the Wenatchee Valley area published a story about the SR 28 study and ongoing planning efforts. On August 10, 2021, the Wenatchee World published the article "Residents

pinpoint safety, mobility issues in Highway 28 study.” The article linked to the project website and cited members of the Perteet, CDTC, and stakeholder groups as contacts for additional information.

Social Media Posts

Three partner agencies—WSDOT, Douglas County, and City of East Wenatchee—posted about the study using their agency Facebook pages, as well as the City of Wenatchee. Figure 4-1 shows one of the East Wenatchee posts. Images of other posts are available in Appendix G.



Figure 4-1. City of East Wenatchee June 18, 2021 Facebook Post (English Version).

WSDOT Variable Message Sign

Perteet coordinated with the WSDOT traffic and maintenance office to place variable message signs (VMS) on SR 28 in eastbound and westbound directions between East Wenatchee and Rock Island. The message displays on each VMS directed viewers to the study website. The project team saw a significant bump in visitor traffic in the first week that the VMSs were in place.

Project Website

Perteet developed a robust project website. The site included two primary pages of information: “about the study” and “what’s next,” both of which informed visitors of scope and intent of the planning work as well as the schedule for the project, and an interactive mapping and commenting tool. As noted above, users could access either the Spanish or English version of the website. All notification materials advertised the website and the project team was able to track increased usage after each notification.

Interactive Map

The interactive map for the website is shown in Figure 4-2.

Within this map, users could accomplish a variety of activities. First, users could view the full extents of the study area and zoom in or out on an aerial background using GIS functionality. This provided a strong sense of place for those less familiar with the project extents. Second, any user could add personal comments at a specific location along the SR 28 corridor or other roadways within the study area. Comments were classified into four buckets: pedestrian and bicycle, safety, traffic, and other. Each classification used a unique color and symbol to easily distinguish between feedback areas. Figure 4-2 illustrates that most comments were placed along the state route, but some are mapped on other roadways or at land uses such as Hydro Park. Third, visitors of the site were able to interact with other comments placed by other users either by hitting a “like” or “dislike” button. This reduced the number of repetitive comments and allowed all voices to respond to suggestions by others by showing support or disagreement, respectively, for a concept or concern.

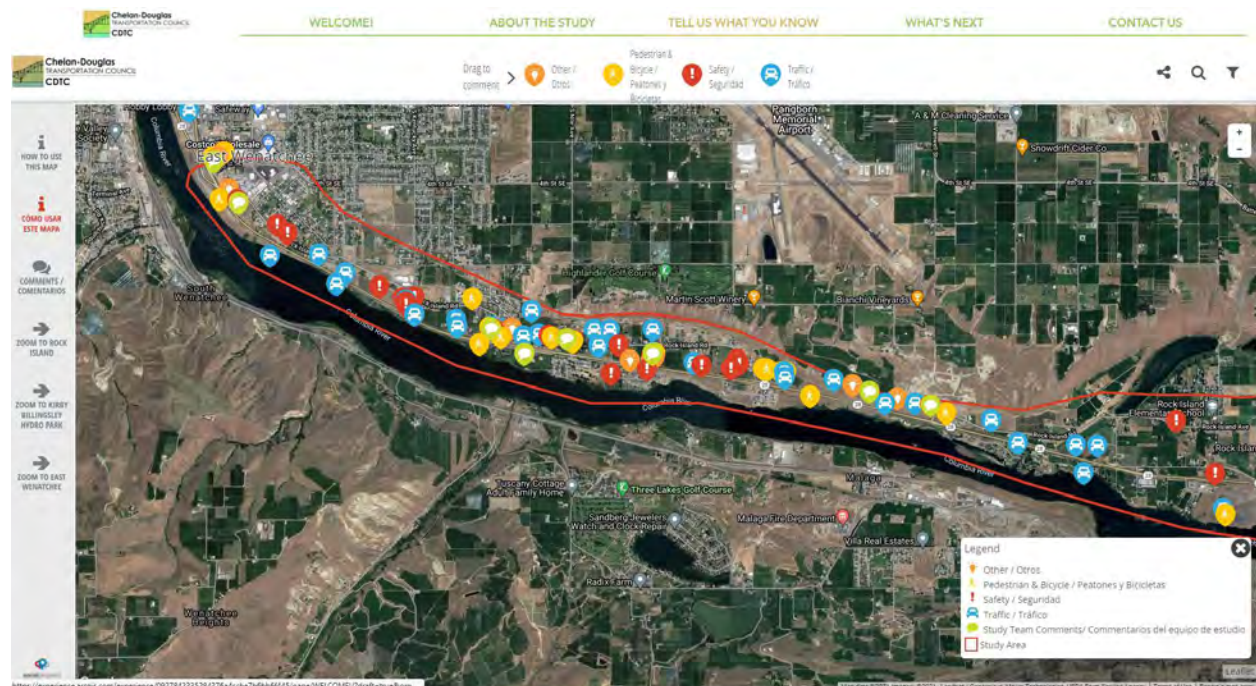


Figure 4-2. Interactive Map and Commenting Tool (English Version).

This mapping feature was very helpful in understanding public thoughts on the existing study area configuration and operations as well as understand some opportunities for change. In total, users added 120 comments on this map during the life of the study and visitors made over 1,800 like or dislike reactions to those comments. The comments and the number of likes/dislikes are shown in Appendix H.

Figure 4-3 is a summary chart of each comment category. Perteet sorted the comments by several major categories, and, as needed extracted multiple categories of feedback from a comment. This figure illustrates not only which categories received the most comments throughout the entire study area, but also which garnered the most “up votes” (likes) and “down votes” (dislikes) by other users.

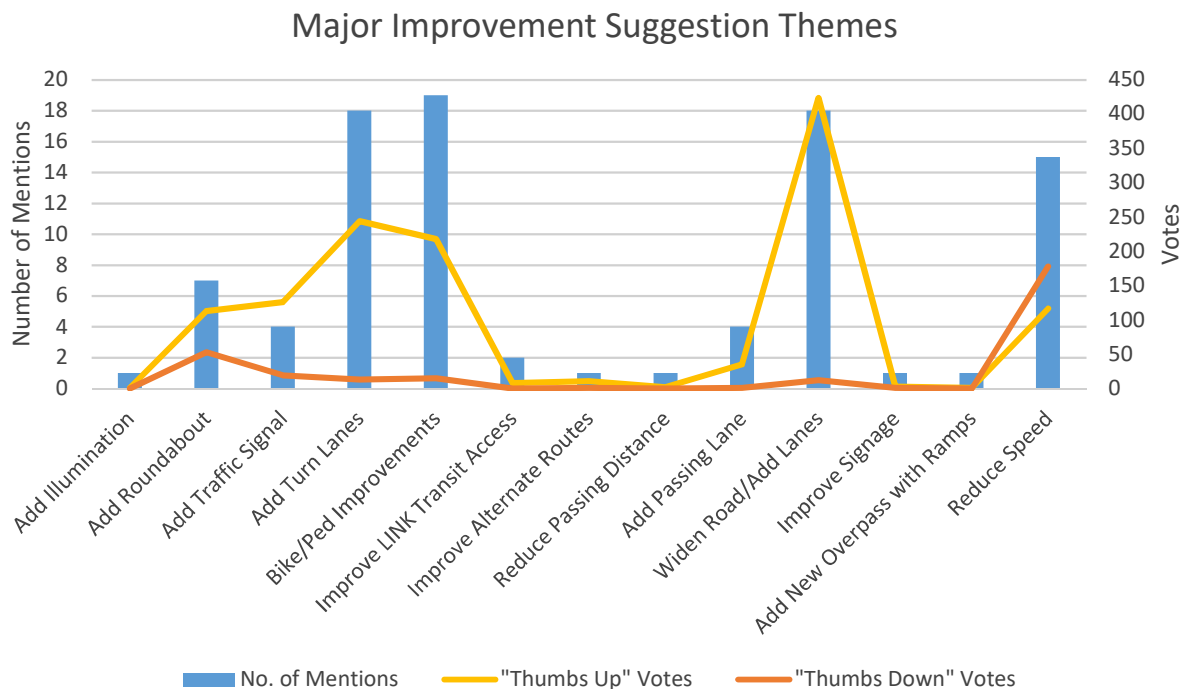


Figure 4-3. Summary of Website Feedback by Theme.

Community Meetings and Events

Virtual Office Hours

Perteet and CDTC hosted two drop-in sessions for members of the public to join a video conference with the project leads in June 2021. They held separate English and Spanish office hours. While no public attendees joined the Spanish session, two individuals attended the English session: a local city council member and a local bus driver. The attendees raised thoughts and concerns surrounding intersection treatments, local access, safety, transit efficiency, travel speed, and active transportation needs.

Un Buen Consejo

Perteet and CDTC staff were invited by Dr. Jorge Chacon with the Community for the Advancement of Family Education (CAFÉ) to present at the July 28, 2021 “Un Buen Consejo” Facebook live event. Jennifer Saugen and Riley Shewak attended and shared information regarding CDTC’s presence in the community and the desire for engagement with the Spanish-speaking community. They also presented information on the ongoing SR 28 Study and directed viewers to the project website.

CAFÉ

Perteet attended a local CAFÉ event at their 766 South Mission Street location in Wenatchee on August 3, 2021. The event was a pre-planned event for the South Wenatchee Community and centered on a vaccine clinic; however, it was also planned as a community event with music, food, games, and outdoor booths. Perteet and CDTC provided a booth specifically to share information on the SR 28 corridor and seek feedback regarding concerns from those who traveled in the study area for work or recreation. Perteet used a roll plot of the study area to allow attendees to point out concerns, as well as feedback forms stating their concerns. Figure 4-4 is a pair of display boards that Perteet had at the booth to promote interest in the study.



Figure 4-4. Event Display Boards.



Figure 4-5. Perteet Project Manager, Jennifer Saugen, Documenting Feedback.

Stakeholder Individual Interviews

Perteet and CDTC conducted interviews with three commuters who use the corridor primarily to connect between Wenatchee and the Crescent Bar area, south of the study limits. Perteet and CDTC also spoke to one interviewee who also uses the SR 28 corridor to reach the sports fields at Hydro Park on a regular basis. Three of these four respondents noted a significant amount of traffic on SR 28, including at early and late hours of the day—either before 6 AM or after 6 PM. All four commuters noted safety concerns in the corridor, including at the SR 28 and Rock Island Drive intersection and in general with passing activities when drivers are queued behind larger trucks. Two interviewees suggested adding passing lanes or widening SR 28, while the other two suggested roundabout treatments to improve select intersections.

Perteet and CDTC also spoke with a leader in Douglas County Fire District 2 (DCFD2). The representative from DCFD2 said that the primary concern from an emergency services perspective was improving safety for all users. They stated that many collisions that the department responds to within the study area are higher in severity due to high speeds on the highway conflicting with side street traffic, pedestrians, or crossover collisions. The representative also said that DCFD2 typically responds to incidents via the fastest route, which is currently SR 28. They stated that internal County and City roadways are generally slower for emergency vehicles to traverse between East Wenatchee and Rock

Island, and some portions of Rock Island Road have poor sight distance and narrow lanes. They did not state any specific mobility concerns.

The final stakeholder interview was with a representative of the Chelan-Douglas Regional Port Authority. This representative listed the general goals from a freight perspective for SR 28 are to eliminate delays and focus the corridor on through trips, instead of local trips. The Port stated safety concerns on SR 28 related to head-on crashes and access movements from side streets and driveways, and potentially lack of illumination as well. This representative noted that trips may increase significantly from Rock Island as the Wenatchee Valley sees economic growth and that the Battermann Road intersection may need corresponding improvements.

The “Stakeholder Interview Guide” that the study team created to lead the stakeholder conversations is located in Appendix G.

5 STAKEHOLDER ADVISORY GROUP (SAG) COORDINATION

Throughout the study, CDTC and Perteet facilitated discussions with several stakeholder advisors, which included local agency representatives as well as a few private citizens. Building a coalition of local support will be important for implementing any SR 28 redevelopment design concept.

Group Composition

Table 5-1 lists the SAG members.

Table 5-1. SAG Representation.

Agency/Group	Name
WSDOT North Central Region (NCR)	George Mazur
Link Transit	Richard DeRock
City of Rock Island	Randy Agnew
Douglas County	Aaron Simmons
City of East Wenatchee	Tom Wachholder
Chelan County Public Utility District (PUD)	Matt Shales
Washington State Patrol (WSP)	Kelly Gregerson
Rock Island business owner	Kurt Davis
Study area resident	Cassidy Cue
Complete the Loop Coalition	Mike Sorensen

Meeting Summaries

Meeting materials from all five SAG discussions are included in Appendix I. The following sections provide a brief overview of the topics from each meeting.

Meeting #1: Kickoff

The SAG kickoff meeting occurred on March 24, 2021. This first meeting included the following agenda topics:

- Introductions
- Study overview and work tasks, schedule, and public engagement
- Project resources
- Round robin (individual feedback from stakeholder advisors)
- Next steps

This kickoff meeting set the table for future discussions with this group of local stakeholders. Perteet shared the goals and process for the study and then opened the discussion for attendees to provide individual feedback, which is included in the Appendix I meeting notes.

Meeting #2

The group covered the following topics at this meeting on May 12, 2021:

- Stakeholder outreach
- Traffic analysis review
- Corridor priorities
- Upcoming consultant tasks
- Next steps for SAG

Pereteet shared results from several individual stakeholder interviews, including multiple individual corridor users and two agency representatives. Regarding traffic analysis, Pereteet explained that the basis for future assessments is the 2045 PM peak hour CDTC travel demand model, which shows significant growth—between 50% and 80% in certain locations—compared to existing volumes. Pereteet also focused on safety for the corridor and presented a graphic of the current crash rates compared to average crash rates.

To gain a better understanding of the SAG priorities for the SR 28 corridor, Pereteet used an online, real-time poll during Meeting #2 to gauge attendee’s opinions related to alternate routes, safety, long-term corridor needs, benefits, and modal priorities. These poll results are included in Appendix I for review.

Meeting #3

The third SAG meeting, on June 24, 2021, covered the following:

- Stakeholder outreach update
- Needs analysis review
- Concept discussion
- Concept measures of effectiveness
- Next steps

At this stage in the public engagement effort, 250 users had viewed the project website and produced a total of 44 comments. Pereteet updated the SAG on upcoming plans for additional engagement, both in person and via local media spotlights. For the needs evaluation, the discussions centered on potential safety-related roadway treatments and the concept of level of traffic stress. The group then reviewed the general SR 28 corridor design concepts by examining section views of each one before homing in on measures of effectiveness (MOEs) that may be relevant in the ultimate decision-making process.

Meeting #4

The fourth SAG meeting occurred on August 18, 2021 and had the following agenda:

- Stakeholder outreach update
- Corridor concepts review
- Concept benefits and challenges
- Next steps

Perteet shared engagement metrics from the online project website as well as other public outreach methods, including in-person events and local media publications. Then Perteet led a discussion of the three SR 28 corridor design concept, including the tradeoffs between safety, access, mobility, active transportation, and other factors with each design concept.

Meeting #5

The final SAG meeting was on October 7, 2021. The group covered the following agenda topics:

- Stakeholder outreach update
- Review of public comments and themes
- Corridor concepts final changes, opinions of cost
- Corridor comparison table
- Next steps for study

This final stakeholder advisory meeting wrapped up multiple discussions from prior meetings, including a final review of public comments received via the online portal and in person engagements. Similarly, the design team shared the finalized (for this planning study) design concepts and the planning-level opinions of costs reflected in the prior chapter. The design team also presented the comparison table (see Table 1 or Table 3-13 in this report) and previewed the next phase for this study, which includes evaluating additional segments of SR 28 further east and presenting findings to the CDTC Board.

6 SR 28/SR 281 ROCK ISLAND TO I-90 OPINIONS OF COST

South and east of Rock Island, SR 28 typically has one travel lane per direction with segments of passing lanes to provide enhanced mobility. Within Quincy, SR 28 contains both two- and five-lane segments. Similarly, SR 281 extending south from Quincy has either two or five lanes within City Limits and has one travel lane in each direction south of the City.

The costs described in this chapter reflect the effort required to widen the full SR 28/281 corridor from Battermann Road near Rock Island to I-90 via Quincy. Figure 6-1 shows the typical section for the widening work. This section view is identical to the high-speed, four-lane section from the East Wenatchee–Rock Island study, with the exception of the right-of-way limits being right-sized to the widening need.

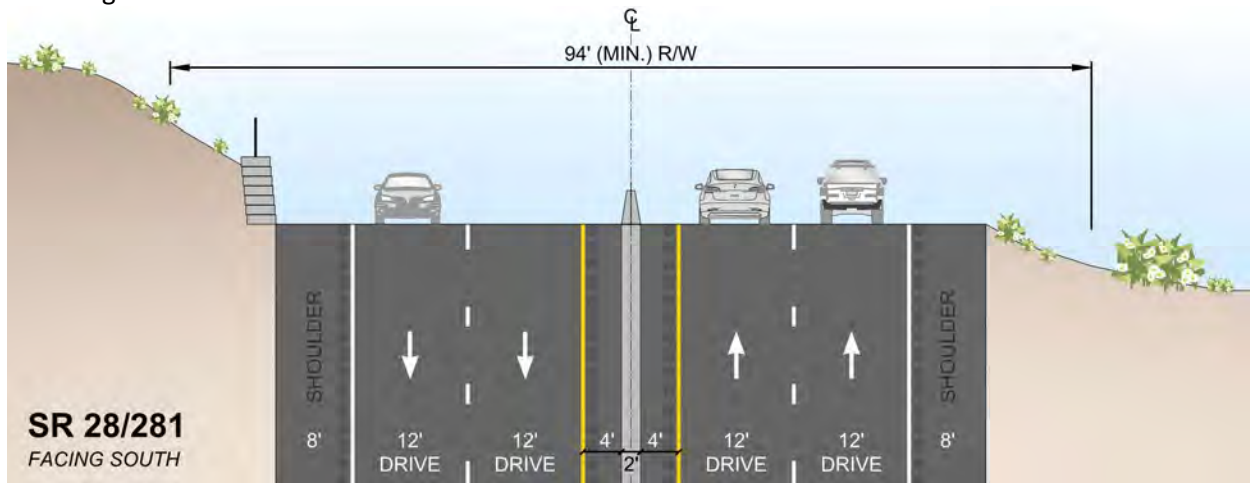


Figure 6-1. SR 28/281 Rock Island to I-90 Typical Section.

In addition to the general widening costs along the alignment, the SR 28 and SR 281 Rock Island to I-90 estimates include the following items:

- New roundabout at SR 28 MP 22.31 (Crescent Bar Road/Baird Springs Road intersection)
- Widened (to dual lane) roundabouts at SR 28 MP 25.73 (White Trail Road intersection) and MP 28.73 (13th Avenue SW intersection)
- Rebuilt railroad bridge at SR 28 MP 22.06
- Upgraded irrigation canal crossing on SR 281 south of N Street SW
- New roundabout at SR 281 MP 2.65 (SR 281 Spur intersection)
- Upgraded ramps with roundabout intersections at I-90 and SR 281 interchange

The full list of estimating assumptions used to generate planning-level opinions of cost are included in Appendix J. The estimates for these segments follow many of the same assumptions as the SR 28 East Wenatchee–Rock Island study. This includes that all costs presented include inflation for design in 2025, ROW acquisition in 2027, and construction in 2029. If any phase occurs earlier, then anticipated costs would be reduced due to inflation savings. Conversely, if any phase occurs later, then anticipated costs will likely be higher due to additional applications of inflation over time.

Table 6-1 presents the summary of the planning-level opinions of cost for the two corridors, including the additional projects listed above along each corridor. Appendix K contains the full estimates.

Table 6-1. SR 28/281 Rock Island to I-90 Opinion-of-Cost Summary (Millions).

Corridor	Total
SR 28, Rock Island to Quincy	\$750–865 million
SR 281, Quincy to I-90	\$330–380 million

7 MARKET ANALYSIS SUMMARY

Leland Consulting Group (LCG) was engaged to help the project team and CDTC understand how regional growth and development will impact the specific corridor study area. The focus of LCG's economic analysis was the Wenatchee Valley urbanized area and areas within greater Quincy and Grant County. LCG's economic analysis memorandum is attached as Appendix L, which covers the following:

- Provides an overview of the jobs to housing balance between Grant County and Chelan-Douglas counties to characterize interregional commute patterns,
- Identifies future land use opportunities that may respond to potential transportation changes and other infrastructure investments,
- Describes the growth opportunities within the corridor and region more broadly, and
- Provides a forecast of household and employment growth for the corridor and region through 2045.

This market analysis evaluated past and current development and growth trends to understand patterns of development and to inform an analysis of future development potential. The growth projection was then compared to a land capacity analysis to determine whether there is an adequate supply of land for each land use to meet the market potential.

Key findings from this analysis include:

- There is significant growth across all land uses anticipated throughout the region between 2020 and 2045.
- Almost 10,000 new housing units are expected to be built in the region between 2020 and 2045. Almost 11,000 new jobs are expected during that same time frame.
- The unincorporated urban growth areas have significant growth potential for all land uses and could potentially support about 7,000 new housing units, 4.3 million square feet of commercial development, and 10.5 million square feet of industrial development.
- There is so much demand for industrial development today that there is not currently enough vacant land in incorporated cities to accommodate all that growth, however there is likely a significant excess of commercially zoned land currently.
- As a result of the booming data center industry, the greater Quincy area is expected to capture a disproportionate share of industrial development growth.
- Job growth is expected to outpace household construction as currently planned and zoned in the Quincy urban growth area, creating a jobs-housing imbalance. Long-distance commute trips on state highways to the Wenatchee Valley and other communities in Grant County will increase if housing isn't provided at a rate necessary and appropriate to meet job growth in the Quincy urban growth area.
- Most residential growth is expected to occur within existing cities, and there is adequate land capacity to meet that growth except for the East Wenatchee UGA, where most growth is expected north and east of the incorporated city.
- Generally, past patterns and trends are expected to continue, with accelerated growth in industrial development.

Leland’s identification of continued data center growth and jobs-household imbalance in Quincy matches the assumptions in CDTC’s travel demand model. This increases confidence in the future traffic projections used to measure and compare vehicle mobility across the three design concepts described in other sections of this report.

8 CONCLUSIONS

SR 28: East Wenatchee to Rock Island Segment

This study of SR 28 between East Wenatchee and Rock Island along with other major parallel roadways in the area is an initial step in shaping the ultimate design concept for transportation in and through the study area. This initial stage identified transportation needs for the future and evaluated three corridor design concepts in terms of predicted safety performance, traffic operations, impacts, costs, and active transportation. These three design concepts represent general concepts of how the SR 28 corridor and surrounding roads could function in the future. The performance of each design concept is summarized in table form in Table 3-13 in Chapter 3.

This study also included coordination between the project team and local agency and citizen representatives through SAG meetings, as well as coordination between the project team and the public through a project website, virtual presentations, media announcements, and in-person events. These interactions helped shape elements of the three design concepts under consideration and serve as an important building block for future coordination efforts.

The next step in understanding the vision for SR 28 and the surrounding area is for local agencies to consider which design concepts should be advanced for further study and/or design. Due to the regional importance of the SR 28 highway, these decisions will likely involve elected leadership in agencies and senior staff. Outcomes of that evaluation may include evaluations of alternative roadway concepts or refined versions of the three design concepts evaluated in this report.

Future Study Elements

Regardless of which actions are recommended by local agency leaders, there are several assumptions of this study report that should be explored further in upcoming planning or design phases of a project. These include the following:

- Intersection control evaluations, including traffic modeling
- Pedestrian and bicycle network treatments
- Design dimensioning (e.g. setting lane and shoulder widths)
- Specific environmental impacts and mitigation requirements
- Drainage requirements and systems design
- Transit stop upgrades
- Utility installations, upgrades, or impacts
- Estimated project costs and funding opportunities
- Value engineering measures

SR 28: Rock Island to Quincy, SR 281: Quincy to I-90 Segments

Widening either SR 28 or SR 281, or both, to a four-lane section will be a significant expenditure for the region. On a per-mile basis, these upgrades are estimated to cost between \$33–40 million, depending on the surrounding topography and existing conditions of each corridor. This study did not evaluate the

benefits of these widening efforts (e.g. safety and operational impacts). The numbers presented in Chapter 6 assume a midpoint of construction for each corridor of 2029. If an actual construction date is sooner than 2029, costs may be lower due to less compounding inflation. Conversely, if construction lags beyond 2029, costs will likely increase beyond the projected numbers in this study.

Market Analysis

Residential and commercial growth trends from recent years are generally expected to continue for the Wenatchee Valley and greater Quincy areas. Industrial growth is projected to accelerate, particularly in the greater Quincy area with a focus on data center developments. This growth near Quincy will create a jobs-housing imbalance leading to increased long-distance commute trips on state highways. If housing isn't provided at a rate necessary and appropriate to meet job growth in the Quincy urban growth area.

These growth patterns will cause traffic increases on SR 28 and other regional corridors. Growth is expected to align generally with prior CDTC traffic projections, which are the foundation for the traffic operations analysis and metrics included in this study.

APPENDIX A

Needs Evaluation Memorandum

MEMORANDUM

123 Ohme Garden Road, Suite 8, Wenatchee, WA 98801 | P 425.252.7700

To: Riley Shewak

From: Jennifer Saugen, PE
Brent Powell, PE

Date: August 20, 2021

Re: SR 28 Corridor Study – Needs Evaluation

INTRODUCTION

Chelan Douglas Transportation Council (CDTC) hired Perteet Inc. to complete a corridor evaluation focused on SR 28 between East Wenatchee and Rock Island. This memorandum documents Perteet’s needs evaluation for the different users of the study area. The needs evaluation spans the full extent of the study area in Figure 1 and focuses on safety for all users, multi-modal connectivity and comfort, mobility, and community needs.

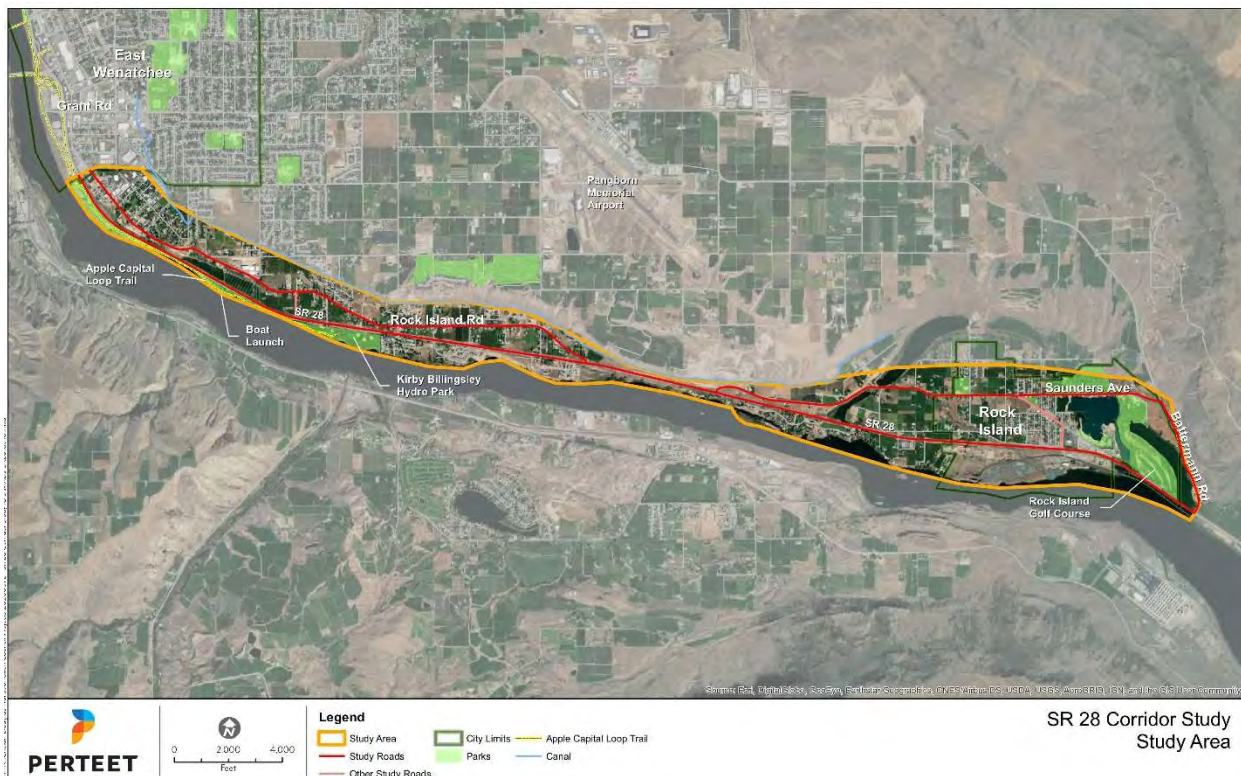


Figure 1. Study Area Map.

This needs evaluation serves as the basis for future coordination between the project team and stakeholders to assess potential treatments for the SR 28 corridor and surrounding transportation network. The evaluation covers three primary areas:

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1. Safety needs,
2. Active transportation needs (i.e. pedestrians and bicyclists), and
3. Vehicle mobility needs, including transit and freight.

SAFETY NEEDS

Perteet used a combination of quantitative and qualitative evaluations to assess areas of recommended improvements to address safety needs for the study area. This evaluation included looking at all modes and focusing on locations with high existing crash rates, elements of the current transportation network that could be modified for a general safety improvement, and contributing factors that led to fatal or serious-injury crashes in the past five years.

Data Sources

The WSDOT crash history provided to Perteet spanned January 1, 2016 through December 31, 2020. Perteet used this full five-year history for analysis. Perteet reduced this dataset to evaluate only the crashes that occurred within the study area limits, which include the SR 28 corridor as well as the study roadways shown in Figure 1. This reduced dataset included 230 total crash records.

For crash modification factor (CMF) data, Perteet relied on the information included in the *Highway Safety Manual (HSM)* and the online database <http://www.cmfclearinghouse.org/>.

As the *HSM* evaluation requires information on configuration elements and traffic demand data, Perteet collected that information using available online resources such as aerial imagery (for lane configurations, intersection control, etc.), GIS map information, and existing and future traffic model data from CDTC.

Highway Safety Manual Evaluation

The *HSM* uses crash rates, presented in crashes per year, to evaluate corridors. Perteet sorted the 230 study crash records by segment/intersection, number of vehicles, and severity to match the *HSM*'s required inputs.

The *HSM* uses the Federal Highway Administration (FHWA) "KABCO" classification scale to denote the most severe injury experienced by a driver, passenger, pedestrian, or bicyclist in a crash. Each state provides definitions for each letter grade. The Washington classification, from WSDOT's *Safety Analysis Manual*, is provided in Table 1.

Table 1. Washington KABCO Classification.

KABCO	WSDOT	Crash Record Coding
K	Fatality	Fatal injury
A	Suspected serious injury	Suspected serious Injury
B	Evident injury	Suspected minor injury
C	Possible injury	Possible injury
O	Property damage only	No apparent injury

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For urban arterial analysis in the *HSM*, crashes are aggregated into two groups: KABC (any fatality, injury, or possible injury) and O (property damage only). For segments, crashes are broken out into multiple-vehicle driveway crashes, multiple-vehicle non-driveway crashes, and single-vehicle crashes. At intersections, crashes are broken out only by number of vehicles involved (multiple-vehicle or single-vehicle). Tables 2 and 3 present the number of crashes in the five-year record for each HSM classification. The annual rates are in crashes per year and are the average amount of crashes per year over the five-year period.

Table 2. Segment *HSM* Crash Inputs.

Segment	KABCO	Multiple Vehicles at Driveways		Multiple Vehicles not at Driveways		Single Vehicle	
		5-Year Crashes	Annual Rate	5-Year Crashes	Annual Rate	5-Year Crashes	Annual Rate
		SR 28, 3rd St SE to Battermann Rd	KABC	1	0.2	16	3.2
	O	1	0.2	23	4.6	26	5.2
Rock Island Rd (west)	KABC	0	0.0	0	0.0	0	0.0
	O	0	0.0	0	0.0	0	0.0
Rock Island Rd/Ave/Drive (east)	KABC	0	0.0	0	0.0	3	0.6
	O	0	0.0	1	0.2	5	1.0
Batterman Rd, SR 28 to Saunders Ave	KABC	0	0.0	0	0.0	0	0.0
	O	0	0.0	0	0.0	0	0.0

Table 3. Intersection *HSM* Crash Inputs.

Intersection	KABCO	Multiple Vehicles		Single Vehicle	
		5-Year Crashes	Annual Rate	5-Year Crashes	Annual Rate
SR 28 (Spur) & 3rd St SE	KABC	9	1.8	0	0.0
	O	11	2.2	0	0.0
SR 28 & Lyle Ave	KABC	1	0.2	1	0.2
	O	0	0.0	0	0.0
SR 28 & S Mary Ave	KABC	2	0.4	0	0.0
	O	2	0.4	0	0.0
SR 28 & S Nile Ave	KABC	3	0.6	0	0.0
	O	2	0.4	5	1.0
SR 28 & Perry Ave S	KABC	0	0.0	2	0.4
	O	0	0.0	0	0.0
SR 28 & Quincy Ave S/Akamai Way	KABC	0	0.0	0	0.0
	O	1	0.2	0	0.0
SR 28 & S Union Ave	KABC	0	0.0	0	0.0
	O	1	0.2	0	0.0
SR 28 & S Tyee Ave	KABC	2	0.4	0	0.0
	O	1	0.2	1	0.2
SR 28 & Rock Island Rd (West)	KABC	1	0.2	0	0.0
	O	1	0.2	0	0.0
SR 28 & Rock Island Rd (East)	KABC	1	0.2	0	0.0
	O	1	0.2	0	0.0
SR 28 & Columbia Cove Ln	KABC	0	0.0	0	0.0
	O	0	0.0	1	0.2

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Intersection	KABCO	Multiple Vehicles		Single Vehicle	
		5-Year Crashes	Annual Rate	5-Year Crashes	Annual Rate
SR 28 & Riverside Place	KABC	0	0.0	0	0.0
	O	0	0.0	1	0.2
SR 28 & Nature Shore Dr	KABC	1	0.2	0	0.0
	O	2	0.4	0	0.0
SR 28 & Rock Island Dr	KABC	3	0.6	0	0.0
	O	1	0.2	0	0.0
SR 28 & Battermann Rd	KABC	1	0.2	0	0.0
	O	2	0.4	0	0.0
Rock Island Rd (West) & 3rd St SE	KABC	0	0.0	0	0.0
	O	0	0.0	0	0.0
Rock Island Rd (West) & 8th St SE	KABC	0	0.0	0	0.0
	O	0	0.0	0	0.0
Rock Island Rd (West) & S Nile Ave	KABC	0	0.0	0	0.0
	O	0	0.0	0	0.0
Saunders Ave & N Garden Ave	KABC	1	0.2	0	0.0
	O	0	0.0	0	0.0
Batterman Rd & Saunders Ave	KABC	1	0.2	0	0.0
	O	1	0.2	1	0.2

The *Highway Safety Manual* builds off national safety and crash data research to create an analytical way to predict the annual crash rate for segments and intersections using a variety of geometric and traffic parameters. The “predictive method” of analysis for urban arterials (Chapter 12 of the *HSM*) provides an anticipated annual crash rate for segments and intersections based on their characteristics.

The *HSM* predicted annual crash rate can be compared to the safety performance of the project study area that is presented in the five-year crash history. The *HSM* uses an “expected average crash frequency” statistic to quantify the anticipated crash rates for the study segments and intersections based on the inputted past crash data shown in Tables 2 and 3. The inputted crash rates are broken down into different classifications on the KABCO scale based on assumed crash type percentages for a segment/intersection type. So, while the overall expected average crash frequency (in crashes per year) for all KABCO crashes is roughly equal to the observed crash rate over the five-year dataset, the KACB and O groups may have different crash rates than what has been observed because these proportions of the total are based on national averages for a site type as opposed to the inputted data. The expected average crash frequency can be viewed as the anticipated safety performance for each site assuming no improvements are made to the corridor.

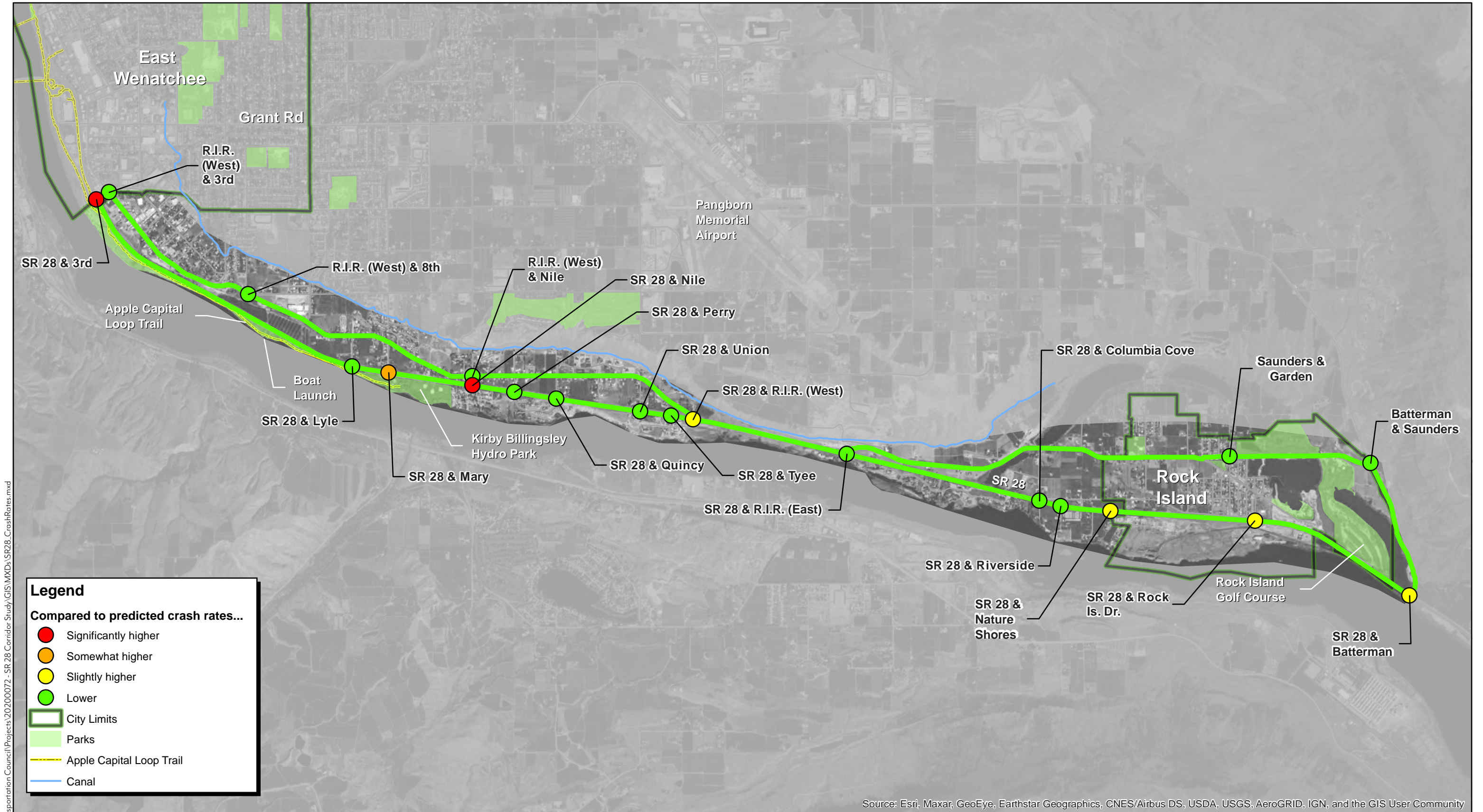
If the expected average crash frequency is lower than the predicted average crash frequency, the site is projected to operate with fewer crashes per year than a comparable site with similar characteristics would. If the no-build expected average crash frequency is higher than the predicted average crash frequency, the site will likely operate with more crashes per year than a comparable site with similar characteristics would, and the difference between the expected and predicted average crash frequencies is classified as the “potential for improvement.” Table 4 presents those three crash metrics for locations with a potential for improvement greater than 0, which for this project are only intersections; all segments have fewer expected crashes than predicted.

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Table 4. Predicted Crash Rates and Expected Crash Rates (Crashes per Year).

Intersection	KABCO	Predicted Average Crash Frequency	Expected Average Crash Frequency	Potential for Improvement
SR 28 (Spur) & 3rd St SE	KABCO	1.3	3.2	2.0
	KABC	0.4	1.0	0.6
	O	0.9	2.2	1.3
SR 28 & S Mary Ave	KABCO	1.0	1.1	0.1
	KABC	0.4	0.4	-
	O	0.6	0.7	0.1
SR 28 & S Nile Ave	KABCO	1.0	1.3	0.4
	KABC	0.4	0.5	0.1
	O	0.6	0.8	0.2
SR 28 & Rock Island Rd (West)	KABCO	0.1	0.2	0.1
	KABC	0.1	0.1	0.1
	O	0.1	0.1	-
SR 28 & Nature Shore Dr	KABCO	0.4	0.6	0.1
	KABC	0.2	0.3	0.1
	O	0.2	0.3	0.1
SR 28 & Rock Island Dr	KABCO	0.7	0.8	0.1
	KABC	0.3	0.3	-
	O	0.4	0.5	0.1
SR 28 & Battermann Rd	KABCO	0.4	0.6	0.1
	KABC	0.2	0.3	0.1
	O	0.2	0.3	0.1

See Appendix B for the *HSM* calculations, which present results to three decimal places for full accuracy. Results in this memorandum are rounded to one decimal place in summary tables to conform with WSDOT safety analysis guidance. Figure 2 illustrates the “potential for improvement” metric from Table 4 in a map format. Two locations in Figure 2—SR 28 (Spur) at 3rd Street SE and SR 28 at S Nile Avenue—are color-coded red and orange to indicate they have the highest potential improvement.



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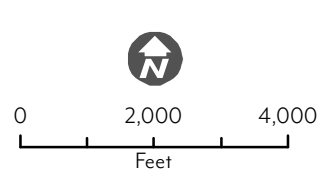


Figure 2

SR 28 Corridor Study
Crash Rates

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Fatal and Serious-Injury Crash Review

There were six crash events in the five-year dataset that included a report of at least one fatality or serious injury. These crashes are summarized in Table 5.

Table 5. Fatal and Serious-Injury Crash Summary.

Crash Location	MP	No. of Fatalities	No. of Serious Injuries	Description
SR 28, west of Hydro Park	1.75	0	1	Opposite directions; one vehicle was defective and crossed the centerline; dawn
SR 28 at S Mary Ave	2.85	0	2	Entering at angle; northbound vehicle from S Mary Ave did not grant right-of-way to eastbound SR 28 vehicle; daylight
SR 28, west of S Perry Ave	3.50	1	1	Same-direction sideswipe; one driver, under the influence of alcohol, attempted to improperly pass the second driver; dark, with no street lights
SR 28 at S Tye Ave	4.53	1	1	Eastbound SR 28 driver stuck and killed a crossing pedestrian, who was reported as not granting right-of-way to the vehicle; dark, with no street lights
SR 28, west of Rock Is. Rd (east)	5.45	2	3	Opposite directions; eastbound SR 28 vehicle listed as exceeding reasonable safe speed, no other information provided; daylight with snow/slush surface conditions
SR 28, east of Rock Is. Dr	8.42	0	2	Opposite-direction sideswipe; eastbound SR 28 driver listed as exceeding reasonable safe speeds; dark, with no street lights, with snow/slush surface conditions

The crash record at milepost 5.45 listed in Table 5 contained minimal details, but Perteet found extra information on this event from local news reporting from December 2016. A Wenatchee World article on the crash reported that the fatalities were passengers in a minivan moving westbound on SR 28, which crossed over the centerline and was struck by an eastbound semi-truck and was then deflected back into the westbound lane and struck by a westbound sedan. The WSDOT crash record listed five involved vehicles; the remaining two vehicles were traveling eastbound and swerved into the SR 28 roadside ditch and did crash into any vehicles.

All four crashes in Table 5 that occurred beyond intersections involved vehicles crossing the centerline.

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Improvement Measures

Perteet evaluated different tactics to improve safety performance for the study area. The first set of tactics is countermeasures to reduce crash rates for known areas of needed improvement, which are those listed in Table 4. The improvements targeted by these tactics include intersection reconfigurations (e.g. adding a turn lane) or changes in control type (e.g. converting a side-street stop-controlled intersection to a roundabout). The benefits of these tactics are quantified using CMFs.

The second set of tactics are corridor-wide strategies to modify the general configuration of SR 28. Instead of relying on only CMFs for this evaluation, Perteet looked at baseline crash rate values for different global attributes of a corridor with all other variables being equal. Some strategies include adding one lane per direction or installing a continuous median along the segments. This evaluation is still relevant even though the segment of SR 28 between 3rd Street SE and Batterman Road is not listed in Table 4, as that segment includes locations with reported near-miss crashes and crash performance can always be improved to approach zero.

Countermeasures to Address Specific Locations

Table 5 provides a collection of available intersection countermeasures that could be applied to the locations on SR 28 (and SR 28 Spur) listed in Table 4. Applicable candidate intersections are noted below.

Table 6. Candidate Countermeasures and Locations.

Treatment	CMF	Candidate Locations
Convert intersection to roundabout	0.52	SR 28 Spur & 3rd St SE
	0.56	All stop-controlled intersections
Install left-turn lanes on major road approaches	0.67	SR 28 & Rock Island Rd (West)
		SR 28 & Nature Shores Dr
		SR 28 & Battermann Rd
Install intersection conflict warning system ¹	0.73 – 0.74	All stop-controlled intersections
	0.74	SR 28 & S Nile Ave
Provide right-turn lanes on major road approaches ²	0.86	SR 28 & S Mary Ave (one approach)
		SR 28 & Rock Island Rd (West)
		SR 28 & Nature Shores Dr
Provide intersection illumination ³	0.91	SR 28 Spur & 3rd St SE (one approach)
		SR 28 & Rock Island Rd (West)
Provide flashing beacons at stop-controlled intersections	0.95	SR 28 & Nature Shores Dr
Restrict right turn on red (CMF is per approach)	0.98	All stop-controlled intersections
		SR 28 Spur & 3rd St SE

¹ CMF of 0.73 for two-lane at two-lane intersections in a rural context. Four-lane at two-lane intersections in a rural context have a CMF of 0.74. **Study citation:** Himes, S., F. Gross, K. Eccles, and B. Persaud. "Multi-State Safety Evaluation of Intersection Conflict Warning Systems (ICWS)". Presented at the 95th Annual Meeting of the Transportation Research Board, Paper No. 16-4225, Washington, D.C., (2016).

² Qualifying right-turn additions per the *HSM* must be dedicated right-turn lanes; short pockets or tapers do not qualify for this CMF. WSDOT North Central Region generally requires dedicated right-turn lanes on similar state routes include a 12-foot-wide offset from adjacent through travel lanes.

³ Adding illumination on state routes is subject to requirements of WSDOT *Design Manual* Chapter 1040.

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The CMF values listed in Table 6 are all less than 1, meaning that they all suggest a reduction in crashes per year if implemented. Mathematically, the anticipated impact can be achieved by multiplying a crash rate by a CMF to produce a “build crash rate.” Multiple CMFs can be multiplied together.

Realistically, treatments may not be practical for all locations, even if they are listed as a candidate location. For example, restricting left-turn access from SR 28 to Rock Island Drive would be a significant change for Rock Island residents and could lead to safety concerns at other access points in the network.

Based on the existing crash records and patterns Perteet has identified, Perteet recommends considering the following treatments to reduce crash rates at these intersections:

- **SR 28 Spur at 3rd Street SE.** Supplemental signal heads and signal-ahead warning signing for eastbound approach, due to the sharp horizontal curvature. Signal-ahead warning signing for westbound and southbound movements to improve driver attention. Consider extending the duration of all-red timing following the southbound phase to decrease angle crash likelihood. As an alternative, consider converting traffic signal to a roundabout.
- **SR 28 at S Mary Avenue.** Convert intersection to a roundabout to address entering-at-angle crashes.
- **SR 28 at S Nile Avenue.** Convert intersection to a roundabout to address entering-at-angle and object crashes.
- **SR 28 at Rock Island Road (West).** Install center turn lane on SR 28 at intersection.
- **SR 28 at Nature Shores Drive.** Install center turn lane on SR 28 at intersection.
- **SR 28 at Rock Island Drive.** No clear pattern among the crash records, consider a roundabout treatment to generally reduce crashes.
- **SR 28 at Battermann Road.** Install center turn lane on SR 28 at intersection.

Corridor-Wide Strategies

Table 7 summarizes the predicted crash performance for a roadway with SR 28’s characteristics with three different alternative lane configurations. Compared to the existing condition, which is a two-lane undivided highway, adding additional lanes generally increases crash rates, both injury and property-damage-only. However, installing a median or physical barrier between directions reduces crash rates, to an even larger degree. Widening to four lanes *and* installing a dividing median would reduce anticipated crash rates to be less than the existing condition, by around 25%.

Table 7. Corridor-Wide Predicted Crash Rates (crashes per year).

Segment Strategy	KABCO	KABC	O
Two lanes, undivided (typical existing condition)	24.4	6.7	17.7
Three lanes, center turn lane	26.9	7.3	19.6
Four lanes, undivided	28.8	9.0	19.9
Four lanes, divided (physical divider)	19.6	5.4	14.2

The data in Table 7 comes from an analysis of the SR 28 corridor using the *Highway Safety Manual* with all variables being equal, other than number of lanes and median length. The *HSM* does not provide a quantifiable benefit for a divided two-lane roadway or for a two-lane roadway with passing lanes.

MEMORANDUM

For that data, Perteet used information from the online CMF Clearinghouse. One study found a CMF of 0.29 associated with installing a raised median⁴. For passing lanes, data is available for rural roads (note that WSDOT classifies all of the study area as urban). A study on periodic passing lanes showed a CMF of 0.65 for injury/fatal crashes⁵, while a separate study on “short 2+1 road sections” (i.e. a three-lane roadway with alternating directional passing opportunities) found a CMF of 0.53 for that treatment⁶. Both treatments are used on WSDOT state routes.

ACTIVE TRANSPORTATION NEEDS

Active transportation users are pedestrians, which include people walking and people using mobility devices such as scooters, and bicyclists. The study area includes multiple pedestrian and bicycle facilities, including the Apple Capitol Loop Trail and the local street networks surrounding SR 28 and within Rock Island. The CDTC *2020 Regional Transportation Plan Update*, CDTC *Regional Bicycle Plan*, and WSDOT *Active Transportation Plan 2020 and Beyond – Part 1* are relevant planning documents for the active transportation modes.

Existing Network

The existing active transportation network is limited in most of the study area. The Loop Trail is a regional facility that connects East Wenatchee to Hydro Park and is used by pedestrians and bicyclists for recreational travel. South of 3rd Street SE, there are no marked crossings available for people in the study area to access the Loop Trail, which limits its utility as a route for local trip making. Local walking or biking trips typically occur on the edge of the roadway, in a shoulder if available, throughout the study area. There are a few locations in the East Wenatchee and in Rock Island portions of the study area (not on SR 28) that have sidewalks available as well as some crosswalks. There is one segment of existing bicycle lanes on 3rd Street SE.

Planned Projects and Future Network

The *2020 Regional Transportation Plan Update* and *Regional Bicycle Plan* include one relevant project to improve active transportation facilities in the study area. The former document includes an unprioritized expansion project listing for “Access and circulation projects consistent with Rock Island Waterfront Plan.” The full transportation project list from the *Rock Island Waterfront Subarea Plan* is included as Figure 11 in a later section of this memorandum. The relevant pedestrian and bicycle projects listed are a 1.5-mile-long waterfront trail and potential grade-separated crossings (likely undercrossings) of SR 28 and railroad tracks in the waterfront area. Intersection improvements are also listed as SR 28 with Rock

⁴ **Study Citation:** Schultz, G.G., K.T. Braley, and T. Boschert, "Correlating Access Management to Crash Rate, Severity, and Collision Type." TRB 87th Annual Meeting Compendium of Papers CD-ROM. Washington, D.C., (2008).

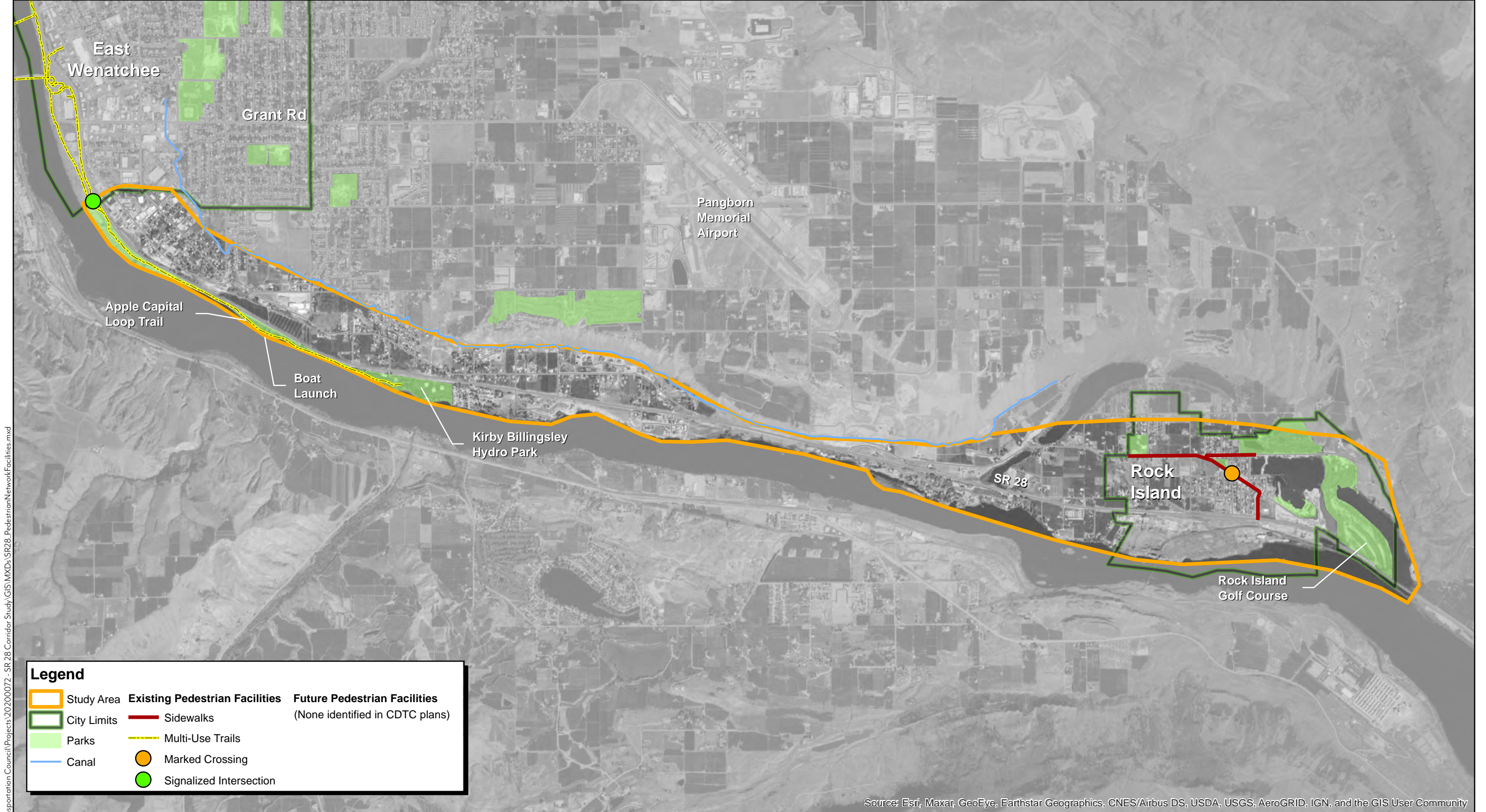
⁵ **Study Citation:** Park, B., Fitzpatrick, K., and Brewer, M., "Safety Effectiveness of Super 2 Highways in Texas." Transportation Research Record: Journal of the Transportation Research Board, No. 2280, Transportation Research Board of the National Academies, Washington, D.C., 2012, pp. 38-50. DOI: 10.3141/2280-05

⁶ **Study Citation:** D'Agostino, C., S. Cafiso, and M. Kiec. "Comparison of Bayesian techniques for the before–after evaluation of the safety effectiveness of short 2+1 road sections". Accident Analysis and Prevention, Vol. 127, (2019) pp. 163-171.

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Island Drive and SR 28 with Nature Shores Drive, which could include crossing enhancements for active transportation users.

The existing and future pedestrian facility network from existing plans are shown in Figure 3. The existing and future bicycle facility network from existing plans are shown in Figure 4. Perteet did not modify these facility elements; this linework comes from the CDTC.



Legend

Symbol	Category	Description
Orange outline	Study Area	Study Area
Green outline	City Limits	City Limits
Light green fill	Parks	Parks
Blue line	Canal	Canal
Red line	Existing Pedestrian Facilities	Sidewalks
Yellow dashed line	Existing Pedestrian Facilities	Multi-Use Trails
Orange circle	Existing Pedestrian Facilities	Marked Crossing
Green circle	Existing Pedestrian Facilities	Signalized Intersection
(None)	Future Pedestrian Facilities	(None identified in CDTC plans)

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

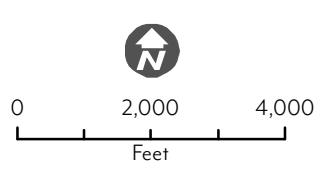
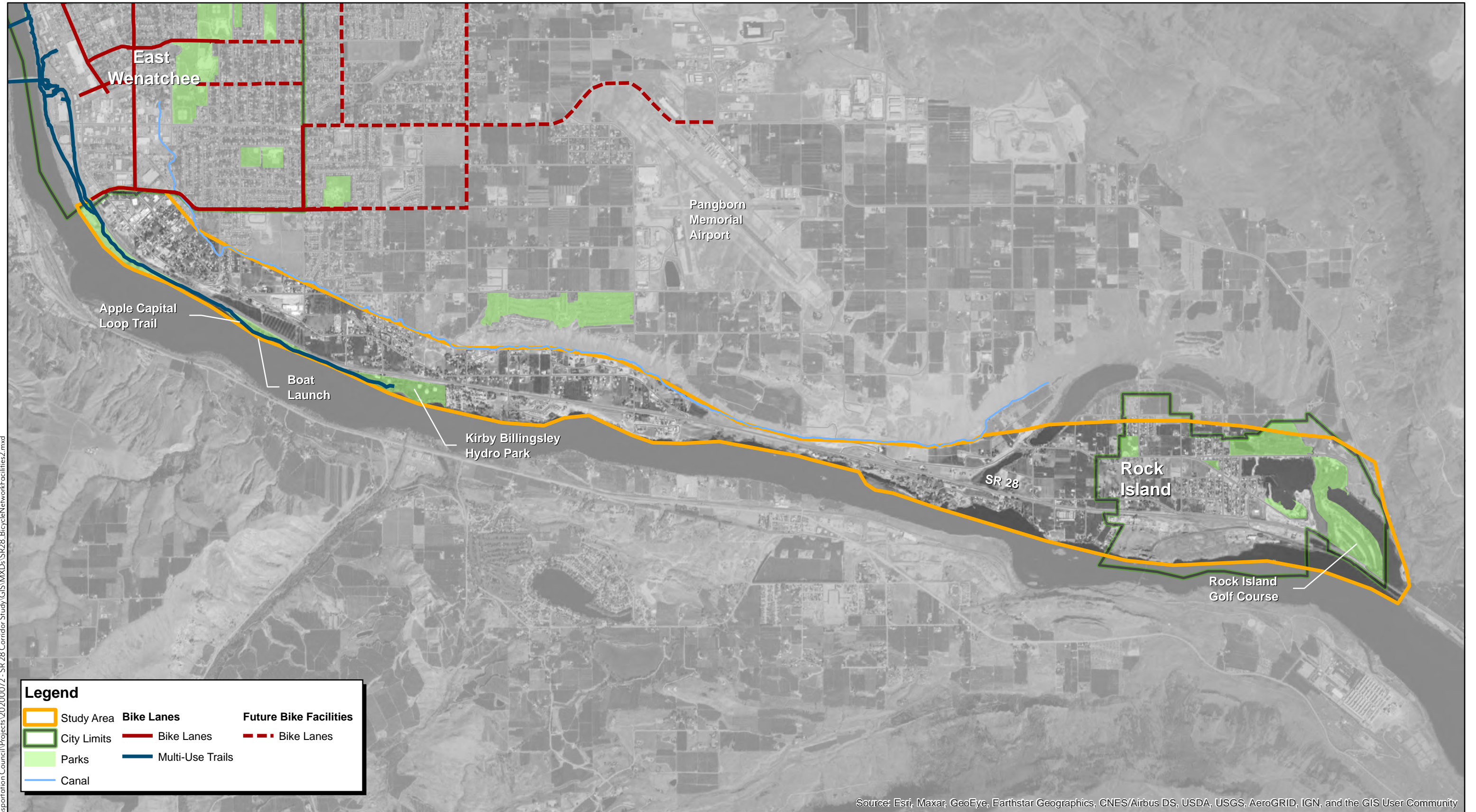


Figure 3

SR 28 Corridor Study
Pedestrian Network Facilities



Legend

Study Area	Bike Lanes	Future Bike Facilities
City Limits	Bike Lanes	Bike Lanes
Parks	Multi-Use Trails	
Canal		

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Figure 4

SR 28 Corridor Study
Bicycle Network Facilities

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MEMORANDUM

Gap Analysis

Gaps in the active transportation network exist in two primary forms. First, a “missing link” gap is any location where there is a discontinuity in a facility that physically leaves a missing segment for users. An example would be a series of three blocks with sidewalk on the outer blocks only, leaving a missing sidewalk link in the middle block, creating a gap. Second, gaps can be created by areas of decreased user comfort along a facility. An example of this type of gap is a bicycle network that provides bicycle lanes until transitioning into a shared condition where bicycle and drivers both use the same lane width of pavement. The latter segment may be uncomfortable for some desired users. The two types of gaps often overlap—users feel less comfortable if a facility is not present for a segment of their travel path.

To quantify the concept of user comfort for pedestrian and bicycle facilities, WSDOT’s *Active Transportation Plan 2020 and Beyond – Part 1* uses a metric called “level of traffic stress” (LTS). LTS is a numeric score for a facility—or a combination of facilities along a route—ranging from 1 to 4. LTS 1 facilities have the lowest stress on active transportation modes from adjacent vehicle traffic, whereas LTS 4 facilities represent the highest stress. WSDOT defines “low stress” facilities as those scoring as LTS 1 or 2 and “high stress” as LTS 3 or 4. The high-stress facilities typically constitute gaps for most users, as the degree of stress impacts many users to the point where the trip is undesirable along that route.

Level of traffic stress is measured separately for pedestrians (i.e. PLTS) and for bicyclists (i.e. BLTS). Figures 5 and 6 are taken from the *Active Transportation Plan 2020 and Beyond – Part 1*.



Figure 3-7: Bicycle level of traffic stress (BLTS) is illustrated by associating user types with examples of types of facilities that they feel comfortable using. The BLTS 1 scenario shows facilities that are likely to appeal to 100 percent of people who want to ride a bicycle. For BLTS 2 the facilities include buffered bike lanes which offer more separation than standard bike lines, but no physical barrier. 81% of bicycle riders would use this facility. For BLTS 3 standard bike lanes are provided and about 12 percent of riders would use this facility. Only about 1 percent of riders would use BLTS 4 facilities where no separated space is offered.

Figure 5. WSDOT Visualization of Bicycle Level of Traffic Stress.

MEMORANDUM

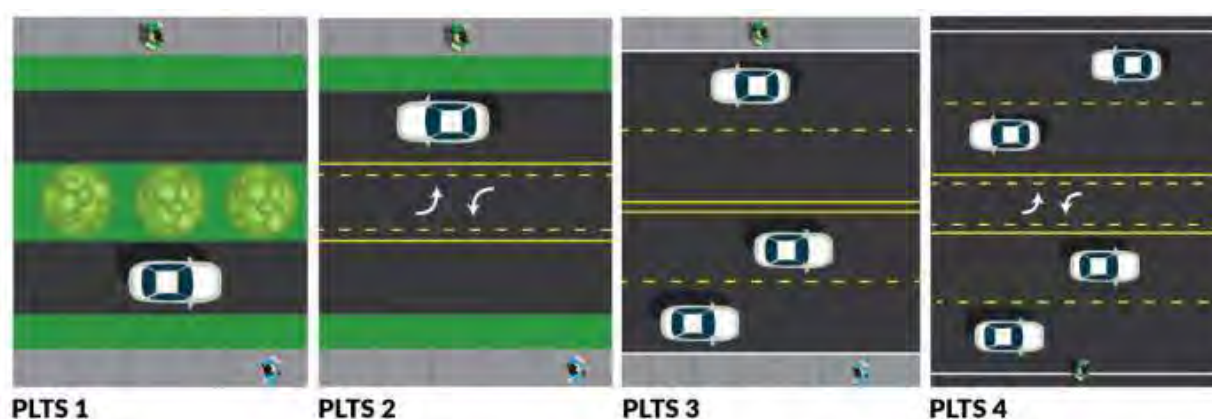


Figure 3-9: Pedestrian level of traffic stress (PLTS) is illustrated by associating user types with examples of types of facilities that they feel comfortable using. In the PLTS 1 scenario the facilities are presumed to appeal to anyone who wants to walk. For PLTS 2 the facilities are presumed to appeal to a high percentage of people who want to walk. For PLTS 3 the facilities are likely to appeal to many people who want to walk, but separation from traffic is lower and there are more potential challenges, especially when it comes to crossing considerations (although these are not illustrated). For PLTS 4 the facilities are unlikely to appeal to very many people who want to walk. There is minimal separation from traffic and there are more potential challenges associated with a complex and wide roadway, especially when it comes to crossing considerations.

Figure 6. WSDOT Visualization of Pedestrian Level of Traffic Stress.

The following sections document Perteet’s evaluation of the two primary types of active transportation network gaps.

Missing Links Evaluation

Shared-Use Facilities

These facilities include multi-use paths, either alongside a roadway or in separate right of way, and roadway crossings to be used by pedestrians or cyclists. The primary shared-use facility in the study area is the Apple Capital Recreation Loop Trail that extends from East Wenatchee to Hydro Park. While the Loop Trail does not include any missing segments, its endpoint at Hydro Park means that it does not service the City of Rock Island and represents a missing link for potential Rock Island users.

While the Wenatchee Reclamation Ditch east of SR 28 connects East Wenatchee and Rock Island and includes an adjacent gravel road/pathway, this road/path is signed as “No Trespassing on Canal Right of Way” so it is not a current legal facility for either pedestrians or bicyclists to use as a connection.

Pedestrian Facilities

The CDTC *2020 Regional Transportation Plan Update* Figure 3-6, shown here as Figure 7, illustrates a pedestrian demand index evaluation for the Wenatchee, East Wenatchee, and Rock Island Urban Growth Areas (UGAs). The evaluation is limited to highways and primary roadways. CDTC has a policy target of 100% of the federal-aid road network having sidewalks on both sides⁷.

The highest index—meaning the highest demand—value in Figure 7 is on Rock Island Avenue adjacent to Rock Island Elementary School. Other locations in this map with an index of at least 4 include:

⁷ CDTC exemptions to this policy from Page 2-5 of the *Regional Transportation Plan*: managed-access class 1, 2, or 3 roads or limited access roads; where a sufficient alternative is approved via the Complete Streets ordinance.

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- SR 28 from 3rd Street SE to East Wenatchee UGA limits
- 3rd Street SE from Rock Island Road to Highline Drive
- Rock Island Road between S Iowa Avenue and 8th Street SE
- S Kentucky Avenue between 8th Street SE and Rock Island Road
- Rock Island Road at S Mary Avenue
- Rock Island Road at S Nile Avenue
- Rock Island Road/Avenue/Drive between Rock Island UGA and SR 28

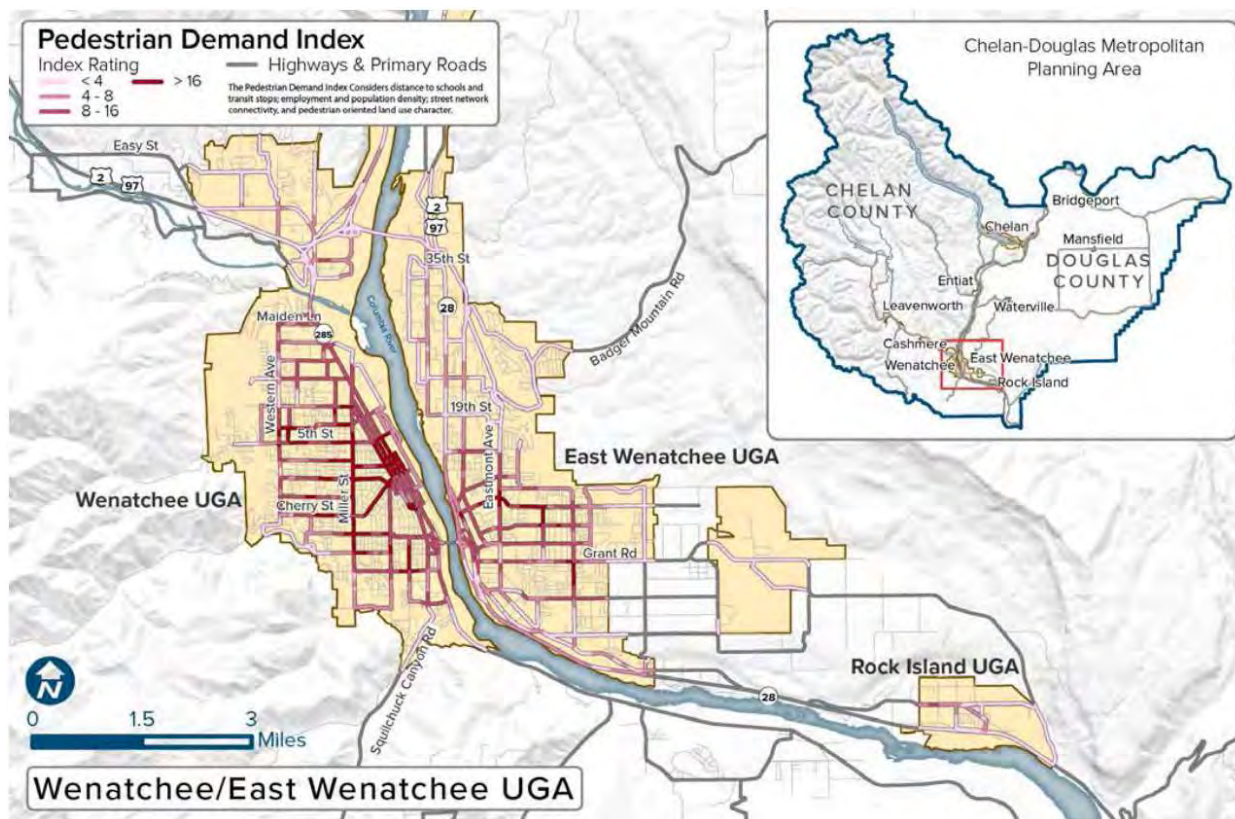


Figure 7. CDTA Pedestrian Demand Index Map.

Sidewalks currently exist in some portions of East Wenatchee and Rock Island within the study limits. In East Wenatchee, sidewalks are provided on 3rd Street SE and for a short distance on Highline Drive. In Rock Island, the sidewalk network includes Rock Island Avenue/Drive west of Center Street, Saunders Avenue, N Garden Avenue, and Delaware Avenue. Elsewhere, sidewalks are not provided, including where most of the higher demand index locations are as described above. Specifically, the higher-index locations listed above and illustrated in Figure 7 where sidewalks are not present are:

- SR 28 from 3rd Street SE to East Wenatchee UGA limits
- Rock Island Road between S Iowa Avenue and 8th Street SE
- S Kentucky Avenue between 8th Street SE and Rock Island Road
- Rock Island Road at S Mary Avenue
- Rock Island Road at S Nile Avenue
- Rock Island Road/Avenue/Drive between Rock Island UGA and Center Street

MEMORANDUM

These six locations are considered missing links in the network because they do not provide a pedestrian facility for safe and comfortable travel. Note that the Loop Trail does service some of the demand for pedestrian travel on SR 28, but barriers to meet demand still exist because SR 28 does not have any marked or enhanced crossing locations to connect users to the Loop Trail south of 3rd Street SE. Figure 2-2 from the *Regional Transportation Plan*, included here as Figure 8, shows the existing sidewalk gaps identified by CDTC. However, this figure shows gaps on portions of Rock Island Drive and Saunders Avenue in Rock Island that have sidewalks on both sides today.

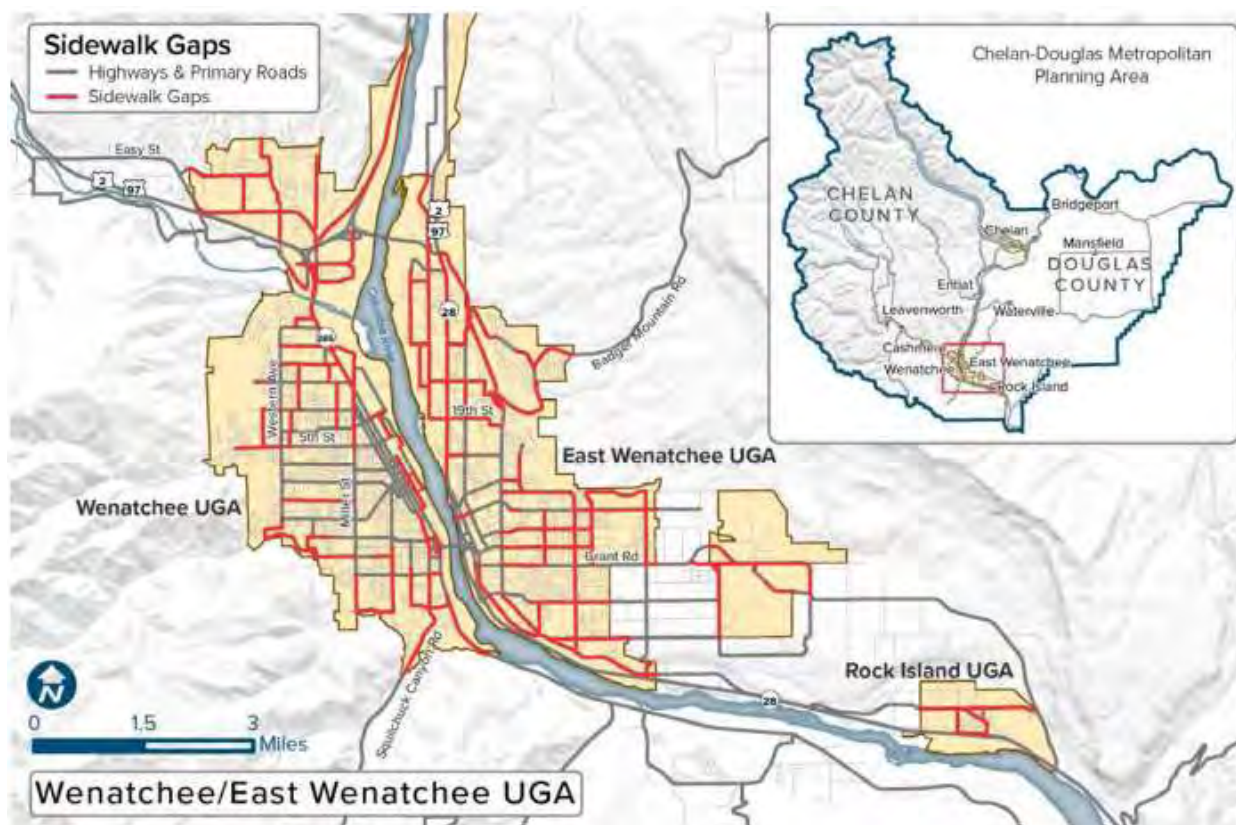


Figure 8. CDTC Sidewalk Gaps Map.

On the minor roadway network—the streets not shown in Figures 7 or 8—where sidewalks and crossings are provided, they are typically connected to other facilities. The segment of Fremont Avenue between Saunders Avenue and Rock Island Drive is the only portion of missing sidewalk between two adjacent segments on these types of streets.

Bicycle Facilities

The Loop Trail is the primary bicycle network element in this study area. However, there are existing bike lanes on 3rd Street SE in East Wenatchee. There are no bicycle facilities in or around Rock Island. The 3rd Street SE bicycle lanes connect to the Loop Trail and have a recommended expansion east to S Nile Avenue in the *Regional Bicycle Plan*.

The lack of a bicycle facility connecting Rock Island and the Loop Trail is considered a missing link. An extension of the Loop Trail across Hydro Park should evaluate potential Park and Trail user conflicts.

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Level of Traffic Stress Evaluation

Perteet applied the WSDOT LTS methodology to generate the pedestrian and bicycle scores shown in Figures 9 and 10. Consistent with the relatively low number of sidewalks and bicycle lanes that exist in the network today, many facilities register as high-stress, with the majority at LTS 4.

Table 8 summarizes the type of facility and the corresponding LTS score for facilities ranking better than LTS 3. This threshold is the standard dividing line between “high-stress” and “low-stress” network elements. Note that some segments in Table 8 do not include sidewalks or bike lanes but score better than LTS 3 because of lower travel speeds and/or fewer adjacent travel lanes. All LTS calculations are provided in Appendix C.

All facilities not listed in Table 8 score at an LTS 3 or LTS 4. Note that this evaluation is only for facilities that run along or across roadways, so the Loop Trail is not included. For this reason, a low LTS score does not always mean that there is a gap in the network because users can take parallel routes, so long as they are connected. The Loop Trail may be able to service the needs of active transportation users, provided it has connectivity to other facilities via crossings that provide LTS 1 or LTS 2 scores. Figures 9 and 10 illustrate quarter-mile service areas around LTS 1 and 2 facilities to illustrate where active transportation needs are currently being met through parallel route options.

The current WSDOT LTS methodology for intersection scoring is based on the assumption of an unsignalized crossing without a median refuge. This assumption holds for this existing condition analysis, but proposed treatments may enhance crossings or modify intersection configurations such that this assumption would no longer apply to this study. In this case, Perteet plans to use the LTS evaluation framework used by Oregon Department of Transportation⁸ to quantify the benefits of those candidate treatments for active transportation users.

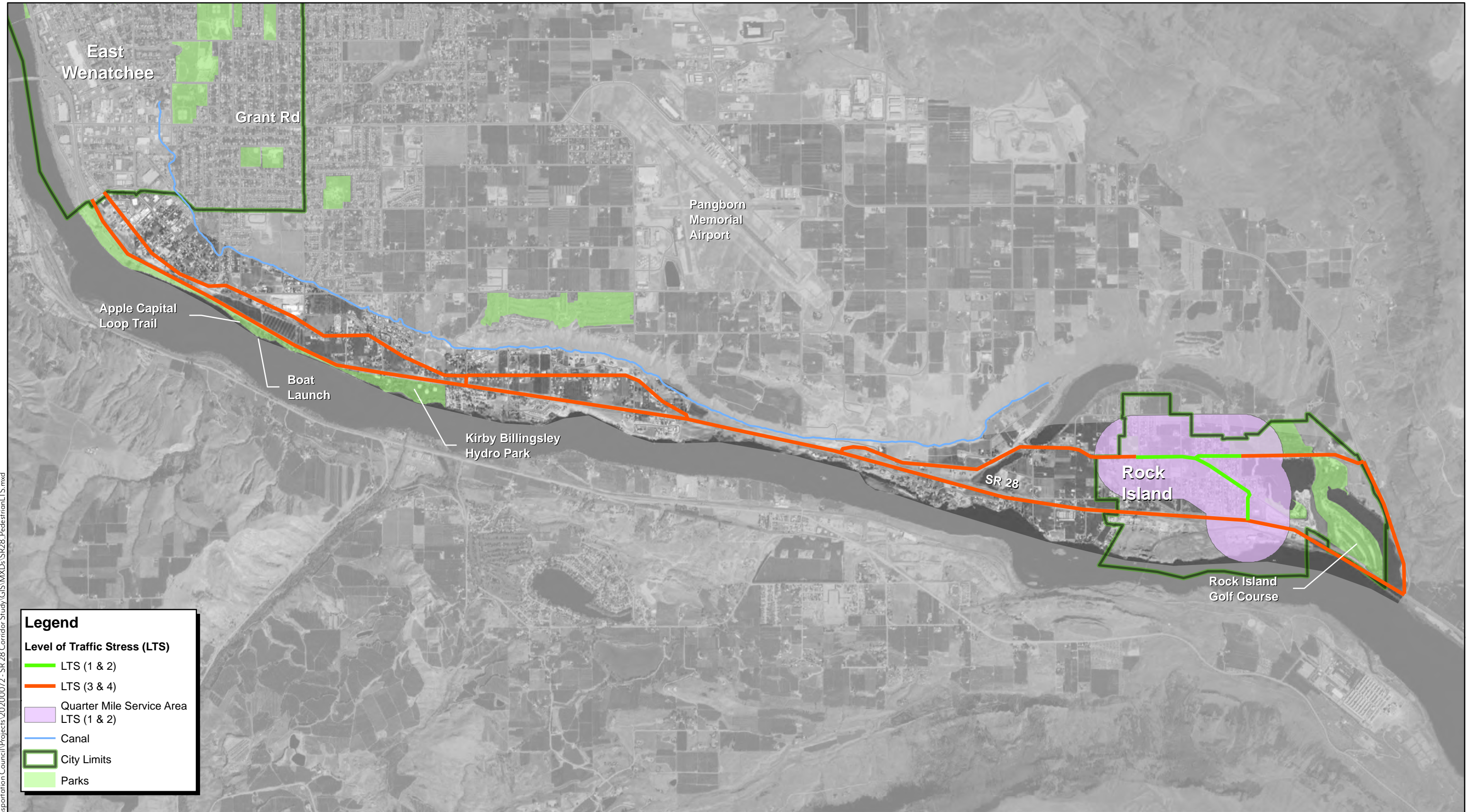
Table 8. LTS 1 and LTS 2 Facilities.

Segment/Intersection	Facility Type	LTS
Pedestrian Facilities		PLTS
Saunders Ave from Delaware Ave to Rock Island Drive (E) Rock Island Dr from Saunders Ave to SR 28	Sidewalks, both sides	2
Rock Island Rd (E) from Saunders Ave to Center St	Sidewalks, one side	2
Saunders Ave and N Garden Ave Rock Island Dr and Saunders Ave Rock Island Dr (E) and Douglas St Rock Island Dr (E) and Center St Rock Island Dr and S Garden Ave Rock Island Rd (W) and S Mary Ave Rock Island Rd (W) and S Kentucky Ave Rock Island Rd (W) and 8th St SE Rock Island Rd (W) and S Iowa Ave	n/a (Intersection)	2

⁸ Oregon Department of Transportation (ODOT) LTS evaluation procedures are documented in ODOT’s *Analysis Procedures Manual Version 2*, Chapter 14.4 (bicycle LTS) and Chapter 14.5 (pedestrian LTS). ODOT pedestrian LTS calculations incorporate posted/prevaling speed; number of lanes crossed; daily traffic volume; and presence of medians, crosswalk markings, signage, illumination, beacons, in-street signs, curb extensions, or raised crossings.

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Segment/Intersection	Facility Type	LTS
Bicycle Facilities		BLTS
Saunders Ave from Delaware Ave to Rock Island Drive (E)		
Rock Island Rd (E) from Saunders Ave to Center St	No bicycle lanes	2
Rock Island Dr from Saunders Ave to SR 28		
Saunders Ave and N Garden Ave		
Rock Island Dr and Saunders Ave		
Rock Island Dr (E) and Douglas St		
Rock Island Dr (E) and Center St		
Rock Island Dr and S Garden Ave	n/a (Intersection)	2
Rock Island Rd (W) and S Mary Ave		
Rock Island Rd (W) and S Kentucky Ave		
Rock Island Rd (W) and 8th St SE		
Rock Island Rd (W) and S Iowa Ave		



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Legend

Level of Traffic Stress (LTS)

- LTS (1 & 2)
- LTS (3 & 4)
- Quarter Mile Service Area
- Canal
- City Limits
- Parks

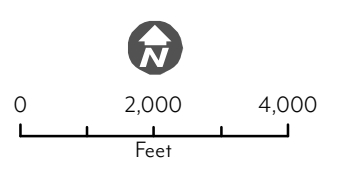
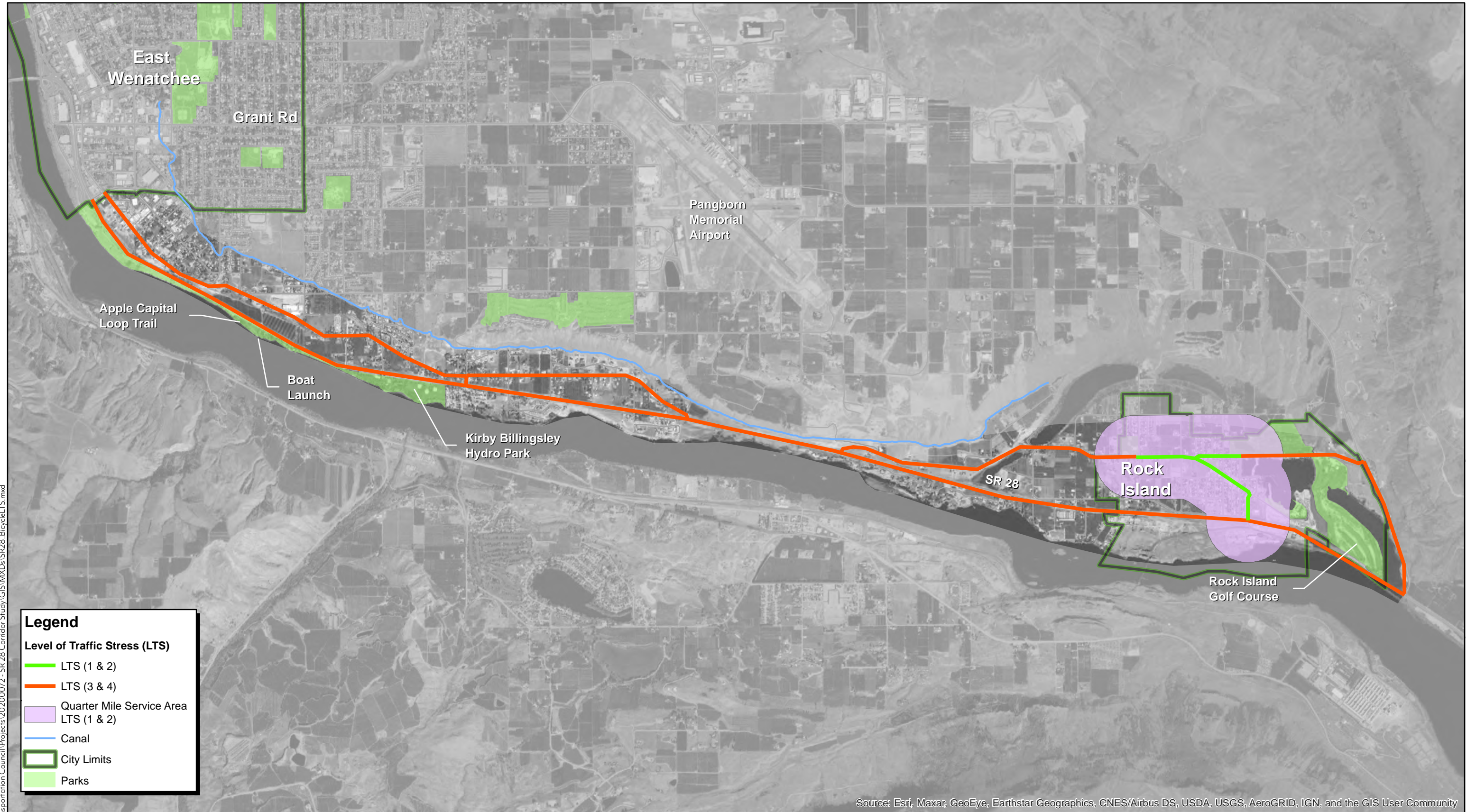


Figure 8

SR 28 Corridor Study
Pedestrian Level of Traffic Stress



Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

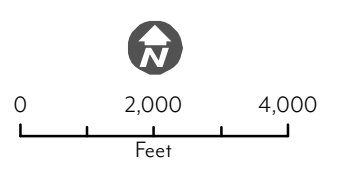


Figure 9

SR 28 Corridor Study
Bicycle Level of Traffic Stress

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MEMORANDUM

VEHICLE MOBILITY NEEDS

Transit, freight, and general-purpose traffic all have varying priorities and typical routes through the study area. Perteet's evaluation of the needs for each mode is summarized below.

Transit

The study area is serviced by LINK Transit's Route 23, which connects Wenatchee to Rock Island via East Wenatchee. The route map is shown in Figure 12. This route primarily uses roads other than SR 28, however, it does use SR 28 for the segment between Rock Island Road to the east and west, since there is no other parallel route to use.

Per the LINK Transit route timetable, the eastbound trip lasts 27 minutes end-to-end and the westbound trip lasts 23 minutes. The route runs nine times per weekday.

Transit Needs

Transit is optimized when the service has adequate speed and reliability and when ridership is maximized for the context of an area.

Both speed and reliability can suffer in areas with high traffic volumes and congestion patterns. However, Route 23 uses Rock Island Road, which tends to feature low traffic volumes and consistent travel speeds. The components of the route map that stand out as potential reliability issue areas are the turns to and from SR 28, particularly the left turns required from Rock Island Road onto SR 28. As traffic volumes increase in the study area over time, delays to make these turning movements will likely increase for buses absent any intersection re-configurations or route adjustments.

Ridership for a bus route is generally described in terms of a walkshed, which is the standard area within a certain distance of bus stops that riders will walk to reach the transit service. Typical transit planning walksheds are one-quarter-mile radii from each stop. The current routing along Rock Island Road appears to maximize the walkshed for users north of SR 28, as it cuts through the middle of Rock Island on the east end and approximately halfway between SR 28 and 8th Street SE on the west end of the study area. However, the walkshed is limited for potential transit riders south of SR 28. In some locations, properties south of SR 28 are located more than one-quarter mile away from the nearest transit stop. And for the parcels that are within the walkshed, potential riders face a barrier in having to cross SR 28, which does not currently have any marked crossings south of East Wenatchee.

Figure 11 presents ridership data in terms of average boardings plus alightings at the stops along Route 23. The data in the chart is aggregated by pair of stops, so both directions are captured in a column. The left side of the chart reflects ridership at the north end of the study area near 3rd Street SE and the right side of the chart is ridership in Rock Island. Data was available for weekday averages and Saturdays.

MEMORANDUM

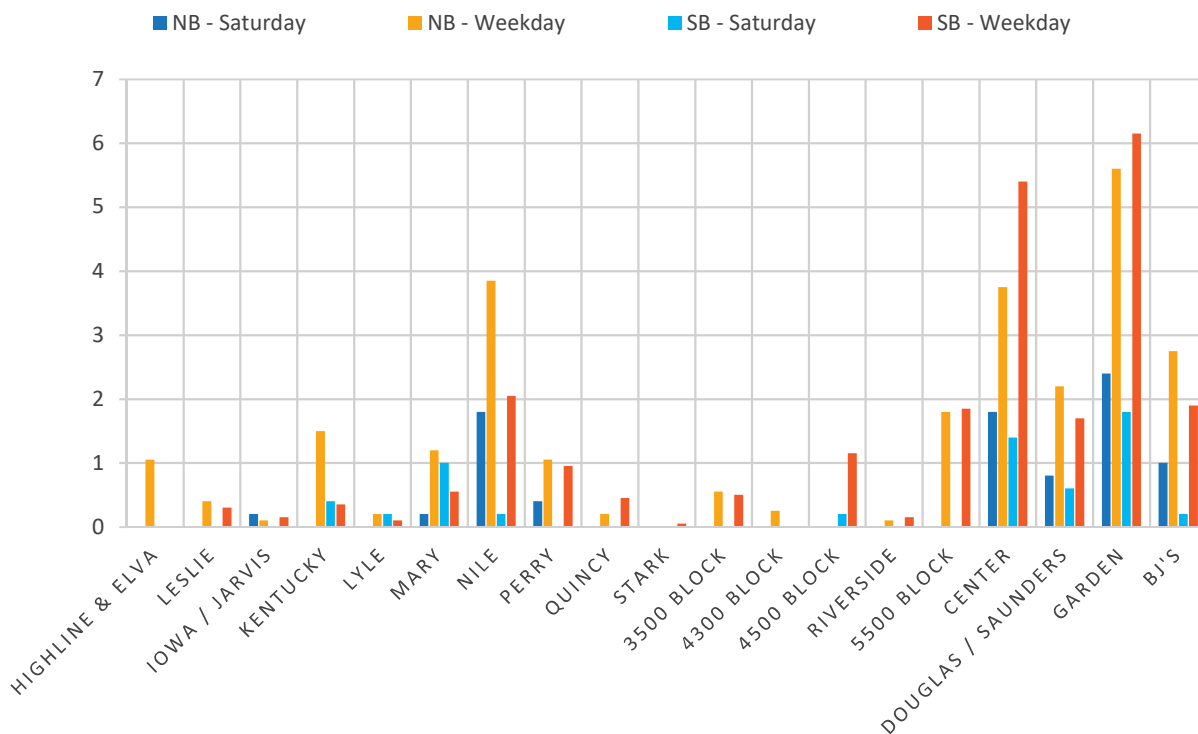


Figure 11. LINK Transit Route 23 Average Ridership.

Figure 11 illustrates that the highest-rider stops are in Rock Island, which today are generally surrounded by sidewalk. Outside of Rock Island, the stops at S Nile Avenue have the highest activity.

Note there is a Rock Island Park and Ride facility located west of Battermann Road, but it does not currently have any transit service.

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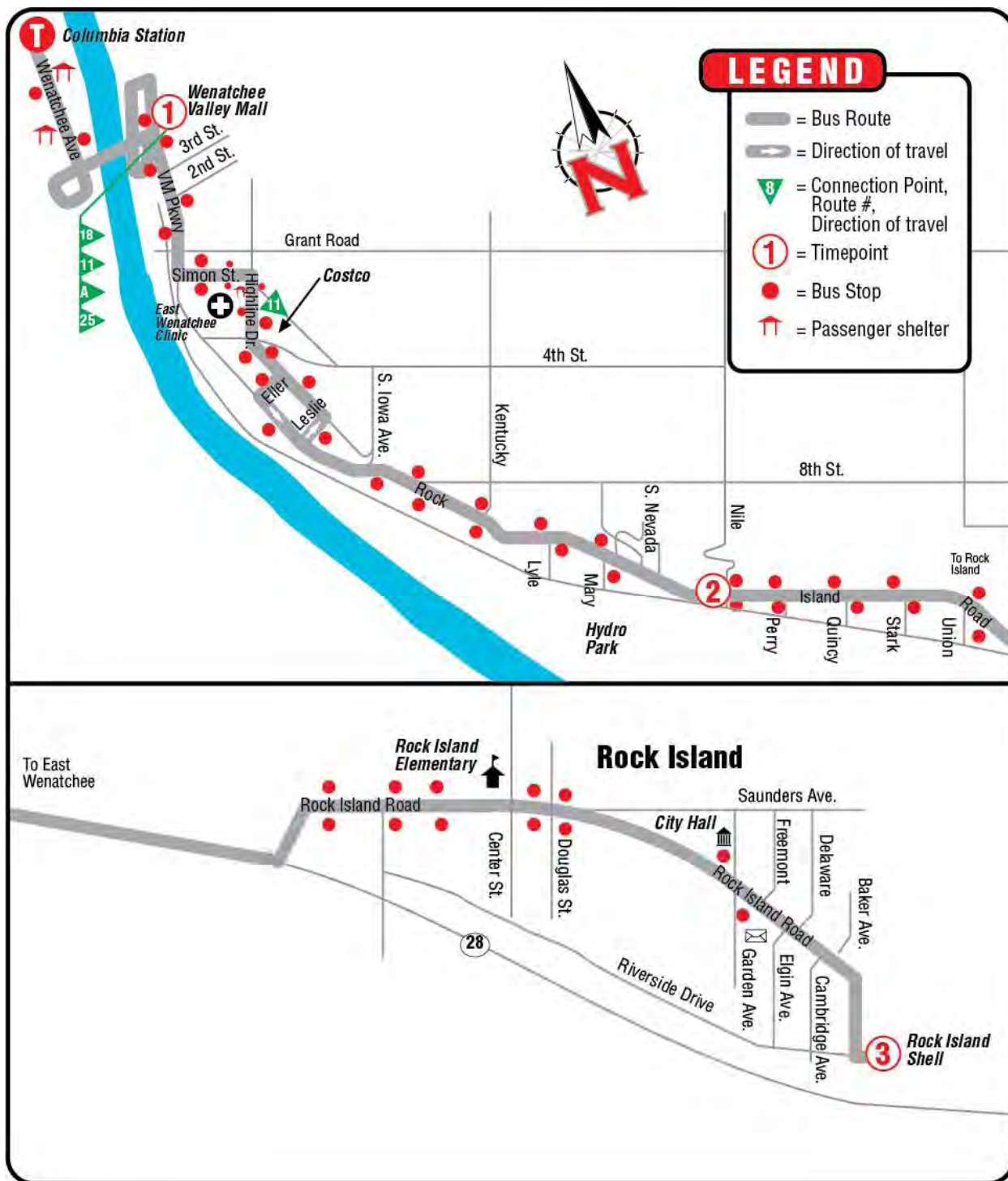


Figure 12. LINK Transit Route 23 Map.

Freight

SR 28 is the primary freight route through the study area. Approximately 10% of all trips on SR 28 are by commercial trucks. This route is a key connection between the Wenatchee Valley and I-90.

MEMORANDUM

A key need for efficient freight movement is reliable travel times. Travel time can increase due to vehicle congestion, required stoppages at intersections or crosswalks, or increased side-street activity that either slows traffic turning off of SR 28 onto local streets or adds traffic that must accelerate after turning on SR 28. The CDTC *2020 Regional Transportation Plan Update* Table 2-1 outlines that a performance target for the full CDTC jurisdiction is that a metric called “Level of Travel Time Reliability Ratio” is at least 70%, with current performance (as of 2020) at 92%. This high percentage indicates that current roadways in the CDTC study are operating with more consistent travel times during peak periods as compared to the agency target. The companion CDTC *2020 System Performance Report* shows that SR 28 is classified as a “reliable” facility.

General-Purpose Traffic

All roadways in the study area service general-purpose trip demands. Local roadways in Rock Island and East Wenatchee are primarily used by local residents or employees of businesses, whereas SR 28 is also used for recreational and inter-county trips.

Like all other modes, safety is a top priority need for general-purpose traffic. Mobility and access are also key needs. These are discussed in the following sections.

Planned Improvements

Figure 13 shows the transportation entries in Table 3 from the *Rock Island Waterfront Subarea Plan*, which envisions a revised transportation network between SR 28 and the Columbia River.

Project	Description	Cost Forecast
TRANSPORTATION		
SR 28/Rock Island Drive Intersection	Construct a one-lane roundabout in the existing right-of-way when development reaches approx. 154,000 square feet or 185 total weekday PM peak hour trips	\$1,600,000 to \$2,500,000
SR 28/Nature Shores Drive Intersection	Modify intersection to be right-in/right-out when development reaches approx. 154,000 square feet or 185 total weekday PM peak hour trips	\$20,000 to \$30,000
At-Grade Railroad Crossing Improvement	Install signal and crossbars at existing rail crossing	\$1,000,000 to \$1,500,000
Railroad Grade-Separated Crossing	Grade-separated crossing of rail line to provide second point of access	\$8,000,000 to \$10,000,000
SR 28 Undercrossing	Type, size, and location study for vehicle and pedestrian undercrossing	\$150,000 to \$250,000
Interior Streets	SR 28 frontage street and interior loop. Full width with sidewalk and lighting (approx. 8,000 linear feet)	\$3,000,000 to \$4,500,000
OPEN SPACE AND TRAILS		
Waterfront Trail	Approximately 1.5 mile, paved trail	\$250,000 to \$350,000

Figure 13. Relevant *Rock Island Waterfront Subarea Plan* Project Listing.

MEMORANDUM

The subarea plan calls for some internal improvements, but also modifications that would affect travel on SR 28 with improvements at the intersections of SR 28 and Rock Island Drive (proposed roundabout) and SR 28 and Nature Shores Drive (proposed right-in/right-out configuration).

A proposed but unprioritized expansion project in the *2020 Regional Transportation Plan Update* is to add passing lanes on SR 28 from Wenatchee to Crescent Bar. This expansion project would primarily benefit general purpose traffic by providing recurring locations to pass slower-moving heavy vehicles ahead of them.

Origin and Destination Patterns

As with freight, SR 28 is the primary route for general-purpose trips through the study, even for trips with an origin or destination point elsewhere in the study area. Perteet coordinated with CDTC to evaluate origin-destination data for trips on SR 28, which revealed the breakdown of local versus regional uses for the facility.

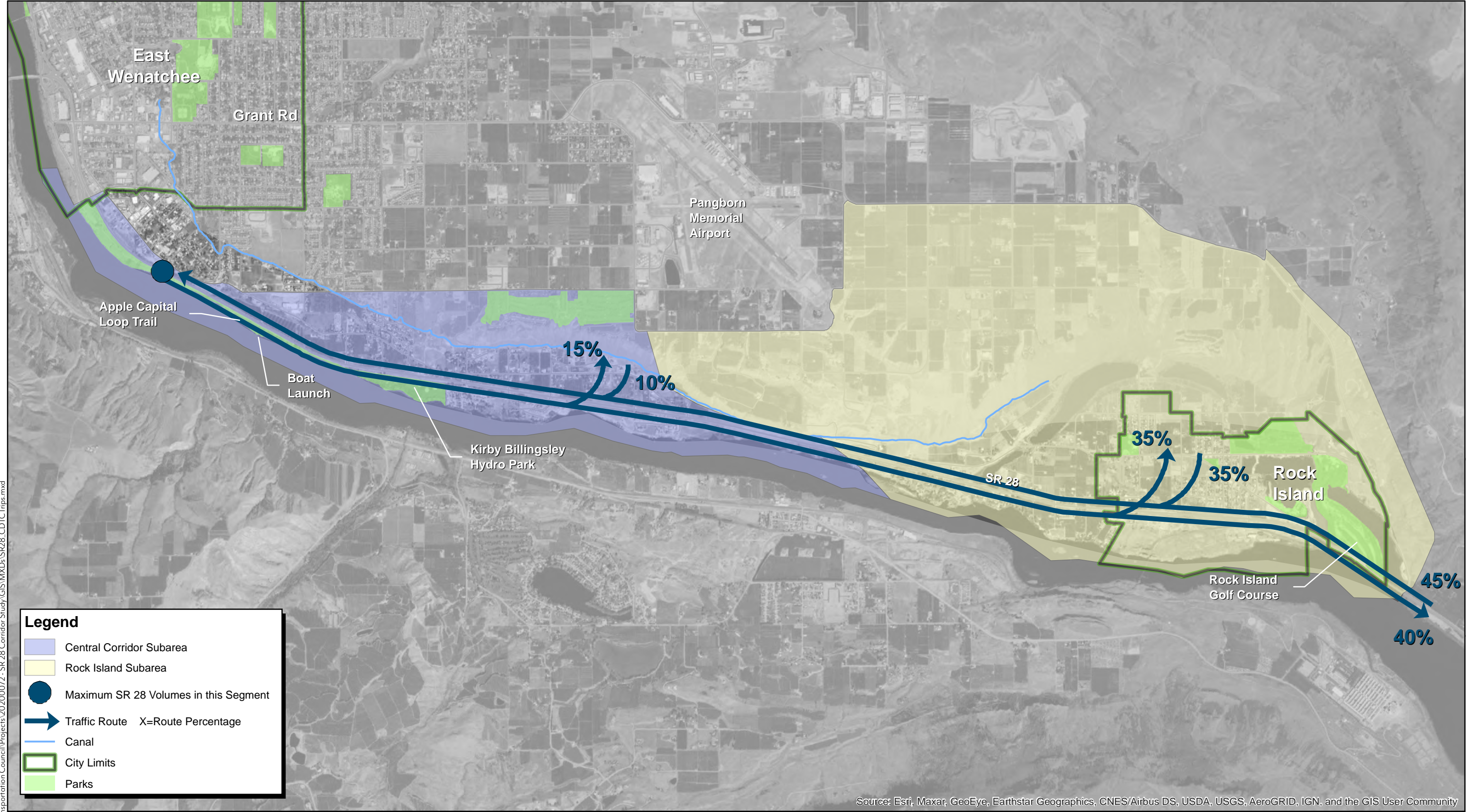
Figure 14 illustrates this breakdown at one point along SR with the highest daily use: between 3rd Street SE and the boat launch along the Columbia River. This data is also summarized in Table 9. All of this analysis is based on P.M. Peak Hour data from CDTC’s 2045 travel demand model.

Table 9. SR 28 Origin-Destination Data for Trips South of 3rd Street SE.

To/From Zone	Southbound	Northbound
“Central Corridor Subarea”	15%	10%
“Rock Island Subarea”	35%	35%
South/east of Rock Island	40%	45%
Other	10%	10%
Total	100%	100%

As Table 9 and Figure 14 show, SR 28 supports roughly equal local versus regional demand in the P.M. Peak Hour.

Perteet also evaluated trip patterns to/from each subarea and found that 90% of trips from both subareas come from or head to either East Wenatchee or the airport vicinity. Around two-thirds of these movements happen via SR 28, with the remaining third using alternate routes.



Legend

- Central Corridor Subarea
- Rock Island Subarea
- Maximum SR 28 Volumes in this Segment
- Traffic Route X=Route Percentage
- Canal
- City Limits
- Parks

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community







SR 28 Corridor Study
Trip Origin-Destination
2045 P.M. Peak Hour

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Access

This segment of SR 28 is classified by WSDOT as partially controlled limited access. The WSDOT *Design Manual* Section 530.04(3)(b)(1) standard for intersection spacing on a partially controlled limited access principal arterial is 1 mile, minimum, for crossroads with average daily travel volumes of less than 2,000. Intersection with crossroad volumes above 2,000 vehicles per day in a 20-year horizon should “plan for grade separation.”

Between and including the intersections of SR 28 at S Lyle Avenue and SR 28 at Battermann Road, there are 14 intersections along the state highway in a 6.5-mile stretch. The smallest distance between two intersections is 0.13 miles between S Tye Avenue and Rock Island Road (west). There are opportunities throughout the corridor to either consolidate access points on one side of SR 28 or to remove the offset in existing access points on either side of SR 28.

Intersection locations may be dictated by the location of developments on the waterfront side of SR 28, as they have a more constrained existing and potential street network than the north side of SR 28. These existing developments on the south side are spaced less than one mile apart, which may present a barrier to achieving the WSDOT standard for intersection spacing. Still, there are potential access changes for these locations that can be explored to bring intersection spacing closer to the standard minimum.

Based on Perteet’s evaluation of anticipated 2045 peak hour traffic demands, three intersections are projected to exceed the 2,000 vehicle per day threshold listed in Section 530.04(3)(b)(1): SR 28 at 3rd Street SE, SR 28 at Rock Island Road (east), and SR 28 at Rock Island Drive.

Capacity

Perteet evaluated traffic SR 28 segment volume projections for 2045. For this phase of the study, these volumes reveal anticipated planning-level levels of service for different SR 28 configurations. Future phases of SR 28 analysis will dive deeper into traffic data and establish intersection turning movement volumes. The traffic volumes analysis is detailed in Appendix A.

Table 10 shows the peak hour traffic volumes Perteet established for the SR 28 corridor for 2045. See Appendix A for additional details on how these numbers were developed.

Table 10. 2045 Peak Season P.M. Peak Hour SR 28 Traffic Volumes.

SR 28 Segment	Southbound	Northbound	Total
3rd Street SE to S Nile Avenue	1440–1530	1360–1430	2800–2960
S Nile Avenue to Rock Island Road (East)	1390–1460	1350–1410	2740–2870
Rock Island Road (East) to Rock Island Drive	980–1040	1040–1090	2020–2130
Rock Island Drive to Battermann Road	670–710	740–780	1410–1490

Perteet compared these anticipated volumes to planning-level level of service tables found in HCHRP Report 825, *Planning and Preliminary Engineering Applications Guide to the Highway Capacity Manual (2016)*. These planning-level tables provide maximum volumes per hour per lane for different level of service (LOS) classifications (A-C, D, and E). Exhibit 30 in NCHRP 825 covers multi-lane highways, Exhibit

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36 has data for two-lane highways, and Exhibit 45 addresses urban streets (see note below). These three exhibits span the current SR 28 corridor strategy alternatives in review with this study.

Table 11 summarizes the key pieces of the NCHRP 825 data relevant to this SR 28 study.

Table 11. NCHRP 825 Relevant Planning-Level Threshold Volumes.

Facility Type	Peak Hour Directional Volume (veh/hr)		
	LOS A-C	LOS D	LOS E
Multi-lane highway (urban, level terrain)	2720	3400	3880
Two-lane highway (Class 1 ⁹ , level terrain)	440	750	1490

Note that these planning-level thresholds incorporate a series of assumptions from the *Highway Capacity Manual* methodology. One assumption for the two-lane highway data in Table 11 is a configuration with 20% no-passing zones.

Table 11 does not include an analysis of an “urban street,” even though that planning-level information is available in NCHRP 825. The reason is that the assumptions for the urban street analysis include signalized intersections at 1,500-foot spacing for a 45-mph facility. For this SR 28 study area, that frequency would translate to approximately 30 signals on the corridor, which is not consistent with existing conditions or any future configuration scenario. Therefore, the urban street values cannot be accurately used in this planning-level assessment.

Comparing Tables 10 and 11 shows that a multi-lane highway would have operations in the LOS A-C range because the Table 11 data is in vehicles per lane, so the directional capacity would be approximately double the anticipated demand. For a two-lane highway (Class 1), operations for most segments would be at LOS E. However, in the southbound direction the upper range of volumes for the 3rd Street SE to S Nile Avenue section would reach LOS F performance. And in both directions the segment between Rock Island Drive and Battermann Road would reach LOS D operations.

The capacity analysis is subject to further refinement in future phases of the study when highway modeling can address the assumptions included in this planning-level assessment.

ATTACHMENTS

- Appendix A Data and Traffic Volumes Forecast and Analysis Memorandum
- Appendix B *Highway Safety Manual* Evaluations
- Appendix C Level of Traffic Stress Evaluations

⁹ From NCHRP 835: Class 1 highways are highways where motorists expect to travel at relatively high speeds.

APPENDIX A
CDTC Model Outputs

MEMORANDUM

123 Ohme Garden Road, Suite 8, Wenatchee, WA 98801 | P 425.252.7700

To: Riley Shewak

From: Brent Powell, PE
Jennifer Saugen, PE
Cody Wuestney, EIT

Date: July 30, 2021

Re: SR 28 Corridor Study – Data and Traffic Volumes Forecast and Analysis Memorandum

INTRODUCTION

Chelan Douglas Transportation Council (CDTC) hired Perteet Inc. to complete a corridor evaluation focused on SR 28 between East Wenatchee and Rock Island. The intent of this phase of the study is to evaluate three high-level concepts for overall SR 28 planning: two-lane rural, four-lane rural, and two-lane urban. The study also includes evaluations of Rock Island Road and Battermann Road as parallel routes with potential for urban and/or multi-modal upgrades. Though this phase of the study will not include detailed traffic modeling, Perteet will compare the traffic volumes discussed in this against planning-level level-of-service thresholds to shape SR 28 concepts.

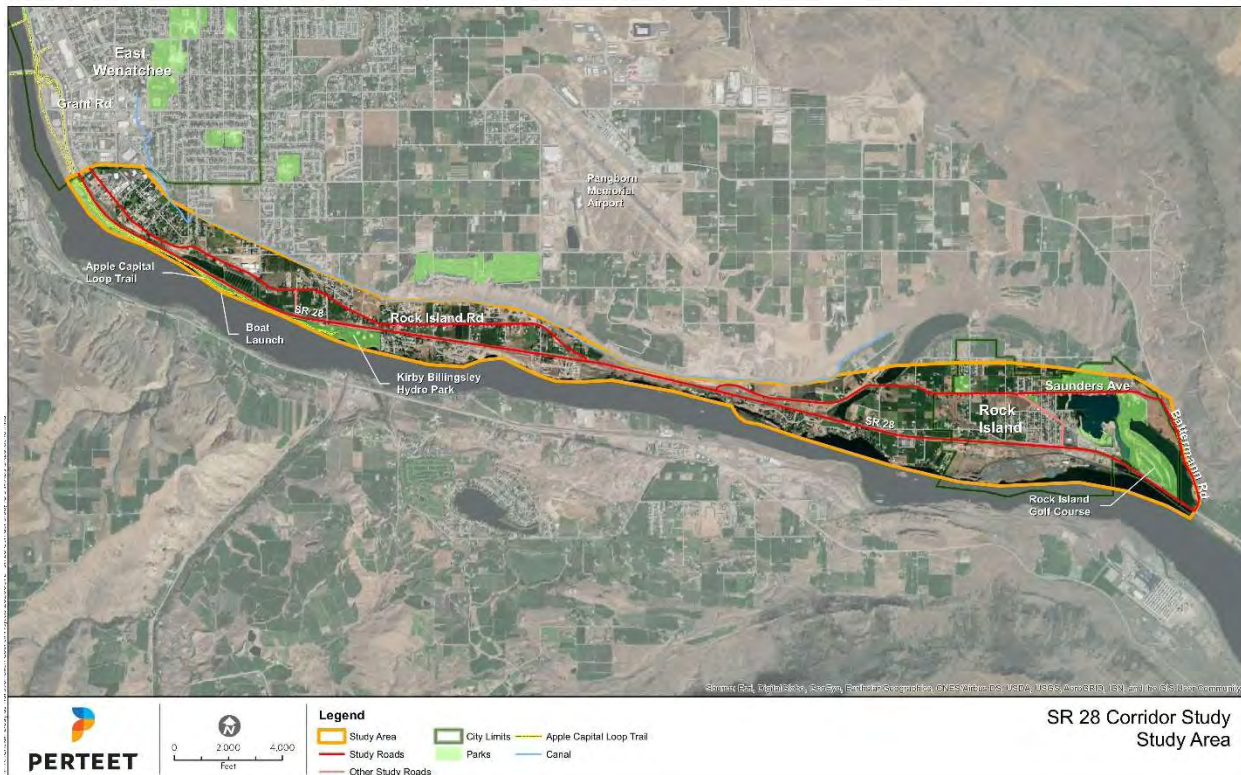


Figure 1. Study Area Map

MEMORANDUM

This memorandum documents Perteet’s evaluation of traffic volumes throughout the study area and details expected ranges of traffic volumes on four SR 28 segments. The analysis provides volumes for peak season in the P.M. Peak Hour of the horizon year (2045).

The four SR 28 segments are:

1. 3rd Street SE to S Nile Avenue¹
2. S Nile Avenue to Rock Island Road (East)
3. Rock Island Road (East) to Rock Island Drive
4. Rock Island Drive to Battermann Road

Project Direction Notation

Within the project limits, SR 28 is oriented both north-south and east-west. North and west of the Kirby Billingsly Hydro Park driveway (roughly at milepost 1.25), SR 28 will be referred to as a north-south roadway with the intersecting roadways oriented east-west. South, east, and at the Kirby Billingsly Hydro Park driveway, SR 28 will be referred to as an east-west roadway with the intersecting roadways oriented north-south.

EXISTING TRAFFIC VOLUMES AND DATA

Perteet obtained traffic, roadway, and development data from CDTC, Washington State Department of Transportation (WSDOT), Douglas County, City of East Wenatchee, and City of Quincy. (City of Rock Island did not provide any relevant traffic data upon request.) Traffic data consisted of: intersection turning movement counts, average annual daily traffic (AADT), travel demand model (TDM) outputs, past transportation studies in the vicinity, and crash records. Roadway data consisted of: intersection control, roadway and intersection configuration, and operational data. Development data consisted of: planned transportation projects in the area as well as reviewing nearby city comprehensive or transportation plans and reviewing WSDOT planning documents including WSDOT’s *Active Transportation Plan Part 1, 2020 and Beyond*.

The available data provided sufficient information to calculate the high-level volumes necessary for the planning applications of this phase of the SR 28 study. However, new traffic volume data would be helpful to model intersection treatments and other traffic control elements—such as enhanced intersection crossings—in future phases of the study. Perteet recommends collecting new count data concurrently at all locations that may see intersection control modifications in future phases. The available turning movement count data provided by CDTC and WSDOT covers most of the major intersections along SR 28 within the study limits, but data was collected during different months and years. If older data is used in conjunction with new traffic counts, Perteet recommends applying annual growth and seasonal adjustment factors to the older data to provide a consistent analysis framework.

One data gap that Perteet found is that no current speed data was available for analysis. Perteet recommends collecting travel speed data for future phases of the study.

¹ The 3rd Street SE to S Nile Avenue segment includes the SR 28 Spur instead of SR 28 when the two highways run parallel. See Figure 1 for project study roads.

MEMORANDUM

TRAFFIC VOLUMES ANALYSIS

Perteet determined with CDTC and WSDOT that using a range of traffic volumes per SR 28 segment would be appropriate for this planning study. The following sections detail the steps Perteet took to develop these volume ranges. All of the calculations are presented in tabular form in Appendix B.

Perteet found that the 2020 CDTC travel demand model (TDM) output for the SR 28 corridor and intersections included noticeably higher traffic volumes than the counts collected along the corridor in the 2010s showed. For this reason, Perteet, CDTC, and WSDOT agreed to set the low end of the volume range based on the traffic demand recorded in the turning movement counts with the high end of the volume range at the CDTC model projection.

Low-End Volume Range Calculations

One location in the corridor had multiple counts available to perform a regression analysis: SR 28 Spur at 3rd Street SE. Perteet compared volumes collected at this intersection in 2013, 2015, 2017, and 2018 to find a trendline to project volumes to 2020, the year of the CDTC TDM baseline. For this analysis, Perteet isolated the volumes on the south leg of the intersection, since those are within the boundaries of the study area and could be easily compared to CDTC's outputs. This analysis step showed that the CDTC model included 294 southbound departure vehicles from the 3rd Street SE intersection versus 221 estimated vehicles from the trendline estimate, a difference of 73 vehicles.

Perteet used origin-destination (O-D) data provided by the CDTC TDM (the 2045 model) to estimate how to distribute this 73-vehicle difference across the four study segments. The O-D data shows that the highest travel volumes on SR 28 (or SR 28 spur) are near the 3rd Street SE intersection, with volumes progressively lowering to the south along the corridor. To account for this, Perteet reduced the volume difference segment by segment. For example, at the final study segment of Rock Island Drive to Battermann Road, Perteet estimated that the volume difference would be only 40% of what it is at 3rd Street SE, since approximately 40% of the SR 28 traffic from the north continues on the corridor to reach Batterman Road.

Perteet performed the same analysis and adjustments for the northbound traffic. All calculations are summarized in Appendix B. Perteet adjusted the 2045 CDTC TDM outputs by the volume differences to produce the lower volume ranges for each study segment. The final adjustment required was applying a peak season adjustment factor to bring both the low end and high end of the volume range up to peak season demands.

Seasonal Adjustment – Peak Season

Traffic volumes vary throughout the year, with lower than average volumes in the winter and higher than average volumes in the summer. The magnitude of seasonal variation varies based on location, with urban areas staying closer to average and rural areas experiencing higher peaks in the summer from recreational and agricultural traffic. Accounting for seasonal adjustment is important in developing average annual traffic volumes, since individual counts taken on a given day, if extrapolated, may under- or overestimate the average annual traffic at that location. Seasonal adjustment factors can be used to

MEMORANDUM

adjust raw count data to average annual volumes as well adjusting average annual volumes to seasonal volumes.

Perteet used WSDOT’s permanent traffic recorder (PTR) data on the Sellar Bridge (WSDOT PTR site S103) to evaluate the seasonal variation on a month scale. We calculated the seasonal adjustment factors for each month between 2017 and 2019 and found the month with the peak volume is May. The seasonal adjustment factor to adjust average annual to the peak month (May) volumes is 1.058.

2045 Analysis Traffic Volumes

Table 1 shows the segment volume ranges throughout the SR 28 corridor that Perteet determined based on the above analysis steps.

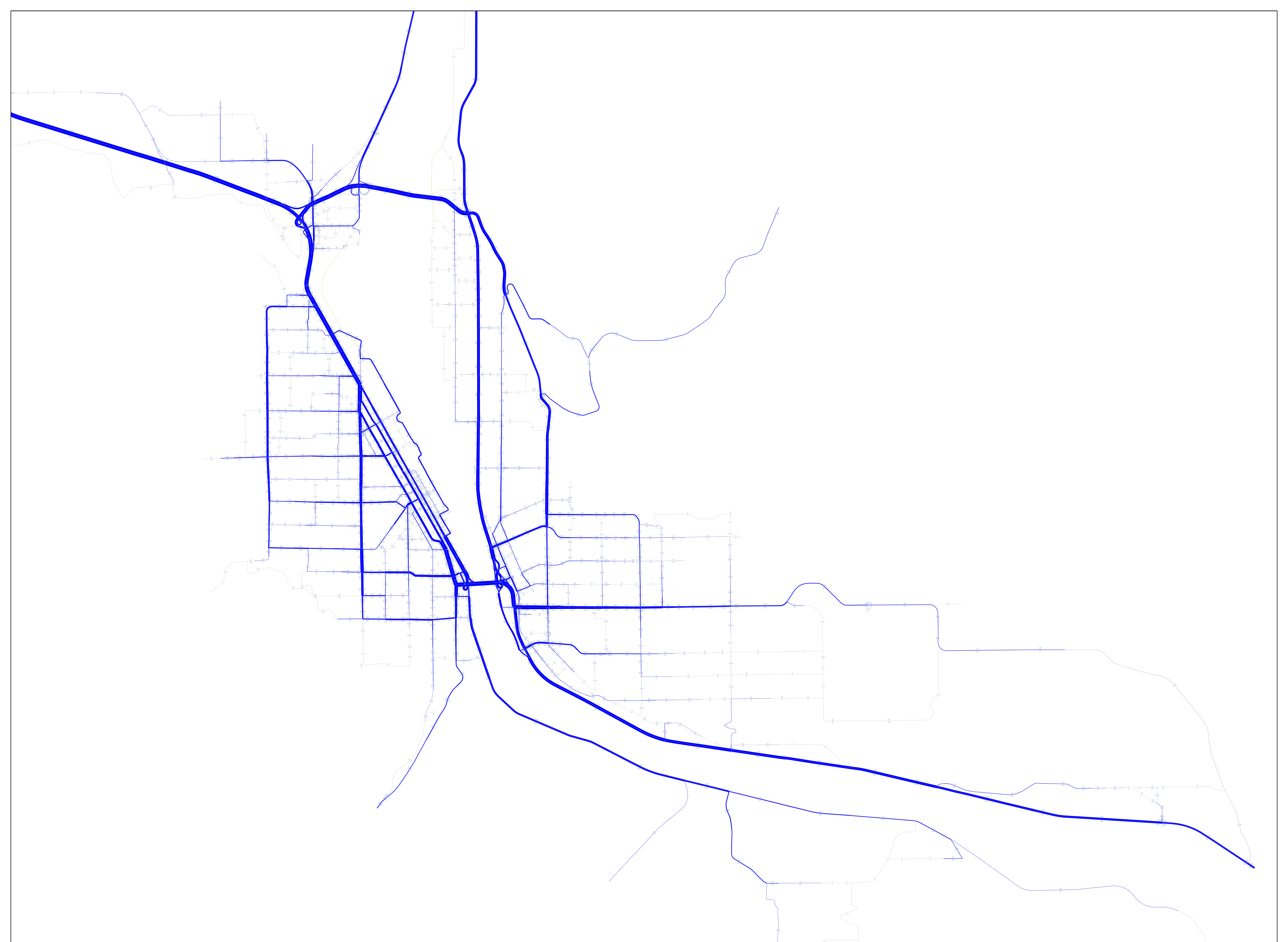
Table 1. 2045 Peak Season P.M. Peak Hour SR 28 Traffic Volume Ranges.

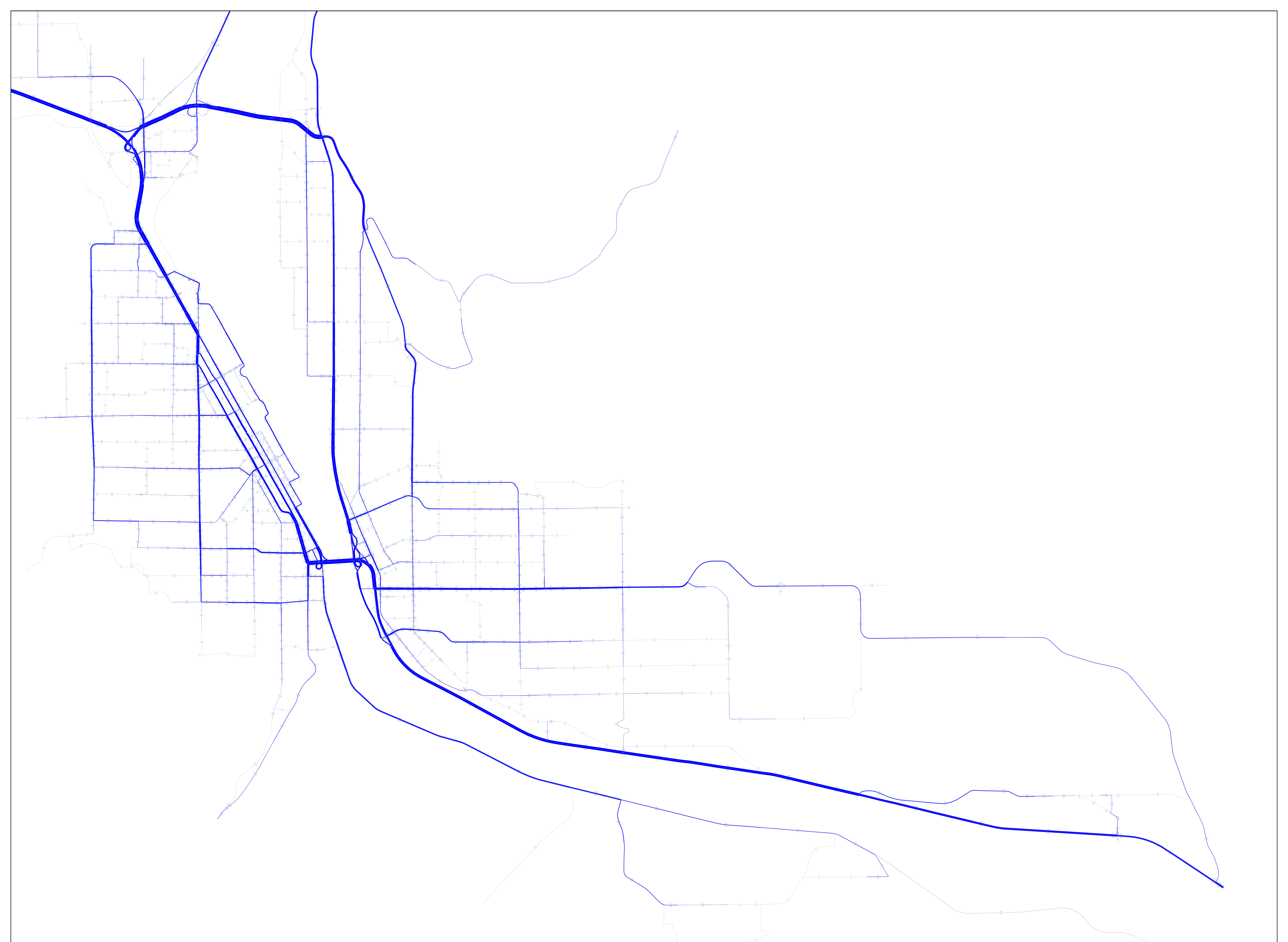
SR 28 Segment	Southbound	Northbound	Total
3rd Street SE to S Nile Avenue	1440–1530	1360–1430	2800–2960
S Nile Avenue to Rock Island Road (East)	1390–1460	1340–1410	2730–2870
Rock Island Road (East) to Rock Island Drive	970–1040	1020–1090	1990–2130
Rock Island Drive to Battermann Road	670–710	710–780	1380–1490

ATTACHMENTS

- Appendix A CDTC TDM Outputs
- Appendix B Volume Analysis

APPENDIX A
CDTC Model Outputs





APPENDIX B

Volumes Analysis

SR 28 at 3rd Street SE Historical Volumes

Year	SB Depart.	NB Approach	Total	Notes
2013	239	414	653	4-5pm 1/18-19/2013 WSDOT Mioivision count
2015	250	575	825	5-6pm 6/10/2015 WSDOT Mioivision count
2017	231	667	898	Avg of 4:15-5:15pm 4/25-26/2017 WSDOT Mioivision count
2018	234	592	826	2/1/2018 CDTC Mioivision count

SR 28 at 3rd Street SE Historical and TDM Volumes

Year	A.A. Factor	SB Depart.	NB Approach	Total	Notes
2013	1.118	267	463	730	Converted to average annual for 2013
2015	0.948	237	545	782	Converted to average annual for 2015
2017	0.976	225	651	876	Converted to average annual for 2017
2018	1.049	245	621	866	Converted to average annual for 2018
2020	-	294	778	1072	TDM model output
2045	-	549	1347	1896	TDM model output

SR 28 at 3rd Street SE Overall Volume Adjustments

Year	SB Depart.	NB Approach	Total	Notes
2020 (Trendline Estimate)	221	721	942	See chart below for trendline equations
2020 (TDM)	294	778	1072	
Adjustment to TDM	-73	-57	-130	

SR 28 Segment Volume Adjustments (2020, 2045)

Segment	Southbound		Northbound		Total
	Impact %	Adjustment	Impact %	Adjustment	
3rd Street SE to S Nile Avenue	100%	-73	100%	-57	-130
S Nile Avenue to Rock Island Road (East)	75%	-55	80%	-46	-101
Rock Island Road (East) to Rock Island Drive	60%	-44	65%	-37	-81
Rock Island Drive to Battermann Road	40%	-29	45%	-26	-55

SR 28 P.M. Peak Hour CDTC 2045 TDM Outputs

Segment	Southbound	Northbound	Notes on Collection Point
3rd Street SE to S Nile Avenue	1440	1347	Maximum value, at midpoint
S Nile Avenue to Rock Island Road (East)	1375	1324	Maximum value, just east of Nile
Rock Island Road (East) to Rock Island Drive	976	1021	Maximum value, just east of R.I.R. (East)
Rock Island Drive to Battermann Road	665	731	

SR 28 P.M. Peak Hour Segment Volumes (2045) (Average Annual)

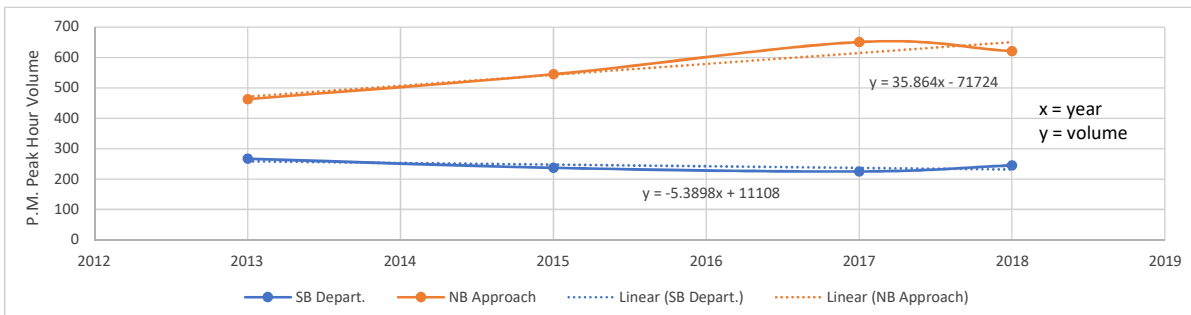
Segment	Southbound		Northbound		Total	
	Low End	High End	Low End	High End	Low End	High End
3rd Street SE to S Nile Avenue	1360	1440	1290	1350	2650	2790
S Nile Avenue to Rock Island Road (East)	1320	1380	1270	1330	2590	2710
Rock Island Road (East) to Rock Island Drive	930	980	980	1030	1910	2010
Rock Island Drive to Battermann Road	630	670	700	740	1330	1410

Peak Season Adjustment Factor 1.058 (converts from average annual to peak season)

SR 28 P.M. Peak Hour Segment Volumes (2045) (Peak Season)

Segment	Southbound		Northbound		Total	
	Low End	High End	Low End	High End	Low End	High End
3rd Street SE to S Nile Avenue	1440	1530	1360	1430	2800	2960
S Nile Avenue to Rock Island Road (East)	1390	1460	1350	1410	2740	2870
Rock Island Road (East) to Rock Island Drive	980	1040	1040	1090	2020	2130
Rock Island Drive to Battermann Road	670	710	740	780	1410	1490

Note: Results rounded to nearest 10 vehicles. Low-end volumes rounded down. High-end volumes rounded up.



APPENDIX B

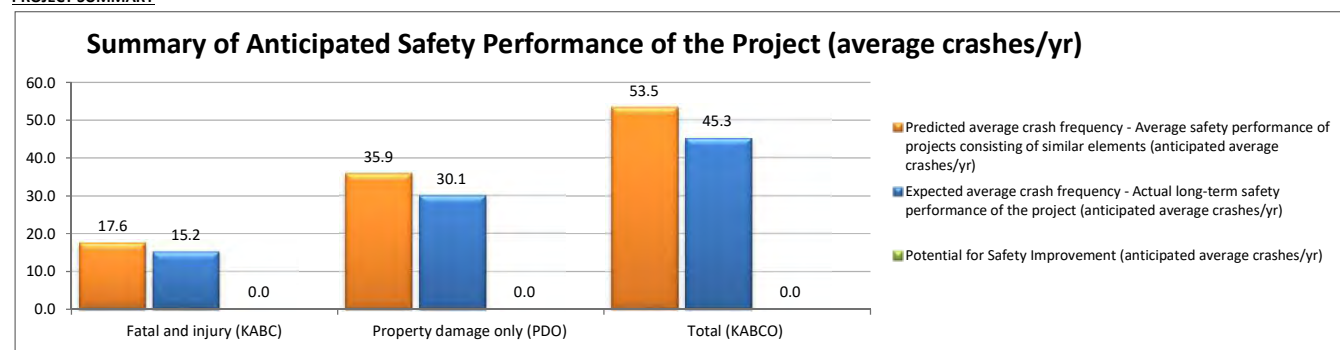
***Highway Safety Manual* Evaluations**

PROJECT SAFETY PERFORMANCE SUMMARY REPORT

General Information

Project Name	SR 28 Corridor Study	
Project Description	Project Description	
Reference Number	20200072	
Analyst	Cody Wuestney	
Agency/Company	Chelan Douglas Transportation Council (CDTC)	
Contact Email	cody.wuestney@Perteet.com	
Contact Phone	206.436.0515	
Date Completed	05/12/11	Years of crash data incorporated into the analysis: 5

PROJECT SUMMARY



Project Element	Total Crashes/yr (KABCO)			Fatal and Injury Crashes/yr (KABC)			Property Damage Only Crashes/yr (PDO)		
	Predicted average crash frequency	Expected average crash frequency	Potential for Improvement	Predicted average crash frequency	Expected average crash frequency	Potential for Improvement	Predicted average crash frequency	Expected average crash frequency	Potential for Improvement
	N _{predicted} (KABCO)	N _{expected} (KABCO)		N _{predicted} (KABC)	N _{expected} (KABC)		N _{predicted} (O)	N _{expected} (O)	
INDIVIDUAL SEGMENTS									
SR 28 Spur Segment 1 Grant - 3rd	1.5	2.3	0.8	0.5	0.7	0.2	1.1	1.6	0.5
SR 28 Segment 2 3rd - Battermann	24.4	15.8	0.0	6.7	4.3	0.0	17.7	11.4	0.0
Battermann Segment 3 SR 28 - Saunders	0.2	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.0
R.I.R. (East)/Saunders Segment 4 Batterman - SR 28	2.3	2.0	0.0	0.8	0.7	0.0	1.5	1.3	0.0
R.I.R. (West) Segment 5 SR 28 - Grant	2.9	0.6	0.0	1.0	0.2	0.0	1.9	0.4	0.0
INDIVIDUAL INTERSECTIONS									
Intersection 1 28 Spur & Grant	2.3	10.1	7.8	0.8	3.7	2.8	1.5	6.5	5.0
Intersection 2 28 Spur & 3rd	1.3	3.2	2.0	0.4	1.0	0.6	0.9	2.2	1.3
Intersection 3 28 & Mary	1.0	1.1	0.1	0.4	0.4	0.0	0.6	0.7	0.1
Intersection 4 28 & Nile	1.0	1.3	0.4	0.4	0.5	0.1	0.6	0.8	0.2
Intersection 5 28 & Tyee	1.2	1.0	0.0	0.4	0.4	0.0	0.7	0.6	0.0
Intersection 6 28 & R.I.R. (West)	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.0
Intersection 7 28 & R.I.R. (East)	0.6	0.5	0.0	0.2	0.2	0.0	0.4	0.3	0.0
Intersection 8 28 & Rock Is. Dr	0.7	0.8	0.1	0.3	0.3	0.0	0.4	0.5	0.1
Intersection 9 28 & Battermann	0.4	0.6	0.1	0.2	0.3	0.1	0.2	0.3	0.1
Intersection 10 Batterman & Saunders	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Intersection 11 Saunders & Garden	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Intersection 12 R.I.R. (West) & Nile	0.4	0.3	0.0	0.1	0.1	0.0	0.3	0.2	0.0
Intersection 13 R.I.R. (West) & 8th	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.1	0.0
Intersection 14 R.I.R. (West) & 3rd	0.8	0.4	0.0	0.3	0.2	0.0	0.5	0.2	0.0
Intersection 15 R.I.R. (West) & Grant	3.9	0.7	0.0	1.4	0.3	0.0	2.5	0.5	0.0
Intersection 16 28 & Lyle	0.8	0.5	0.0	0.4	0.2	0.0	0.5	0.3	0.0
Intersection 17 28 & Perry	1.8	0.7	0.0	0.7	0.3	0.0	1.1	0.4	0.0
Intersection 18 28 & Quincy/Akamai	2.1	0.8	0.0	0.8	0.3	0.0	1.3	0.5	0.0
Intersection 19 28 & Union	1.8	0.7	0.0	0.7	0.3	0.0	1.1	0.4	0.0
Intersection 20 28 & Nature Shore	0.4	0.6	0.1	0.2	0.3	0.1	0.2	0.3	0.1
Intersection 21 28 & Columbia Cove	0.4	0.3	0.0	0.2	0.1	0.0	0.2	0.1	0.0
Intersection 22 28 & Riverside	0.7	0.4	0.0	0.2	0.2	0.0	0.4	0.3	0.0
COMBINED (sum of column)	53.5	45.3	0.0	17.6	15.2	0.0	35.9	30.1	0.0

PROJECT SUMMARY -- Site-Specific EB Method Summary Results for Urban and Suburban Arterial Project

Crash severity level	N _{predicted} (PROJECT)	N _{expected} (PROJECT)	N _{potential for improvement} (PROJECT)
	Predicted average crash frequency - Average safety performance of projects consisting of similar elements (anticipated average crashes/yr)	Expected average crash frequency - Actual long-term safety performance of the project (anticipated average crashes/yr)	Potential for Safety Improvement (anticipated average crashes/yr)
Fatal and injury (KABC)	17.6	15.2	N/A
Property damage only (PDO)	35.9	30.1	N/A
Total (KABCO)	53.5	45.3	N/A

HSM1 Extended Spreadsheet for Part C Chapter 12 v.9

Discussion of Results

Given the potential effects of project characteristics on safety performance, results indicate that:

1. It is anticipated that the project will, on average, experience 45.3 crashes per year (15.2 fatal and injury crashes per year; and 30.1 property damage only crashes per year).
2. A similar project is anticipated, on average, to experience 53.5 crashes per year (17.6 fatal and injury crashes per year; and 35.9 property damage only crashes per year).

#VALUE!

APPENDIX C

Level of Traffic Stress Evaluations

Road	From	To	Pedestrian Facility Type	Bike Lane Width	Veh. Lanes per Dir.	Speed Limit	BLTS	PLTS
SR 28	Battermann Rd	3rd Ave	No sidewalk	0	1	60	4	4
Battermann Rd	SR 28	Saunders Rd	No sidewalk	0	1	50	4	4
Saunders Rd	Battermann Rd	Delaware Ave	No sidewalk	0	1	35	4	4
Saunders Rd	Delaware Ave	Rock Island Drive (E)	Complete sidewalk on both sides	0	1	25	2	2
Rock Island Rd (E)	Saunders Rd	Center St	Complete sidewalk on one side	0	1	25	2	2
Rock Island Rd (E)	Center St	SR 28	No sidewalk	0	1	35	4	4
Rock Island Dr	Saunders Rd	SR 28	Complete sidewalk on both sides	0	1	25	2	2
Rock Island Rd (W)	SR 28	S Nile Ave	No sidewalk	0	1	35	4	4
Rock Island Rd (W)	S Nile Ave	3rd St SE	No sidewalk	0	1	30	3	3
S Nile Ave	SR 28	Rock Island Rd (W)	No sidewalk	0	1	30	3	3

Road	Cross Street	Speed Limit	Total Lanes Crossed	BLTS	PLTS
SR 28	3rd St SE	40	3	4	4
SR 28	Mary Ave	60	2	4	4
SR 28	S Nile Ave	60	2	4	4
SR 28	Perry Ave S	60	2	4	4
SR 28	Quincy Ave S	60	2	4	4
SR 28	S Union Ave	60	2	4	4
SR 28	Rock Island Rd (W)	60	2	4	4
SR 28	Rock Island Rd (E)	60	2	4	4
SR 28	Riverside Pl	60	2	4	4
SR 28	Rock Island Dr	60	4	4	4
SR 28	Battermann Rd	60	2	4	4
Battermann Rd	Saunders Ave	50	3	4	4
Saunders Ave	N Garden Ave	25	2	2	2
Rock Island Dr	Saunders Ave	25	2	2	2
Rock Island Rd (E)	Douglas St	25	2	2	2
Rock Island Rd (E)	Center St	25	2	2	2
Rock Island Rd (E)	S Ohio St	35	2	3	3
Rock Island Rd (E)	Riverside Dr	35	2	3	3
Rock Island Dr	S Garden Ave	25	2	2	2
Rock Island Rd (W)	S Union Ave	35	2	3	3
Rock Island Rd (W)	Quincy Ave S	35	2	3	3
Rock Island Rd (W)	Perry Ave S	35	2	3	3
Rock Island Rd (W)	S Nile Ave	35	2	3	3
Rock Island Rd (W)	S Mary Ave	30	2	2	2
Rock Island Rd (W)	S Kentucky Ave	30	2	2	2
Rock Island Rd (W)	8th St SE	30	2	2	2
Rock Island Rd (W)	S Iowa Ave	30	2	2	2
Rock Island Rd (W)	3rd St SE	30	4	3	3

APPENDIX B

Environmental Analysis Memorandum

DRAFT MEMORANDUM

2302 W Dolarway Road, Suite 1, Ellensburg, WA 98926 | P 800.615.9900

To: Jennifer Saugen, PE
From: Christina Wollman, AICP CFM
Date: September 20, 2021
Re: Environmental Review Memo – SR 28 Corridor Study

PURPOSE

This memo was prepared as part of a larger corridor study to inform the selection of a preferred scenario for improvements to the SR 28 corridor between East Wenatchee and Rock Island. The memo provides basic environmental considerations based upon a desktop review of conceptual scenarios.

SCENARIOS

This memo is based upon review of three scenarios prepared by Perteet dated August 16, 2021. Currently, SR 28 is a two-lane road with wide shoulders and turning lanes at some intersections. Rock Island Road is currently a two-lane road with narrow shoulders. There is a gap in Rock Island Road that forces vehicles to share the highway for about one mile.

The Urban scenario includes adding a center turn lane, single-lane roundabouts or turning lanes at some intersections, and planting strips separating an 8-foot sidewalk on one side of the highway and a 12-foot shared use path on the other. There are no shoulders.

The Rural 2 scenario includes adding a center dividing median, single-lane roundabouts or turning lanes at some intersections, extending the Apple Capital Loop Trail to Rock Island Drive, constructing a new frontage road to connect the gap in Rock Island Road, and keeping wide shoulders.

The Rural 4 scenario includes adding an additional lane in each direction for a total of four-lanes, a center dividing median, multi-lane roundabouts at some intersections, extending the Apple Capital Loop Trail to Rock Island Drive, constructing a new frontage road to connect the gap in Rock Island Road, and keeping wide shoulders. This scenario has the greatest change in road prism.

Each scenario also includes adding a center turn lane and sidewalks to Rock Island Road and may require relocating a portion of the existing trail that is currently adjacent to the highway shoulder.

REGULATORY CONTEXT

Federal Determinations/Permits

- **NEPA** – If this project receives Federal Highway Administration (FHWA) funding NEPA will be required following the Washington State Department of Transportation (WSDOT) NEPA procedures.

MEMORANDUM

- **404 Permit** – If any project activities occur within the Waters of the US (the lakes, river, or wetlands), the project applicant agency may be required to obtain a Clean Water Act Section 404 permit from the US Army Corps of Engineers (Corps) along with impact and mitigation identification for any work in Waters of the US. A Section 404 permit is a federal permit nexus triggering Section 106 and Section 7 consultations
- **Section 106 NHPA Consultation** – If there is a federal project or permit nexus, 106 National Historic Preservation Act (NHPA) review would occur under NEPA evaluation and could be applied to other federal permits as needed (e.g., Corps 404). The Corps would coordinate Section 106 review if occurring for a 404 permit outside of NEPA.
- **Section 7 ESA Consultation** – If there is a federal project or permit nexus, Section 7 Endangered Species Act review would occur under NEPA evaluation and could be applied to other federal permits as needed (e.g., Corps 404). The Corps would coordinate Section 7 consultation if occurring for a 404 permit outside of NEPA.

State Permits

- **Hydrologic Project Approval** – Work within, above, or below the waterbody or near the ordinary high water mark of a State Water must be permitted by the Washington Department of Fish and Wildlife (WDFW) through the Hydraulic Project Approval (HPA) process. WDFW HPA occurs after local SEPA determination.
- **NPDES** – Construction Stormwater General Permit Notice of Intent is assumed to be required for construction activities.
- **401 Certification** – If triggered under Section 404 Permit, Corps can require Ecology to certify under 404 regional general conditions. Requires separate JARPA submittal to Ecology similar to 404 permit and coordinated with both the Corps and Ecology under 404 permit evaluation.

Local Determinations/Permits

- **SEPA** – Project action is assumed to require evaluation under the Washington State Environmental Policy Act (SEPA) under Douglas County jurisdiction.
- **Shoreline Management Program (SMP)** – A portion of the site falls within the jurisdiction of the Douglas County and City of Rock Island SMP. The Columbia River and all of the lakes at Rock Island are under SMP jurisdiction. The project sites fall within several shoreline designations: Shoreline Residential, Urban Conservancy, Rural Conservancy, and High Intensity. Roads and trails are considered to be Transportation and Essential Public Facilities and are a permitted use within all designations, but expansion of the roadway prism and trail will require a Shoreline Substantial Development Permit (SSDP) from both Douglas County and the City of Rock Island. The project must also demonstrate compliance with all of the policies and regulations related to transportation facilities, grading and filling, all of the general policies and regulations, and other relevant activities. There do not appear to be setback requirements for roads or trails, but critical area buffers do apply. The County's 2021 SMP update changed the permitting requirement for Essential Public Facilities from a Conditional Use Permit (CUP) to a SSDP, but the update also includes language that the SSDP may be taken through the quasi-judicial process at the determination of the administrator.

MEMORANDUM

- **Critical Areas** – Critical areas will be regulated either by the agency’s Critical Areas Ordinance or SMP depending on the location. All wetland and riparian critical areas appear to be under the jurisdiction of the SMP, Appendix H.

ENVIRONMENTAL REVIEW

Due to the conceptual level of the design scenarios, it is not possible to determine exact impacts to the surrounding areas. There are certain areas that will require expansion towards water bodies but the level of impact or need for fill is unknown at this point. There may be opportunities to reduce impacts during project design. The potential areas of environmental impact include:

- Station 150+00 – The existing trail is adjacent to the shoulder and may need to move closer to the river to accommodate road widening.
- Station 510+00 to 545+00 – The highway crosses between lakes and is adjacent to the river. The roadway will be closer to the lakes and river when it is expanded. Some filling of the lakes may be required to accommodate road widening.
- Road Island Road near SR 28 station 400+00 – The roadway may move closer to the lake when it is expanded. Some filling of the lakes may be required to accommodate road widening.
- [Add general cultural resource impact area if applicable]

Wetlands

The US Fish and Wildlife Service National Wetlands Inventory (NWI) identifies the Columbia River as a Lacustrine wetland due to its permanently flooded deepwater habitat. All of the lakes around Rock Island, except for Blue Heron Lake (the westernmost lake at station 510+00), are also identified as Lacustrine wetlands. Blue Heron Lake is identified as a Palustrine wetland. The road and trail are located within the wetland buffers pursuant to Appendix H of the SMP.

Habitat

The lakes at Rock Island are considered riparian habitat within the Fish and Wildlife Habitat Conservation Areas critical areas regulations. The road and trail are located within the buffers pursuant to Appendix H of the SMP.

The WDFW Priority Habitat and Species (PHS) on the Web map identifies the lakes at Rock Island as aquatic habitat. The notes state: “Ponds with cattail/bullrush fringe marshes utilized by nesting and wintering waterfowl, rails, and nongame birds. Also used by furbearers including muskrats and nesting and foraging raptors. Mitigation land for Rock Island Dam.”

The WDFW PHS on the Web map identifies the Columbia River as supporting the following State Priority species:

- Rainbow Trout
- Spring and Summer Chinook
- Sockeye
- White Sturgeon

MEMORANDUM

- Dolly Varden/Bull Trout (Federal EFH species)
- Summer Steelhead
- Kokanee
- Coho

According to the WDFW SalmonScape map, the Columbia River is home to the following Endangered Species Act (ESA) listed fish species:

- Upper Columbia River Summer and Fall Chinook Salmon
- Upper Columbia River Summer and Winter Steelhead

The WDFW PHS on the Web map also identifies the area as masked for Golden Eagle. WDFW Research Scientist Jim Watson stated that this project is not likely to have impacts on the Golden Eagles due to the distance to the nests and the existing traffic and human activity in the area (Pentico, 2021). No other upland habitat is identified as a critical area.

Aquifer Recharge Area

A portion of the site is located within the Wellhead Protection Area C, the Kentucky Street Wellfield, as identified by Douglas County Code 19.18E.0130. With provisions for appropriate stormwater control, the project will not be considered a risk to groundwater resources.

Frequently Flooded Areas

Based upon the FEMA Flood Insurance Rate Maps, no portion of the project is within the floodplain.

Geohazards

Some areas of geohazard exist within the project site according to the Critical Soils layer on the Douglas County Interactive Web Map. These areas are described as “Slopes Greater than 40%.” Some areas of severe erosion hazard exist within the project area as identified on the Web Soil Survey. These geohazards can be managed by using best practices and engineering incorporated into the project design based on the recommendations of a geotechnical report.

Cultural Resources

For all proposed scenarios, the entire project area is classified as Very High Risk (Survey Highly Advised) in the DAHP’s predictive model for cultural resources. Although near surface soils and sediments have likely been disturbed by road construction and modern infrastructure improvements, deeper excavations with the potential to encounter native soils may have potential to impact buried archaeological sites due to the project location in a high sensitivity area.

There are no recorded cultural resources within the proposed roadway areas but both pre- and post-contact period archaeological sites and historic properties are adjacent to the potential project area. Three archaeological sites are within approximately 100 feet of the proposed improvement areas. Most of the sites are

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within the Kirby Billingsley Hydro Park on the south side of SR 28. Archaeological site 45 DOI274 is a historic debris concentration less than 100 feet south of SR 28. It was determined ineligible for listing in the NRHP in 2019. Site 45DO474 is a precontact period site identified in an eroding bank in 1985. Subsequent subsurface testing identified a rock cluster feature within 40cm of the ground surface. If project ground disturbance cannot avoid these sites, an excavation permit from the DAHP may be required. The subject section of SR 28 was constructed as the Wenatchee-Quincy highway in 1926 and later designated as Primary State highway 10 in 1937 when full paving was complete. Historic maps also show Rock Island Road completed by 1932 (Metsker 1932). If remnants of the old road and other infrastructure are present below the surface of the modern roadway, they may constitute an archaeological site and require recording by a professional archaeologist.

The cultural resources review process will depend on project funding. If the project becomes a federal undertaking through federal funding or permitting, cultural resources review will be required under NEPA and Section 106 of the NRHP including consultation with the DAHP, federal agencies, and affected Tribes and survey to identify effects or impacts on cultural resources. If project uses state but not federal funding, it will be subject to Governor's Executive Order 21-02 which also requires consultation with the DAHP and affected Tribes and would likely require cultural resources survey. If the project will buildings over 40 years old, such buildings may need to be recorded on Historic Property Inventory Forms.

SUMMARY

- Project design should focus, to the extent possible, on minimizing impacts to the lakes and river adjacent to the project. By minimizing impacts, the project may be able to avoid more intensive state and federal permitting processes or, if impacts are unavoidable, minimize mitigation requirements.
- The project will require a Shoreline Substantial Development Permit from Douglas County and the City of Rock Island and compliance with the SMP.
- There are geohazards and an area of critical aquifer recharge within the project area. Impacts to these critical areas will be avoided or minimized through standard stormwater design and geotechnical review processes.
- Project design should minimize ground disturbance in the vicinity of Kirby Billingsley Hydro Park to reduce potential for adverse impacts to known archaeological sites.
- Cultural resources field investigations may be required for regulatory compliance. Such investigations should focus on areas where significant project disturbance will occur outside the existing road prism.

DATA SOURCES

Department of Archaeology and Historic Preservation, Washington Information System for Architectural and Archaeological Records Data (WISAARD). Accessed at <https://wisaard.dahp.wa.gov/>.

Douglas County Code. Accessed at <https://www.codepublishing.com/WA/DouglasCounty/>.

Douglas County Interactive Web Map. Provided wellhead and geohazard data. Accessed through <https://gis.douglascountywa.net/portal/apps/webappviewer/index.html?id=0fe80ac77b224f0c980d4052e946be03>.

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Douglas County Regional Shoreline Master Program. Updated program in Ordinance TLS: 21-15-45B and Resolution TLS: 21-45B, and effective program dated October 23, 2015. Accessed through <https://www.douglascountysmp.com/>.

FEMA Flood Insurance Rate Maps. Provided by Department of Ecology as Q3 Data through ArcGIS Online.

Pentico, Eric. WDFW Regional Biologist. Personal Communication on September 13, 2021.

US Department of Agriculture Web Soil Survey. Accessed through <https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>.

US Fish and Wildlife Service National Wetlands Inventory. Accessed through ArcGIS Online USA Wetlands data hosted by ESRI and <https://www.fws.gov/wetlands/data/mapper.html>.

Washington Department of Fish and Wildlife SalmonScape Map. Accessed through <https://apps.wdfw.wa.gov/salmonscape/>.

Washington Department of Fish and Wildlife Priority Habitat Species on the Web Map. Accessed through <https://geodataservices.wdfw.wa.gov/hp/phs/>.

ACRONYMS

Corps	US Army Corps of Engineers
DAHP	Department of Archaeology and Historic Preservation
DNR	Washington Department of Natural Resources
EFH	Essential Fish Habitat
ESA	Endangered Species Act
HPA	Hydraulic Project Approval process
NWI	National Wetland Inventory
PHS	Priority Habitat Species
SMP	Douglas County Shoreline Management Program
USFW	US Fish and Wildlife Service
WDFW	Washington Department of Fish and Wildlife
WSDOT	Washington State Department of Transportation

APPENDIX C

High-Speed, Two-Lane SR 28 Planning-Level Opinion of Cost

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description: SR 28 Corridor Study	Client: Chelan-Douglas Transportation Council
Corridor Section: SR 28: 3rd ST SE - Batterman Rd, Rock Island Rd	Date: Aug-21
Location: Chelan-Douglas Transportation Council	Date of Cost Index: 2022
	Calculated By/Entered By: EB
	Checked By: KSW/CJW

Rural 2-Lane Concept

		ITEM	UNIT	ESTIMATED COST	QTY	ESTIMATED UNIT COST
I.	RIGHT OF WAY					
		RIGHT OF WAY (urban undeveloped)	SF	\$8	-	\$0
		TEMPORARY CONSTRUCTION EASEMENTS (urban undeveloped)	SF	\$2	-	\$0
		ADMINISTRATION (titles, appraisals, negotiations consultant, etc.)	EA	\$15,000	12	\$180,000
		RIGHT OF WAY TOTAL				\$180,000
			Inflation	ROW Year	Cost Index	Future Cost
		FUTURE ROW COST BASED ON INFLATION RATE	5%	2027	2022	\$230,000
II.	CONSTRUCTION					
1	PREPARATION/GRADING/DRAINAGE					
	1.1 PREPARATION					
		CLEAR & GRUB, DEMO	ACRE	\$5,000	33	\$165,000
		REMOVING EXISTING PAVEMENT	SY	\$15	90,000	\$1,350,000
		REMOVAL STRUCTURES & OBSTRUCTIONS	LS	\$250,000	1	\$250,000
	1.2 EARTHWORK					
		ROADWAY EXCAVATION INCL. HAUL	CY	\$25	55,000	\$1,375,000
		STRUCTURE EX. CL. A INCL. HAUL	CY	\$45	2,100	\$94,500
	1.3 STORMWATER MITIGATION					
		DETENTION AND TREATMENT	SF	\$10	628,600	\$6,286,000
	1.4 STORM SEWER					
		CATCH BASIN TYPE 1	EA	\$1,800	-	\$0
		CATCH BASIN TYPE 2	EA	\$5,000	-	\$0
		SCHEDULE A STORM SEWER PIPE 12 IN. DIAM.	LF	\$65	-	\$0
		SCHEDULE A STORM SEWER PIPE 18 IN. DIAM.	LF	\$85	-	\$0
2	STRUCTURE					
		RETAINING WALLS (MSE)	SF	\$75	41,600	\$3,120,000
3	SURFACING					
		HOT MIX ASPHALT	TON	\$80	62,900	\$5,032,000
		CRUSHED SURFACING	TON	\$35	74,300	\$2,600,500
4	ROADSIDE DEVELOPMENT					
		TEMP. WATER POLLUTION & EROSION CONTROL (2%)	LS	\$691,000	1	\$691,000
5	TRAFFIC					
		TRAFFIC BARRIER	LF	\$300	45,000	\$13,500,000
		ILLUMINATION	LS	\$300,000	1	\$300,000
		SIGNING	LS	\$86,000	1	\$86,000
		STRIPING	LF	\$2	188,600	\$377,200
		CURBS	LF	\$45	-	\$0
		CURB RAMP	EA	\$8,000	-	\$0
		SIDEWALKS	SY	\$65	-	\$0
		TRAFFIC CONTROL (10%)	LS	\$3,454,000	1	\$3,454,000

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description:	SR 28 Corridor Study	Client:	Chelan-Douglas Transportation Council
Corridor Section:	SR 28: 3rd ST SE - Batterman Rd, Rock Island Rd	Date:	Aug-21
Location:	Chelan-Douglas Transportation Council	Date of Cost Index:	2022

6	OTHER ITEMS				
	SURVEYING (2%)	LS	\$691,000	1	\$691,000
	SPECIAL ITEMS	EST	\$0	1	\$0
	UTILITY RELOCATIONS	EST	\$0	1	\$0
7	SUBTOTAL (ITEMS 1 THRU 6)				\$39,372,200
8	MOBILIZATION (10%)				
	10% OF ITEM 7	EST	\$3,937,300	1	\$3,937,300
9	CONSTRUCTION SUBTOTAL (ITEMS 7 & 8)				\$43,309,500
10	SALES TAX				
11	AGREEMENTS (Utilities, WSP, etc.)	EST	\$0	1	\$0
12	SUBTOTAL (ITEMS 9 THRU 11)				\$43,309,500
13	CONTINGENCY (30% OF ITEM 12)	EST	\$12,992,900	1	\$12,992,900
14	CONSTRUCTION SUBTOTAL (ITEMS 12 & 13)				\$56,302,400
15	FUTURE CN COST BASED ON INFLATION RATE	Inflation	Const. Year	Cost Index	Future Cost
		10%	2029	2022	\$109,718,000
16	CONSTRUCTION ADMINISTRATION				
	CONSTRUCTION ENGINEERING (15% OF ITEM 14)	EST	\$8,445,400	1	\$8,445,400
	CITY ENGINEERING & ADMINISTRATION (5% OF ITEM 14)	EST	\$2,815,200	1	\$2,815,200
17	FUTURE CN ADMIN COST BASED ON INFLATION RATE	Inflation	Const. Year	Cost Index	Future Cost
		5%	2029	2022	\$15,845,000
III.	PRELIMINARY WORK				
	PRELIMINARY ENGINEERING (15.0% OF ITEM 14)	EST	\$8,445,400	1	\$8,445,400
	CITY ENGINEERING & ADMINISTRATION (5% OF ITEM 14)	EST	\$2,815,200	1	\$2,815,200
	ENVIRONMENTAL PERMITS/DOCUMENTS	EST	\$230,000	1	\$230,000
	FUTURE PE COST BASED ON INFLATION RATE	Inflation	Design Year	Cost Index	Future Cost
		5%	2025	2022	\$13,302,000
IV.	TOTAL ESTIMATED COST (ITEMS I, 15, 17, & III)				
	SUB-TOTAL PROJECT COST (BASED ON INFLATION RATE)				\$139,095,000
TOTAL PROJECT COST RANGE (BASED ON INFLATION RATE)					\$140,000,000

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PLANNING LEVEL OPINION OF COST SUMMARY

Project Description: SR 28 Corridor Study	Client: Chelan-Douglas Transportation Council
Corridor Section: SR 28: 3rd ST SE - Batterman Rd, Rock Island Rd	Date: Aug-21
Location: Chelan-Douglas Transportation Council	Date of Cost Index: 2022
	Calculated By/Entered By: EB
	Checked By: KSW/CJW

Loop Trail Extension

		ESTIMATED UNIT			
	ITEM	UNIT	COST	QTY	COST
I.	RIGHT OF WAY				
	RIGHT OF WAY (urban undeveloped)	SF	\$8	-	\$0
	TEMPORARY CONSTRUCTION EASEMENTS (urban undeveloped)	SF	\$2	-	\$0
	ADMINISTRATION (titles, appraisals, negotiations consultant, etc.)	EA	\$15,000	-	\$0
	RIGHT OF WAY TOTAL				\$0
	FUTURE ROW COST BASED ON INFLATION RATE	Inflation	ROW Year	Cost Index	Future Cost
		5%	2027	2022	\$0
II.	CONSTRUCTION				
1	PREPARATION/GRADING/DRAINAGE				
1.1	PREPARATION				
	CLEAR & GRUB, DEMO	ACRE	\$5,000	14	\$70,000
	REMOVING EXISTING PAVEMENT	SY	\$15	-	\$0
	REMOVAL STRUCTURES & OBSTRUCTIONS	LS	\$50,000	1	\$50,000
1.2	EARTHWORK				
	ROADWAY EXCAVATION INCL. HAUL	CY	\$25	23,000	\$575,000
	STRUCTURE EX. CL. A INCL. HAUL	CY	\$45	-	\$0
1.3	STORMWATER MITIGATION				
	DETENTION AND TREATMENT	SF	\$10	307,200	\$3,072,000
1.4	STORM SEWER				
	CATCH BASIN TYPE 1	EA	\$1,800	-	\$0
	CATCH BASIN TYPE 2	EA	\$5,000	-	\$0
	SCHEDULE A STORM SEWER PIPE 12 IN. DIAM.	LF	\$65	-	\$0
	SCHEDULE A STORM SEWER PIPE 18 IN. DIAM.	LF	\$85	-	\$0
2	STRUCTURE				
	RETAINING WALLS (MSE)	SF	\$75	-	\$0
3	SURFACING				
	HOT MIX ASPHALT	TON	\$80	6,800	\$544,000
	CRUSHED SURFACING	TON	\$35	12,200	\$427,000
4	ROADSIDE DEVELOPMENT				
	TEMP. WATER POLLUTION & EROSION CONTROL (2%)	LS	\$95,000	1	\$95,000
5	TRAFFIC				
	TRAFFIC BARRIER	LF	\$300	-	\$0
	ILLUMINATION	LS	\$0	1	\$0
	SIGNING	LS	\$10,000	1	\$10,000
	STRIPING	LF	\$2	-	\$0
	CURBS	LF	\$45	-	\$0
	CURB RAMP	EA	\$8,000	-	\$0
	SIDEWALKS	SY	\$65	-	\$0
	TRAFFIC CONTROL (5%)	LS	\$238,000	1	\$238,000

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description:	SR 28 Corridor Study	Client:	Chelan-Douglas Transportation Council
Corridor Section:	SR 28: 3rd ST SE - Batterman Rd, Rock Island Rd	Date:	Aug-21
Location:	Chelan-Douglas Transportation Council	Date of Cost Index:	2022

6	OTHER ITEMS				
	SURVEYING (2%)	LS	\$95,000	1	\$95,000
	SPECIAL ITEMS	EST	\$0	1	\$0
	UTILITY RELOCATIONS	EST	\$0	1	\$0
7	SUBTOTAL (ITEMS 1 THRU 6)				\$5,176,000
8	MOBILIZATION (10%)				
	10% OF ITEM 7	EST	\$517,600	1	\$517,600
9	CONSTRUCTION SUBTOTAL (ITEMS 7 & 8)				\$5,693,600
10	SALES TAX				
11	AGREEMENTS (Utilities, WSP, etc.)	EST	\$0	1	\$0
12	SUBTOTAL (ITEMS 9 THRU 11)				\$5,693,600
13	CONTINGENCY (30% OF ITEM 12)	EST	\$1,708,100	1	\$1,708,100
14	CONSTRUCTION SUBTOTAL (ITEMS 12 & 13)				\$7,401,700
15	FUTURE CN COST BASED ON INFLATION RATE	Inflation	Const. Year	Cost Index	Future Cost
		10%	2029	2022	\$14,424,000
16	CONSTRUCTION ADMINISTRATION				
	CONSTRUCTION ENGINEERING (15% OF ITEM 14)	EST	\$1,110,300	1	\$1,110,300
	CITY ENGINEERING & ADMINISTRATION (5% OF ITEM 14)	EST	\$370,100	1	\$370,100
17	FUTURE CN ADMIN COST BASED ON INFLATION RATE	Inflation	Const. Year	Cost Index	Future Cost
		5%	2029	2022	\$2,084,000
III.	PRELIMINARY WORK				
	PRELIMINARY ENGINEERING (15.0% OF ITEM 14)	EST	\$1,110,300	1	\$1,110,300
	CITY ENGINEERING & ADMINISTRATION (5% OF ITEM 14)	EST	\$370,100	1	\$370,100
	ENVIRONMENTAL PERMITS/DOCUMENTS	EST	\$140,000	1	\$140,000
	FUTURE PE COST BASED ON INFLATION RATE	Inflation	Design Year	Cost Index	Future Cost
		5%	2025	2022	\$1,876,000
IV.	TOTAL ESTIMATED COST (ITEMS I, 15, 17, & III)				
	SUB-TOTAL PROJECT COST (BASED ON INFLATION RATE)				\$18,384,000
TOTAL PROJECT COST RANGE (BASED ON INFLATION RATE)					\$19,000,000

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PLANNING LEVEL OPINION OF COST SUMMARY

Project Description: SR 28 Corridor Study	Client: Chelan-Douglas Transportation Council
Corridor Section: SR 28: 3rd ST SE - Batterman Rd, Rock Island Rd	Date: May-22
Location: Chelan-Douglas Transportation Council	Date of Cost Index: 2022
	Calculated By/Entered By: RLO
	Checked By: BMP

RIR E-W Widening Only

		ESTIMATED UNIT			
	ITEM	UNIT	COST	QTY	COST
I.	RIGHT OF WAY				
	RIGHT OF WAY (urban undeveloped)	SF	\$8	103,800	\$830,400
	TEMPORARY CONSTRUCTION EASEMENTS (urban undeveloped)	SF	\$2	418,800	\$837,600
	ADMINISTRATION (titles, appraisals, negotiations consultant, etc.)	EA	\$15,000	17	\$255,000
	RIGHT OF WAY TOTAL				\$1,923,000
	FUTURE ROW COST BASED ON INFLATION RATE	Inflation	ROW Year	Cost Index	Future Cost
		5%	2027	2022	\$2,455,000
II.	CONSTRUCTION				
1	PREPARATION/GRADING/DRAINAGE				
1.1	PREPARATION				
	CLEAR & GRUB, DEMO	ACRE	\$5,000	18	\$90,000
	REMOVING EXISTING PAVEMENT	SY	\$15	8,000	\$120,000
	REMOVAL STRUCTURES & OBSTRUCTIONS	LS	\$250,000	1	\$250,000
1.2	EARTHWORK				
	ROADWAY EXCAVATION INCL. HAUL	CY	\$25	25,000	\$625,000
	STRUCTURE EX. CL. A INCL. HAUL	CY	\$45	600	\$27,000
1.3	STORMWATER MITIGATION				
	DETENTION AND TREATMENT	SF	\$10	264,200	\$2,642,000
1.4	STORM SEWER				
	CATCH BASIN TYPE 1	EA	\$1,800	696	\$1,252,800
	CATCH BASIN TYPE 2	EA	\$5,000	174	\$870,000
	SCHEDULE A STORM SEWER PIPE 12 IN. DIAM.	LF	\$65	13,910	\$904,150
	SCHEDULE A STORM SEWER PIPE 18 IN. DIAM.	LF	\$85	69,520	\$5,909,200
2	STRUCTURE				
	RETAINING WALLS (MSE)	SF	\$75	17,500	\$1,312,500
3	SURFACING				
	HOT MIX ASPHALT	TON	\$80	8,200	\$656,000
	CRUSHED SURFACING	TON	\$35	46,400	\$1,624,000
4	ROADSIDE DEVELOPMENT				
	TEMP. WATER POLLUTION & EROSION CONTROL (2%)	LS	\$471,000	1	\$471,000
5	TRAFFIC				
	TRAFFIC BARRIER	LF	\$300	-	\$0
	ILLUMINATION	LS	\$0	1	\$0
	SIGNING	LS	\$67,000	1	\$67,000
	STRIPING	LF	\$2	151,900	\$303,800
	CURBS	LF	\$45	69,600	\$3,132,000
	CURB RAMP	EA	\$8,000	146	\$1,168,000
	SIDEWALKS	SY	\$65	39,600	\$2,574,000
	TRAFFIC CONTROL (10%)	LS	\$2,353,000	1	\$2,353,000

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description:	SR 28 Corridor Study	Client:	Chelan-Douglas Transportation Council
Corridor Section:	SR 28: 3rd ST SE - Batterman Rd, Rock Island Rd	Date:	May-22
Location:	Chelan-Douglas Transportation Council	Date of Cost Index:	2022

6	OTHER ITEMS				
	SURVEYING (2%)	LS	\$471,000	1	\$471,000
	SPECIAL ITEMS	EST	\$0	1	\$0
	UTILITY RELOCATIONS	EST	\$0	1	\$0
7	SUBTOTAL (ITEMS 1 THRU 6)				\$26,822,450
8	MOBILIZATION (10%)				
	10% OF ITEM 7	EST	\$2,682,300	1	\$2,682,300
9	CONSTRUCTION SUBTOTAL (ITEMS 7 & 8)				\$29,504,750
10	SALES TAX				
11	AGREEMENTS (Utilities, WSP, etc.)	EST	\$0	1	\$0
12	SUBTOTAL (ITEMS 9 THRU 11)				\$29,504,750
13	CONTINGENCY (30% OF ITEM 12)	EST	\$8,851,500	1	\$8,851,500
14	CONSTRUCTION SUBTOTAL (ITEMS 12 & 13)				\$38,356,250
15	FUTURE CN COST BASED ON INFLATION RATE	Inflation	Const. Year	Cost Index	Future Cost
		10%	2029	2022	\$74,746,000
16	CONSTRUCTION ADMINISTRATION				
	CONSTRUCTION ENGINEERING (15% OF ITEM 14)	EST	\$5,753,500	1	\$5,753,500
	CITY ENGINEERING & ADMINISTRATION (5% OF ITEM 14)	EST	\$1,917,900	1	\$1,917,900
17	FUTURE CN ADMIN COST BASED ON INFLATION RATE	Inflation	Const. Year	Cost Index	Future Cost
		5%	2029	2022	\$10,795,000
III.	PRELIMINARY WORK				
	PRELIMINARY ENGINEERING (15.0% OF ITEM 14)	EST	\$5,753,500	1	\$5,753,500
	CITY ENGINEERING & ADMINISTRATION (5% OF ITEM 14)	EST	\$1,917,900	1	\$1,917,900
	ENVIRONMENTAL PERMITS/DOCUMENTS	EST	\$230,000	1	\$230,000
	FUTURE PE COST BASED ON INFLATION RATE	Inflation	Design Year	Cost Index	Future Cost
		5%	2025	2022	\$9,147,000
IV.	TOTAL ESTIMATED COST (ITEMS I, 15, 17, & III)				
	SUB-TOTAL PROJECT COST (BASED ON INFLATION RATE)				\$97,143,000
TOTAL PROJECT COST RANGE (BASED ON INFLATION RATE)					\$98,000,000

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PLANNING LEVEL OPINION OF COST SUMMARY

Project Description: SR 28 Corridor Study	Client: Chelan-Douglas Transportation Council
Corridor Section: SR 28: 3rd ST SE - Batterman Rd, Rock Island Rd	Date: May-22
Location: Chelan-Douglas Transportation Council	Date of Cost Index: 2022
	Calculated By/Entered By: RLO
	Checked By: BMP

RIR: Connection Concept

		ESTIMATED UNIT			
	ITEM	UNIT	COST	QTY	COST
I.	RIGHT OF WAY				
	RIGHT OF WAY (urban undeveloped)	SF	\$8	215,000	\$1,720,000
	TEMPORARY CONSTRUCTION EASEMENTS (urban undeveloped)	SF	\$2	60,000	\$120,000
	ADMINISTRATION (titles, appraisals, negotiations consultant, etc.)	EA	\$15,000	5	\$75,000
	RIGHT OF WAY TOTAL				\$1,915,000
	FUTURE ROW COST BASED ON INFLATION RATE	Inflation	ROW Year	Cost Index	Future Cost
		5%	2027	2022	\$2,445,000
II.	CONSTRUCTION				
1	PREPARATION/GRADING/DRAINAGE				
1.1	PREPARATION				
	CLEAR & GRUB, DEMO	ACRE	\$5,000	6	\$30,000
	REMOVING EXISTING PAVEMENT	SY	\$15	-	\$0
	REMOVAL STRUCTURES & OBSTRUCTIONS	LS	\$250,000	1	\$250,000
1.2	EARTHWORK				
	ROADWAY EXCAVATION INCL. HAUL	CY	\$25	10,000	\$250,000
	STRUCTURE EX. CL. A INCL. HAUL	CY	\$45	3,200	\$144,000
1.3	STORMWATER MITIGATION				
	DETENTION AND TREATMENT	SF	\$10	160,000	\$1,600,000
1.4	STORM SEWER				
	CATCH BASIN TYPE 1	EA	\$1,800	55	\$99,000
	CATCH BASIN TYPE 2	EA	\$5,000	15	\$75,000
	SCHEDULE A STORM SEWER PIPE 12 IN. DIAM.	LF	\$65	1,100	\$71,500
	SCHEDULE A STORM SEWER PIPE 18 IN. DIAM.	LF	\$85	5,500	\$467,500
2	STRUCTURE				
	RETAINING WALLS (MSE)	SF	\$75	30,800	\$2,310,000
3	SURFACING				
	HOT MIX ASPHALT	TON	\$80	3,300	\$264,000
	CRUSHED SURFACING	TON	\$35	14,200	\$497,000
4	ROADSIDE DEVELOPMENT				
	TEMP. WATER POLLUTION & EROSION CONTROL (2%)	LS	\$137,000	1	\$137,000
5	TRAFFIC				
	TRAFFIC BARRIER	LF	\$300	-	\$0
	ILLUMINATION	LS	\$0	1	\$0
	SIGNING	LS	\$10,000	1	\$10,000
	STRIPING	LF	\$2	21,000	\$42,000
	CURBS	LF	\$45	11,000	\$495,000
	CURB RAMP	EA	\$8,000	-	\$0
	SIDEWALKS	SY	\$65	3,700	\$240,500
	TRAFFIC CONTROL (1%)	LS	\$69,000	1	\$69,000

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description:	SR 28 Corridor Study	Client:	Chelan-Douglas Transportation Council
Corridor Section:	SR 28: 3rd ST SE - Batterman Rd, Rock Island Rd	Date:	May-22
Location:	Chelan-Douglas Transportation Council	Date of Cost Index:	2022

6	OTHER ITEMS				
	SURVEYING (2%)	LS	\$137,000	1	\$137,000
	SPECIAL ITEMS	EST	\$0	1	\$0
	UTILITY RELOCATIONS	EST	\$0	1	\$0
7	SUBTOTAL (ITEMS 1 THRU 6)				\$7,188,500
8	MOBILIZATION (10%)				
	10% OF ITEM 7	EST	\$718,900	1	\$718,900
9	CONSTRUCTION SUBTOTAL (ITEMS 7 & 8)				\$7,907,400
10	SALES TAX				
11	AGREEMENTS (Utilities, WSP, etc.)	EST	\$0	1	\$0
12	SUBTOTAL (ITEMS 9 THRU 11)				\$7,907,400
13	CONTINGENCY (30% OF ITEM 12)	EST	\$2,372,300	1	\$2,372,300
14	CONSTRUCTION SUBTOTAL (ITEMS 12 & 13)				\$10,279,700
15	FUTURE CN COST BASED ON INFLATION RATE	Inflation	Const. Year	Cost Index	Future Cost
		10%	2029	2022	\$20,033,000
16	CONSTRUCTION ADMINISTRATION				
	CONSTRUCTION ENGINEERING (15% OF ITEM 14)	EST	\$1,542,000	1	\$1,542,000
	CITY ENGINEERING & ADMINISTRATION (5% OF ITEM 14)	EST	\$514,000	1	\$514,000
17	FUTURE CN ADMIN COST BASED ON INFLATION RATE	Inflation	Const. Year	Cost Index	Future Cost
		5%	2029	2022	\$2,893,000
III.	PRELIMINARY WORK				
	PRELIMINARY ENGINEERING (15.0% OF ITEM 14)	EST	\$1,542,000	1	\$1,542,000
	CITY ENGINEERING & ADMINISTRATION (5% OF ITEM 14)	EST	\$514,000	1	\$514,000
	ENVIRONMENTAL PERMITS/DOCUMENTS	EST	\$230,000	1	\$230,000
	FUTURE PE COST BASED ON INFLATION RATE	Inflation	Design Year	Cost Index	Future Cost
		5%	2025	2022	\$2,647,000
IV.	TOTAL ESTIMATED COST (ITEMS I, 15, 17, & III)				
	SUB-TOTAL PROJECT COST (BASED ON INFLATION RATE)				\$28,018,000
TOTAL PROJECT COST RANGE (BASED ON INFLATION RATE)					\$29,000,000

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APPENDIX D

High-Speed, Four-Lane SR 28 Planning-Level Opinion of Cost

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description: SR 28 Corridor Study	Client: Chelan-Douglas Transportation Council
Corridor Section: SR 28: 3rd ST SE - Batterman Rd, Rock Island Rd	Date: Aug-21
Location: Chelan-Douglas Transportation Council	Date of Cost Index: 2022
	Calculated By/Entered By: EB
	Checked By: KSW/CJW

Rural 4-Lane Concept: SR 28 Only

		ITEM	UNIT	ESTIMATED COST	QTY	FUTURE COST
I. RIGHT OF WAY						
		RIGHT OF WAY (urban undeveloped)	SF	\$8	-	\$0
		TEMPORARY CONSTRUCTION EASEMENTS (urban undeveloped)	SF	\$2	-	\$0
		ADMINISTRATION (titles, appraisals, negotiations consultant, etc.)	EA	\$15,000	12	\$180,000
		RIGHT OF WAY TOTAL				\$180,000
		FUTURE ROW COST BASED ON INFLATION RATE	Inflation 5%	ROW Year 2027	Cost Index 2022	Future Cost \$230,000
II. CONSTRUCTION						
1		PREPARATION/GRADING/DRAINAGE				
	1.1	PREPARATION				
		CLEAR & GRUB, DEMO	ACRE	\$5,000	72	\$360,000
		REMOVING EXISTING PAVEMENT	SY	\$15	90,000	\$1,350,000
		REMOVAL STRUCTURES & OBSTRUCTIONS	LS	\$250,000	1	\$250,000
	1.2	EARTHWORK				
		ROADWAY EXCAVATION INCL. HAUL	CY	\$25	121,000	\$3,025,000
		STRUCTURE EX. CL. A INCL. HAUL	CY	\$45	2,100	\$94,500
	1.3	STORMWATER MITIGATION				
		DETENTION AND TREATMENT	SF	\$10	2,245,000	\$22,450,000
	1.4	STORM SEWER				
		CATCH BASIN TYPE 1	EA	\$1,800	-	\$0
		CATCH BASIN TYPE 2	EA	\$5,000	-	\$0
		SCHEDULE A STORM SEWER PIPE 12 IN. DIAM.	LF	\$65	-	\$0
		SCHEDULE A STORM SEWER PIPE 18 IN. DIAM.	LF	\$85	-	\$0
2		STRUCTURE				
		RETAINING WALLS (MSE)	SF	\$75	121,300	\$9,097,500
3		SURFACING				
		HOT MIX ASPHALT	TON	\$80	126,000	\$10,080,000
		CRUSHED SURFACING	TON	\$35	85,000	\$2,975,000
4		ROADSIDE DEVELOPMENT				
		TEMP. WATER POLLUTION & EROSION CONTROL (2%)	LS	\$1,283,000	1	\$1,283,000
5		TRAFFIC				
		TRAFFIC BARRIER	LF	\$300	45,000	\$13,500,000
		ILLUMINATION	LS	\$300,000	1	\$300,000
		SIGNING	LS	\$86,000	1	\$86,000
		STRIPING	LF	\$2	282,900	\$565,800
		CURBS	LF	\$45	-	\$0
		CURB RAMP	EA	\$8,000	-	\$0
		SIDEWALKS	SY	\$65	-	\$0
		TRAFFIC CONTROL (10%)	LS	\$6,414,000	1	\$6,414,000

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description:	SR 28 Corridor Study	Client:	Chelan-Douglas Transportation Council
Corridor Section:	SR 28: 3rd ST SE - Batterman Rd, Rock Island Rd	Date:	Aug-21
Location:	Chelan-Douglas Transportation Council	Date of Cost Index:	2022

6	OTHER ITEMS				
	SURVEYING (2%)	LS	\$1,283,000	1	\$1,283,000
	SPECIAL ITEMS	EST	\$0	1	\$0
	UTILITY RELOCATIONS	EST	\$0	1	\$0
7	SUBTOTAL (ITEMS 1 THRU 6)				\$73,113,800
8	MOBILIZATION (10%)				
	10% OF ITEM 7	EST	\$7,311,400	1	\$7,311,400
9	CONSTRUCTION SUBTOTAL (ITEMS 7 & 8)				\$80,425,200
10	SALES TAX				
11	AGREEMENTS (Utilities, WSP, etc.)	EST	\$0	1	\$0
12	SUBTOTAL (ITEMS 9 THRU 11)				\$80,425,200
13	CONTINGENCY (30% OF ITEM 12)	EST	\$24,127,600	1	\$24,127,600
14	CONSTRUCTION SUBTOTAL (ITEMS 12 & 13)				\$104,552,800
15	FUTURE CN COST BASED ON INFLATION RATE	Inflation	Const. Year	Cost Index	Future Cost
		10%	2029	2022	\$203,744,000
16	CONSTRUCTION ADMINISTRATION				
	CONSTRUCTION ENGINEERING (15% OF ITEM 14)	EST	\$15,683,000	1	\$15,683,000
	CITY ENGINEERING & ADMINISTRATION (5% OF ITEM 14)	EST	\$5,227,700	1	\$5,227,700
17	FUTURE CN ADMIN COST BASED ON INFLATION RATE	Inflation	Const. Year	Cost Index	Future Cost
		5%	2029	2022	\$29,424,000
III.	PRELIMINARY WORK				
	PRELIMINARY ENGINEERING (15.0% OF ITEM 14)	EST	\$15,683,000	1	\$15,683,000
	CITY ENGINEERING & ADMINISTRATION (5% OF ITEM 14)	EST	\$5,227,700	1	\$5,227,700
	ENVIRONMENTAL PERMITS/DOCUMENTS	EST	\$140,000	1	\$140,000
	FUTURE PE COST BASED ON INFLATION RATE	Inflation	Design Year	Cost Index	Future Cost
		5%	2025	2022	\$24,369,000
IV.	TOTAL ESTIMATED COST (ITEMS I, 15, 17, & III)				
	SUB-TOTAL PROJECT COST (BASED ON INFLATION RATE)				\$257,767,000
TOTAL PROJECT COST RANGE (BASED ON INFLATION RATE)					\$258,000,000

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PLANNING LEVEL OPINION OF COST SUMMARY

Project Description: SR 28 Corridor Study	Client: Chelan-Douglas Transportation Council
Corridor Section: SR 28: 3rd ST SE - Batterman Rd, Rock Island Rd	Date: Aug-21
Location: Chelan-Douglas Transportation Council	Date of Cost Index: 2022
	Calculated By/Entered By: EB
	Checked By: KSW/CJW

Loop Trail Extension

		ESTIMATED UNIT			
	ITEM	UNIT	COST	QTY	COST
I.	RIGHT OF WAY				
	RIGHT OF WAY (urban undeveloped)	SF	\$8	-	\$0
	TEMPORARY CONSTRUCTION EASEMENTS (urban undeveloped)	SF	\$2	-	\$0
	ADMINISTRATION (titles, appraisals, negotiations consultant, etc.)	EA	\$15,000	-	\$0
	RIGHT OF WAY TOTAL				\$0
	FUTURE ROW COST BASED ON INFLATION RATE	Inflation	ROW Year	Cost Index	Future Cost
		5%	2027	2022	\$0
II.	CONSTRUCTION				
1	PREPARATION/GRADING/DRAINAGE				
1.1	PREPARATION				
	CLEAR & GRUB, DEMO	ACRE	\$5,000	14	\$70,000
	REMOVING EXISTING PAVEMENT	SY	\$15	-	\$0
	REMOVAL STRUCTURES & OBSTRUCTIONS	LS	\$50,000	1	\$50,000
1.2	EARTHWORK				
	ROADWAY EXCAVATION INCL. HAUL	CY	\$25	23,000	\$575,000
	STRUCTURE EX. CL. A INCL. HAUL	CY	\$45	-	\$0
1.3	STORMWATER MITIGATION				
	DETENTION AND TREATMENT	SF	\$10	307,200	\$3,072,000
1.4	STORM SEWER				
	CATCH BASIN TYPE 1	EA	\$1,800	-	\$0
	CATCH BASIN TYPE 2	EA	\$5,000	-	\$0
	SCHEDULE A STORM SEWER PIPE 12 IN. DIAM.	LF	\$65	-	\$0
	SCHEDULE A STORM SEWER PIPE 18 IN. DIAM.	LF	\$85	-	\$0
2	STRUCTURE				
	RETAINING WALLS (MSE)	SF	\$75	-	\$0
3	SURFACING				
	HOT MIX ASPHALT	TON	\$80	6,800	\$544,000
	CRUSHED SURFACING	TON	\$35	12,200	\$427,000
4	ROADSIDE DEVELOPMENT				
	TEMP. WATER POLLUTION & EROSION CONTROL (2%)	LS	\$95,000	1	\$95,000
5	TRAFFIC				
	TRAFFIC BARRIER	LF	\$300	-	\$0
	ILLUMINATION	LS	\$0	1	\$0
	SIGNING	LS	\$10,000	1	\$10,000
	STRIPING	LF	\$2	-	\$0
	CURBS	LF	\$45	-	\$0
	CURB RAMP	EA	\$8,000	-	\$0
	SIDEWALKS	SY	\$65	-	\$0
	TRAFFIC CONTROL (5%)	LS	\$238,000	1	\$238,000

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description:	SR 28 Corridor Study	Client:	Chelan-Douglas Transportation Council
Corridor Section:	SR 28: 3rd ST SE - Batterman Rd, Rock Island Rd	Date:	Aug-21
Location:	Chelan-Douglas Transportation Council	Date of Cost Index:	2022

6	OTHER ITEMS				
	SURVEYING (2%)	LS	\$95,000	1	\$95,000
	SPECIAL ITEMS	EST	\$0	1	\$0
	UTILITY RELOCATIONS	EST	\$0	1	\$0
7	SUBTOTAL (ITEMS 1 THRU 6)				\$5,176,000
8	MOBILIZATION (10%)				
	10% OF ITEM 7	EST	\$517,600	1	\$517,600
9	CONSTRUCTION SUBTOTAL (ITEMS 7 & 8)				\$5,693,600
10	SALES TAX				
11	AGREEMENTS (Utilities, WSP, etc.)	EST	\$0	1	\$0
12	SUBTOTAL (ITEMS 9 THRU 11)				\$5,693,600
13	CONTINGENCY (30% OF ITEM 12)	EST	\$1,708,100	1	\$1,708,100
14	CONSTRUCTION SUBTOTAL (ITEMS 12 & 13)				\$7,401,700
15	FUTURE CN COST BASED ON INFLATION RATE	Inflation	Const. Year	Cost Index	Future Cost
		10%	2029	2022	\$14,424,000
16	CONSTRUCTION ADMINISTRATION				
	CONSTRUCTION ENGINEERING (15% OF ITEM 14)	EST	\$1,110,300	1	\$1,110,300
	CITY ENGINEERING & ADMINISTRATION (5% OF ITEM 14)	EST	\$370,100	1	\$370,100
17	FUTURE CN ADMIN COST BASED ON INFLATION RATE	Inflation	Const. Year	Cost Index	Future Cost
		5%	2029	2022	\$2,084,000
III.	PRELIMINARY WORK				
	PRELIMINARY ENGINEERING (15.0% OF ITEM 14)	EST	\$1,110,300	1	\$1,110,300
	CITY ENGINEERING & ADMINISTRATION (5% OF ITEM 14)	EST	\$370,100	1	\$370,100
	ENVIRONMENTAL PERMITS/DOCUMENTS	EST	\$140,000	1	\$140,000
	FUTURE PE COST BASED ON INFLATION RATE	Inflation	Design Year	Cost Index	Future Cost
		5%	2025	2022	\$1,876,000
IV.	TOTAL ESTIMATED COST (ITEMS I, 15, 17, & III)				
	SUB-TOTAL PROJECT COST (BASED ON INFLATION RATE)				\$18,384,000
TOTAL PROJECT COST RANGE (BASED ON INFLATION RATE)					\$19,000,000

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PLANNING LEVEL OPINION OF COST SUMMARY

Project Description: SR 28 Corridor Study	Client: Chelan-Douglas Transportation Council
Corridor Section: SR 28: 3rd ST SE - Batterman Rd, Rock Island Rd	Date: May-22
Location: Chelan-Douglas Transportation Council	Date of Cost Index: 2022
	Calculated By/Entered By: RLO
	Checked By: BMP

RIR E-W Widening Only

		ESTIMATED UNIT			
	ITEM	UNIT	COST	QTY	COST
I.	RIGHT OF WAY				
	RIGHT OF WAY (urban undeveloped)	SF	\$8	103,800	\$830,400
	TEMPORARY CONSTRUCTION EASEMENTS (urban undeveloped)	SF	\$2	418,800	\$837,600
	ADMINISTRATION (titles, appraisals, negotiations consultant, etc.)	EA	\$15,000	17	\$255,000
	RIGHT OF WAY TOTAL				\$1,923,000
	FUTURE ROW COST BASED ON INFLATION RATE	Inflation	ROW Year	Cost Index	Future Cost
		5%	2027	2022	\$2,455,000
II.	CONSTRUCTION				
1	PREPARATION/GRADING/DRAINAGE				
1.1	PREPARATION				
	CLEAR & GRUB, DEMO	ACRE	\$5,000	18	\$90,000
	REMOVING EXISTING PAVEMENT	SY	\$15	8,000	\$120,000
	REMOVAL STRUCTURES & OBSTRUCTIONS	LS	\$250,000	1	\$250,000
1.2	EARTHWORK				
	ROADWAY EXCAVATION INCL. HAUL	CY	\$25	25,000	\$625,000
	STRUCTURE EX. CL. A INCL. HAUL	CY	\$45	600	\$27,000
1.3	STORMWATER MITIGATION				
	DETENTION AND TREATMENT	SF	\$10	264,200	\$2,642,000
1.4	STORM SEWER				
	CATCH BASIN TYPE 1	EA	\$1,800	696	\$1,252,800
	CATCH BASIN TYPE 2	EA	\$5,000	174	\$870,000
	SCHEDULE A STORM SEWER PIPE 12 IN. DIAM.	LF	\$65	13,910	\$904,150
	SCHEDULE A STORM SEWER PIPE 18 IN. DIAM.	LF	\$85	69,520	\$5,909,200
2	STRUCTURE				
	RETAINING WALLS (MSE)	SF	\$75	17,500	\$1,312,500
3	SURFACING				
	HOT MIX ASPHALT	TON	\$80	8,200	\$656,000
	CRUSHED SURFACING	TON	\$35	46,400	\$1,624,000
4	ROADSIDE DEVELOPMENT				
	TEMP. WATER POLLUTION & EROSION CONTROL (2%)	LS	\$471,000	1	\$471,000
5	TRAFFIC				
	TRAFFIC BARRIER	LF	\$300	-	\$0
	ILLUMINATION	LS	\$0	1	\$0
	SIGNING	LS	\$67,000	1	\$67,000
	STRIPING	LF	\$2	151,900	\$303,800
	CURBS	LF	\$45	69,600	\$3,132,000
	CURB RAMP	EA	\$8,000	146	\$1,168,000
	SIDEWALKS	SY	\$65	39,600	\$2,574,000
	TRAFFIC CONTROL (10%)	LS	\$2,353,000	1	\$2,353,000

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description:	SR 28 Corridor Study	Client:	Chelan-Douglas Transportation Council
Corridor Section:	SR 28: 3rd ST SE - Batterman Rd, Rock Island Rd	Date:	May-22
Location:	Chelan-Douglas Transportation Council	Date of Cost Index:	2022

6	OTHER ITEMS				
	SURVEYING (2%)	LS	\$471,000	1	\$471,000
	SPECIAL ITEMS	EST	\$0	1	\$0
	UTILITY RELOCATIONS	EST	\$0	1	\$0
7	SUBTOTAL (ITEMS 1 THRU 6)				\$26,822,450
8	MOBILIZATION (10%)				
	10% OF ITEM 7	EST	\$2,682,300	1	\$2,682,300
9	CONSTRUCTION SUBTOTAL (ITEMS 7 & 8)				\$29,504,750
10	SALES TAX				
11	AGREEMENTS (Utilities, WSP, etc.)	EST	\$0	1	\$0
12	SUBTOTAL (ITEMS 9 THRU 11)				\$29,504,750
13	CONTINGENCY (30% OF ITEM 12)	EST	\$8,851,500	1	\$8,851,500
14	CONSTRUCTION SUBTOTAL (ITEMS 12 & 13)				\$38,356,250
15	FUTURE CN COST BASED ON INFLATION RATE	Inflation	Const. Year	Cost Index	Future Cost
		10%	2029	2022	\$74,746,000
16	CONSTRUCTION ADMINISTRATION				
	CONSTRUCTION ENGINEERING (15% OF ITEM 14)	EST	\$5,753,500	1	\$5,753,500
	CITY ENGINEERING & ADMINISTRATION (5% OF ITEM 14)	EST	\$1,917,900	1	\$1,917,900
17	FUTURE CN ADMIN COST BASED ON INFLATION RATE	Inflation	Const. Year	Cost Index	Future Cost
		5%	2029	2022	\$10,795,000
III.	PRELIMINARY WORK				
	PRELIMINARY ENGINEERING (15.0% OF ITEM 14)	EST	\$5,753,500	1	\$5,753,500
	CITY ENGINEERING & ADMINISTRATION (5% OF ITEM 14)	EST	\$1,917,900	1	\$1,917,900
	ENVIRONMENTAL PERMITS/DOCUMENTS	EST	\$230,000	1	\$230,000
	FUTURE PE COST BASED ON INFLATION RATE	Inflation	Design Year	Cost Index	Future Cost
		5%	2025	2022	\$9,147,000
IV.	TOTAL ESTIMATED COST (ITEMS I, 15, 17, & III)				
	SUB-TOTAL PROJECT COST (BASED ON INFLATION RATE)				\$97,143,000
TOTAL PROJECT COST RANGE (BASED ON INFLATION RATE)					\$98,000,000

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PLANNING LEVEL OPINION OF COST SUMMARY

Project Description: SR 28 Corridor Study	Client: Chelan-Douglas Transportation Council
Corridor Section: SR 28: 3rd ST SE - Batterman Rd, Rock Island Rd	Date: May-22
Location: Chelan-Douglas Transportation Council	Date of Cost Index: 2022
	Calculated By/Entered By: RLO
	Checked By: BMP

RIR: Connection Concept

		ESTIMATED UNIT			
	ITEM	UNIT	COST	QTY	COST
I.	RIGHT OF WAY				
	RIGHT OF WAY (urban undeveloped)	SF	\$8	215,000	\$1,720,000
	TEMPORARY CONSTRUCTION EASEMENTS (urban undeveloped)	SF	\$2	60,000	\$120,000
	ADMINISTRATION (titles, appraisals, negotiations consultant, etc.)	EA	\$15,000	5	\$75,000
	RIGHT OF WAY TOTAL				\$1,915,000
	FUTURE ROW COST BASED ON INFLATION RATE	Inflation	ROW Year	Cost Index	Future Cost
		5%	2027	2022	\$2,445,000
II.	CONSTRUCTION				
1	PREPARATION/GRADING/DRAINAGE				
1.1	PREPARATION				
	CLEAR & GRUB, DEMO	ACRE	\$5,000	6	\$30,000
	REMOVING EXISTING PAVEMENT	SY	\$15	-	\$0
	REMOVAL STRUCTURES & OBSTRUCTIONS	LS	\$250,000	1	\$250,000
1.2	EARTHWORK				
	ROADWAY EXCAVATION INCL. HAUL	CY	\$25	10,000	\$250,000
	STRUCTURE EX. CL. A INCL. HAUL	CY	\$45	3,200	\$144,000
1.3	STORMWATER MITIGATION				
	DETENTION AND TREATMENT	SF	\$10	160,000	\$1,600,000
1.4	STORM SEWER				
	CATCH BASIN TYPE 1	EA	\$1,800	55	\$99,000
	CATCH BASIN TYPE 2	EA	\$5,000	15	\$75,000
	SCHEDULE A STORM SEWER PIPE 12 IN. DIAM.	LF	\$65	1,100	\$71,500
	SCHEDULE A STORM SEWER PIPE 18 IN. DIAM.	LF	\$85	5,500	\$467,500
2	STRUCTURE				
	RETAINING WALLS (MSE)	SF	\$75	30,800	\$2,310,000
3	SURFACING				
	HOT MIX ASPHALT	TON	\$80	3,300	\$264,000
	CRUSHED SURFACING	TON	\$35	14,200	\$497,000
4	ROADSIDE DEVELOPMENT				
	TEMP. WATER POLLUTION & EROSION CONTROL (2%)	LS	\$137,000	1	\$137,000
5	TRAFFIC				
	TRAFFIC BARRIER	LF	\$300	-	\$0
	ILLUMINATION	LS	\$0	1	\$0
	SIGNING	LS	\$10,000	1	\$10,000
	STRIPING	LF	\$2	21,000	\$42,000
	CURBS	LF	\$45	11,000	\$495,000
	CURB RAMP	EA	\$8,000	-	\$0
	SIDEWALKS	SY	\$65	3,700	\$240,500
	TRAFFIC CONTROL (1%)	LS	\$69,000	1	\$69,000

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description:	SR 28 Corridor Study	Client:	Chelan-Douglas Transportation Council
Corridor Section:	SR 28: 3rd ST SE - Batterman Rd, Rock Island Rd	Date:	May-22
Location:	Chelan-Douglas Transportation Council	Date of Cost Index:	2022

6	OTHER ITEMS				
	SURVEYING (2%)	LS	\$137,000	1	\$137,000
	SPECIAL ITEMS	EST	\$0	1	\$0
	UTILITY RELOCATIONS	EST	\$0	1	\$0
7	SUBTOTAL (ITEMS 1 THRU 6)				\$7,188,500
8	MOBILIZATION (10%)				
	10% OF ITEM 7	EST	\$718,900	1	\$718,900
9	CONSTRUCTION SUBTOTAL (ITEMS 7 & 8)				\$7,907,400
10	SALES TAX				
11	AGREEMENTS (Utilities, WSP, etc.)	EST	\$0	1	\$0
12	SUBTOTAL (ITEMS 9 THRU 11)				\$7,907,400
13	CONTINGENCY (30% OF ITEM 12)	EST	\$2,372,300	1	\$2,372,300
14	CONSTRUCTION SUBTOTAL (ITEMS 12 & 13)				\$10,279,700
15	FUTURE CN COST BASED ON INFLATION RATE	Inflation	Const. Year	Cost Index	Future Cost
		10%	2029	2022	\$20,033,000
16	CONSTRUCTION ADMINISTRATION				
	CONSTRUCTION ENGINEERING (15% OF ITEM 14)	EST	\$1,542,000	1	\$1,542,000
	CITY ENGINEERING & ADMINISTRATION (5% OF ITEM 14)	EST	\$514,000	1	\$514,000
17	FUTURE CN ADMIN COST BASED ON INFLATION RATE	Inflation	Const. Year	Cost Index	Future Cost
		5%	2029	2022	\$2,893,000
III.	PRELIMINARY WORK				
	PRELIMINARY ENGINEERING (15.0% OF ITEM 14)	EST	\$1,542,000	1	\$1,542,000
	CITY ENGINEERING & ADMINISTRATION (5% OF ITEM 14)	EST	\$514,000	1	\$514,000
	ENVIRONMENTAL PERMITS/DOCUMENTS	EST	\$230,000	1	\$230,000
	FUTURE PE COST BASED ON INFLATION RATE	Inflation	Design Year	Cost Index	Future Cost
		5%	2025	2022	\$2,647,000
IV.	TOTAL ESTIMATED COST (ITEMS I, 15, 17, & III)				
	SUB-TOTAL PROJECT COST (BASED ON INFLATION RATE)				\$28,018,000
TOTAL PROJECT COST RANGE (BASED ON INFLATION RATE)					\$29,000,000

The above opinion of cost is a planning level estimate only. It is based on best available information and scope at the time, not on the results of a detailed engineering study, and is supplied as a budgeting guide only. Perteet Inc. does not guarantee or warrant the accuracy of this planning level estimate.

APPENDIX E

Intermediate-Speed, Three-Lane SR 28 Planning-Level Opinion of Cost

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description: SR 28 Corridor Study	Client: Chelan-Douglas Transportation Council
Corridor Section: SR 28: 3rd ST SE - Batterman Rd, Rock Island Rd	Date: Aug-21
Location: Chelan-Douglas Transportation Council	Date of Cost Index: 2022
	Calculated By/Entered By: EB
	Checked By: KSW/CJW

Urban Concept

ITEM		UNIT	ESTIMATED COST	UNIT QTY	COST
I.	RIGHT OF WAY				
	RIGHT OF WAY (urban undeveloped)	SF	\$8	-	\$0
	TEMPORARY CONSTRUCTION EASEMENTS (urban undeveloped)	SF	\$2	-	\$0
	ADMINISTRATION (titles, appraisals, negotiations consultant, etc.)	EA	\$15,000	8	\$120,000
	RIGHT OF WAY TOTAL				\$120,000
	FUTURE ROW COST BASED ON INFLATION RATE	Inflation 5%	ROW Year 2027	Cost Index 2022	Future Cost \$154,000
II.	CONSTRUCTION				
1	PREPARATION/GRADING/DRAINAGE				
1.1	PREPARATION				
	CLEAR & GRUB, DEMO	ACRE	\$5,000	53	\$265,000
	REMOVING EXISTING PAVEMENT	SY	\$15	90,000	\$1,350,000
	REMOVAL STRUCTURES & OBSTRUCTIONS	LS	\$250,000	1	\$250,000
1.2	EARTHWORK				
	ROADWAY EXCAVATION INCL. HAUL	CY	\$25	204,000	\$5,100,000
	STRUCTURE EX. CL. A INCL. HAUL	CY	\$45	2,100	\$94,500
1.3	STORMWATER MITIGATION				
	DETENTION AND TREATMENT	SF	\$10	1,347,000	\$13,470,000
1.4	STORM SEWER				
	CATCH BASIN TYPE 1	EA	\$1,800	-	\$0
	CATCH BASIN TYPE 2	EA	\$5,000	-	\$0
	SCHEDULE A STORM SEWER PIPE 12 IN. DIAM.	LF	\$65	-	\$0
	SCHEDULE A STORM SEWER PIPE 18 IN. DIAM.	LF	\$85	-	\$0
2	STRUCTURE				
	RETAINING WALLS (MSE)	SF	\$75	141,900	\$10,642,500
3	SURFACING				
	HOT MIX ASPHALT	TON	\$80	68,200	\$5,456,000
	CRUSHED SURFACING	TON	\$35	221,200	\$7,742,000
4	ROADSIDE DEVELOPMENT				
	TEMP. WATER POLLUTION & EROSION CONTROL (2%)	LS	\$907,000	1	\$907,000
5	TRAFFIC				
	TRAFFIC BARRIER	LF	\$300	-	\$0
	ILLUMINATION	LS	\$300,000	1	\$300,000
	SIGNING	LS	\$86,000	1	\$86,000
	STRIPING	LF	\$2	282,900	\$565,800
	CURBS	LF	\$45	-	\$0
	CURB RAMP	EA	\$8,000	-	\$0
	SIDEWALKS	SY	\$65	-	\$0
	TRAFFIC CONTROL (10%)	LS	\$4,533,000	1	\$4,533,000

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description:	SR 28 Corridor Study	Client:	Chelan-Douglas Transportation Council
Corridor Section:	SR 28: 3rd ST SE - Batterman Rd, Rock Island Rd	Date:	Aug-21
Location:	Chelan-Douglas Transportation Council	Date of Cost Index:	2022

6	OTHER ITEMS				
	SURVEYING (2%)	LS	\$907,000	1	\$907,000
	SPECIAL ITEMS	EST	\$0	1	\$0
	UTILITY RELOCATIONS	EST	\$0	1	\$0
7	SUBTOTAL (ITEMS 1 THRU 6)				\$51,668,800
8	MOBILIZATION (10%)				
	10% OF ITEM 7	EST	\$5,166,900	1	\$5,166,900
9	CONSTRUCTION SUBTOTAL (ITEMS 7 & 8)				\$56,835,700
10	SALES TAX				
11	AGREEMENTS (Utilities, WSP, etc.)	EST	\$0	1	\$0
12	SUBTOTAL (ITEMS 9 THRU 11)				\$56,835,700
13	CONTINGENCY (30% OF ITEM 12)	EST	\$17,050,800	1	\$17,050,800
14	CONSTRUCTION SUBTOTAL (ITEMS 12 & 13)				\$73,886,500
15	FUTURE CN COST BASED ON INFLATION RATE	Inflation	Const. Year	Cost Index	Future Cost
		10%	2029	2022	\$143,984,000
16	CONSTRUCTION ADMINISTRATION				
	CONSTRUCTION ENGINEERING (15% OF ITEM 14)	EST	\$11,083,000	1	\$11,083,000
	CITY ENGINEERING & ADMINISTRATION (5% OF ITEM 14)	EST	\$3,694,400	1	\$3,694,400
17	FUTURE CN ADMIN COST BASED ON INFLATION RATE	Inflation	Const. Year	Cost Index	Future Cost
		5%	2029	2022	\$20,794,000
III.	PRELIMINARY WORK				
	PRELIMINARY ENGINEERING (15.0% OF ITEM 14)	EST	\$11,083,000	1	\$11,083,000
	CITY ENGINEERING & ADMINISTRATION (5% OF ITEM 14)	EST	\$3,694,400	1	\$3,694,400
	ENVIRONMENTAL PERMITS/DOCUMENTS	EST	\$140,000	1	\$140,000
	FUTURE PE COST BASED ON INFLATION RATE	Inflation	Design Year	Cost Index	Future Cost
		5%	2025	2022	\$17,269,000
IV.	TOTAL ESTIMATED COST (ITEMS I, 15, 17, & III)				
	SUB-TOTAL PROJECT COST (BASED ON INFLATION RATE)				\$182,201,000
TOTAL PROJECT COST RANGE (BASED ON INFLATION RATE)					\$183,000,000

The above opinion of cost is a planning level estimate only. It is based on best available information and scope at the time, not on the results of a detailed engineering study, and is supplied as a budgeting guide only. Perteet Inc. does not guarantee or warrant the accuracy of this planning level estimate.

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description: SR 28 Corridor Study	Client: Chelan-Douglas Transportation Council
Corridor Section: SR 28: 3rd ST SE - Batterman Rd, Rock Island Rd	Date: May-22
Location: Chelan-Douglas Transportation Council	Date of Cost Index: 2022
	Calculated By/Entered By: RLO
	Checked By: BMP

RIR E-W Widening Only

		ESTIMATED UNIT			
	ITEM	UNIT	COST	QTY	COST
I.	RIGHT OF WAY				
	RIGHT OF WAY (urban undeveloped)	SF	\$8	103,800	\$830,400
	TEMPORARY CONSTRUCTION EASEMENTS (urban undeveloped)	SF	\$2	418,800	\$837,600
	ADMINISTRATION (titles, appraisals, negotiations consultant, etc.)	EA	\$15,000	17	\$255,000
	RIGHT OF WAY TOTAL				\$1,923,000
	FUTURE ROW COST BASED ON INFLATION RATE	Inflation	ROW Year	Cost Index	Future Cost
		5%	2027	2022	\$2,455,000
II.	CONSTRUCTION				
1	PREPARATION/GRADING/DRAINAGE				
1.1	PREPARATION				
	CLEAR & GRUB, DEMO	ACRE	\$5,000	18	\$90,000
	REMOVING EXISTING PAVEMENT	SY	\$15	8,000	\$120,000
	REMOVAL STRUCTURES & OBSTRUCTIONS	LS	\$250,000	1	\$250,000
1.2	EARTHWORK				
	ROADWAY EXCAVATION INCL. HAUL	CY	\$25	25,000	\$625,000
	STRUCTURE EX. CL. A INCL. HAUL	CY	\$45	600	\$27,000
1.3	STORMWATER MITIGATION				
	DETENTION AND TREATMENT	SF	\$10	264,200	\$2,642,000
1.4	STORM SEWER				
	CATCH BASIN TYPE 1	EA	\$1,800	696	\$1,252,800
	CATCH BASIN TYPE 2	EA	\$5,000	174	\$870,000
	SCHEDULE A STORM SEWER PIPE 12 IN. DIAM.	LF	\$65	13,910	\$904,150
	SCHEDULE A STORM SEWER PIPE 18 IN. DIAM.	LF	\$85	69,520	\$5,909,200
2	STRUCTURE				
	RETAINING WALLS (MSE)	SF	\$75	17,500	\$1,312,500
3	SURFACING				
	HOT MIX ASPHALT	TON	\$80	8,200	\$656,000
	CRUSHED SURFACING	TON	\$35	46,400	\$1,624,000
4	ROADSIDE DEVELOPMENT				
	TEMP. WATER POLLUTION & EROSION CONTROL (2%)	LS	\$471,000	1	\$471,000
5	TRAFFIC				
	TRAFFIC BARRIER	LF	\$300	-	\$0
	ILLUMINATION	LS	\$0	1	\$0
	SIGNING	LS	\$67,000	1	\$67,000
	STRIPING	LF	\$2	151,900	\$303,800
	CURBS	LF	\$45	69,600	\$3,132,000
	CURB RAMP	EA	\$8,000	146	\$1,168,000
	SIDEWALKS	SY	\$65	39,600	\$2,574,000
	TRAFFIC CONTROL (10%)	LS	\$2,353,000	1	\$2,353,000

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description:	SR 28 Corridor Study	Client:	Chelan-Douglas Transportation Council
Corridor Section:	SR 28: 3rd ST SE - Batterman Rd, Rock Island Rd	Date:	May-22
Location:	Chelan-Douglas Transportation Council	Date of Cost Index:	2022

6	OTHER ITEMS				
	SURVEYING (2%)	LS	\$471,000	1	\$471,000
	SPECIAL ITEMS	EST	\$0	1	\$0
	UTILITY RELOCATIONS	EST	\$0	1	\$0
7	SUBTOTAL (ITEMS 1 THRU 6)				\$26,822,450
8	MOBILIZATION (10%)				
	10% OF ITEM 7	EST	\$2,682,300	1	\$2,682,300
9	CONSTRUCTION SUBTOTAL (ITEMS 7 & 8)				\$29,504,750
10	SALES TAX				
11	AGREEMENTS (Utilities, WSP, etc.)	EST	\$0	1	\$0
12	SUBTOTAL (ITEMS 9 THRU 11)				\$29,504,750
13	CONTINGENCY (30% OF ITEM 12)	EST	\$8,851,500	1	\$8,851,500
14	CONSTRUCTION SUBTOTAL (ITEMS 12 & 13)				\$38,356,250
15	FUTURE CN COST BASED ON INFLATION RATE	Inflation	Const. Year	Cost Index	Future Cost
		10%	2029	2022	\$74,746,000
16	CONSTRUCTION ADMINISTRATION				
	CONSTRUCTION ENGINEERING (15% OF ITEM 14)	EST	\$5,753,500	1	\$5,753,500
	CITY ENGINEERING & ADMINISTRATION (5% OF ITEM 14)	EST	\$1,917,900	1	\$1,917,900
17	FUTURE CN ADMIN COST BASED ON INFLATION RATE	Inflation	Const. Year	Cost Index	Future Cost
		5%	2029	2022	\$10,795,000
III.	PRELIMINARY WORK				
	PRELIMINARY ENGINEERING (15.0% OF ITEM 14)	EST	\$5,753,500	1	\$5,753,500
	CITY ENGINEERING & ADMINISTRATION (5% OF ITEM 14)	EST	\$1,917,900	1	\$1,917,900
	ENVIRONMENTAL PERMITS/DOCUMENTS	EST	\$230,000	1	\$230,000
	FUTURE PE COST BASED ON INFLATION RATE	Inflation	Design Year	Cost Index	Future Cost
		5%	2025	2022	\$9,147,000
IV.	TOTAL ESTIMATED COST (ITEMS I, 15, 17, & III)				
	SUB-TOTAL PROJECT COST (BASED ON INFLATION RATE)				\$97,143,000
TOTAL PROJECT COST RANGE (BASED ON INFLATION RATE)					\$98,000,000

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APPENDIX F

Design Concept Safety Performance Analysis

Existing Configuration

Project Element	Total Crashes/yr (KABCO)		Fatal and Injury Crashes/yr (KABC)		Property Damage Only Crashes/yr (PDO)		Post Processing				
	Raw HSM Output: Predicted average crash frequency	Adjusted PACF	Raw HSM Output: Predicted average crash frequency	Adjusted PACF	Raw HSM Output: Predicted average crash frequency	Adjusted PACF	Site Condition		Adj.	Notes	
	N _{predicted} (KABCO)	N _{expected} (KABCO)	N _{predicted} (KABC)	N _{expected} (KABC)	N _{predicted} (O)	N _{expected} (O)	HSM	Actual	Factor		
INDIVIDUAL SEGMENTS											
SR 28: Grant to 3rd	Segment 1	1.5	0.0	0.5	0.0	1.1	0.0	4U	n/a	0	Removed from study area
SR 28: 3rd to Battermann	Segment 2	24.4	24.4	6.7	6.7	17.7	17.7	2U	2U	1	
Battermann	Segment 3	0.2	0.2	0.1	0.1	0.1	0.1	2U	2U	1	
RIR (East)/Saunders	Segment 4	2.3	2.3	0.8	0.8	1.5	1.5	2U	2U	1	
RIR (West)	Segment 5	2.9	2.9	1.0	1.0	1.9	1.9	2U	2U	1	
INDIVIDUAL INTERSECTIONS											
SR 28 Spur and Grant Road	Intersection 1	2.3	0.0	0.8	0.0	1.5	0.0	4SG	n/a	0	Removed from study area
SR 28 Spur and 3rd St SE	Intersection 2	1.3	1.3	0.4	0.4	0.9	0.9	4SG	4SG	1	
SR 28 and S Mary Ave	Intersection 3	1.0	1.0	0.4	0.4	0.6	0.6	4ST	4ST	1	
SR 28 and S Nile Ave	Intersection 4	1.0	1.0	0.4	0.4	0.6	0.6	4ST	4ST	1	
SR 28 and S Tyee Ave	Intersection 5	1.2	1.2	0.4	0.4	0.7	0.7	4ST	4ST	1	
SR 28 and Rock Island Rd (West)	Intersection 6	0.1	0.1	0.1	0.1	0.1	0.1	3ST	3ST	1	
SR 28 and Rock Island Rd (East)	Intersection 7	0.6	0.6	0.2	0.2	0.4	0.4	3ST	3ST	1	
SR 28 and Rock Island Dr	Intersection 8	0.7	0.7	0.3	0.3	0.4	0.4	4ST	4ST	1	
SR 28 and Battermann Rd	Intersection 9	0.4	0.4	0.2	0.2	0.2	0.2	3ST	3ST	1	
Battermann Rd and Saunders Ave	Intersection 10	0.0	0.0	0.0	0.0	0.0	0.0	3ST	3ST	1	
Saunders Ave and N Garden Ave	Intersection 11	0.0	0.0	0.0	0.0	0.0	0.0	4ST	4ST	1	
Rock Island Rd (West) and S Nile Ave	Intersection 12	0.4	0.4	0.1	0.1	0.3	0.3	4ST	4ST	1	
Rock Island Rd (West) and 8th St SE	Intersection 13	0.1	0.1	0.1	0.1	0.1	0.1	3ST	3ST	1	
Rock Island Rd (West) and 3rd St SE	Intersection 14	0.8	0.8	0.3	0.3	0.5	0.5	4ST	4ST	1	
Rock Island Rd (West) and Grant Rd	Intersection 15	3.9	0.0	1.4	0.0	2.5	0.0	4SG	n/a	0	Removed from study area
SR 28 and Lyle Ave	Intersection 16	0.8	0.8	0.4	0.4	0.5	0.5	3ST	3ST	1	
SR 28 and Perry Ave S	Intersection 17	1.8	1.8	0.7	0.7	1.1	1.1	4ST	4ST	1	
SR 28 and Quincy Ave S/Akamai Way	Intersection 18	2.1	2.1	0.8	0.8	1.3	1.3	4ST	4ST	1	
SR 28 and S Union Ave	Intersection 19	1.8	1.8	0.7	0.7	1.1	1.1	4ST	4ST	1	
SR 28 and Nature Shore Dr	Intersection 20	0.4	0.4	0.2	0.2	0.2	0.2	3ST	3ST	1	
SR 28 and Columbia Cove Ln	Intersection 21	0.4	0.4	0.2	0.2	0.2	0.2	3ST	3ST	1	
SR 28 and Riverside Pl	Intersection 22	0.7	0.7	0.2	0.2	0.4	0.4	4ST	4ST	1	
TOTAL		53.5	45.4	17.6	14.7	35.9	30.8				

Legends and Abbreviations:

4U Four-lane, undivided

2U Two-lane, undivided

4SG Four-leg traffic signal

4ST Four-leg stop control (on minor streets)

3ST Three-leg stop control (on minor street)

n/a Not applicable

HSM Highway Safety Manual

PACF Predicted average crash frequency

KABCO All crashes

KABC Injury/fatal crashes

PDO Property damage only

Segment/intersection outside of study area

High-Speed, Two-Lane SR 28

Project Element	Total Crashes/yr (KABCO)		Fatal and Injury Crashes/yr (KABC)		Property Damage Only Crashes/yr (PDO)		Post Processing				
	Raw HSM Output: Predicted average crash frequency N _{predicted} (KABCO)	Adjusted PACF N _{expected} (KABCO)	Raw HSM Output: Predicted average crash frequency N _{predicted} (KABC)	Adjusted PACF N _{expected} (KABC)	Raw HSM Output: Predicted average crash frequency N _{predicted} (O)	Adjusted PACF N _{expected} (O)	Site Condition		Adj. Factor	Notes	
							HSM	Actual			
INDIVIDUAL SEGMENTS											
SR 28: Grant to 3rd	Segment 1	1.5	0.0	0.5	0.0	1.1	0.0	4U	n/a	0	Removed from study area
SR 28: 3rd to Battermann	Segment 2	23.9	16.5	6.6	4.0	17.4	12.5	2U	2D	0.61/0.72	Adjusted to divided *
Battermann	Segment 3	0.2	0.2	0.1	0.1	0.1	0.1	2U	2U	1	
RIR (East)/Saunders	Segment 4	2.3	2.3	0.8	0.8	1.5	1.5	2U	2U	1	
RIR (West)	Segment 5	2.9	2.9	1.0	1.0	1.9	1.9	2U	2U	1	
INDIVIDUAL INTERSECTIONS											
SR 28 Spur and Grant Road	Intersection 1	2.3	0.0	0.8	0.0	1.5	0.0	4SG	n/a	0	Removed from study area
SR 28 Spur and 3rd St SE	Intersection 2	1.3	1.3	0.4	0.4	0.9	0.9	4SG	4SG	1	
SR 28 and S Mary Ave	Intersection 3	0.9	0.5	0.3	0.2	0.5	0.3	4ST	4-RIRO	0.55	Adjusted to RIRO
SR 28 and S Nile Ave	Intersection 4	1.0	0.5	0.4	0.2	0.6	0.3	4ST	RAB	0.56	Adjusted to RAB
SR 28 and S Tyee Ave	Intersection 5	1.2	0.7	0.4	0.2	0.7	0.4	4ST	4-RIRO	0.55	Adjusted to RIRO
SR 28 and Rock Island Rd (West)	Intersection 6	0.1	0.0	0.1	0.0	0.1	0.0	3ST	n/a	0	Intersection deleted
SR 28 and Rock Island Rd (East)	Intersection 7	0.6	0.0	0.2	0.0	0.4	0.0	3ST	n/a	0	Intersection deleted
SR 28 and Rock Island Dr	Intersection 8	0.7	0.4	0.3	0.2	0.4	0.3	4ST	RAB	0.56	Adjusted to RAB
SR 28 and Battermann Rd	Intersection 9	0.3	0.2	0.1	0.1	0.2	0.1	3ST	3ST	0.67	Adjusted w/ new LT lane
Battermann Rd and Saunders Ave	Intersection 10	0.0	0.0	0.0	0.0	0.0	0.0	3ST	3ST	1	
Saunders Ave and N Garden Ave	Intersection 11	0.0	0.0	0.0	0.0	0.0	0.0	4ST	4ST	1	
Rock Island Rd (West) and S Nile Ave	Intersection 12	0.4	0.4	0.1	0.1	0.3	0.3	4ST	4ST	1	
Rock Island Rd (West) and 8th St SE	Intersection 13	0.1	0.1	0.1	0.1	0.1	0.1	3ST	3ST	1	
Rock Island Rd (West) and 3rd St SE	Intersection 14	0.8	0.8	0.3	0.3	0.5	0.5	4ST	4ST	1	
Rock Island Rd (West) and Grant Rd	Intersection 15	3.9	0.0	1.4	0.0	2.5	0.0	4SG	n/a	0	Removed from study area
SR 28 and Lyle Ave	Intersection 16	0.8	0.5	0.4	0.2	0.5	0.3	3ST	3-RIRO	0.55	Adjusted to RIRO
SR 28 and Perry Ave S	Intersection 17	1.8	0.0	0.7	0.0	1.1	0.0	4ST	n/a	0	Intersection deleted
SR 28 and Quincy Ave S/Akamai Way	Intersection 18	2.1	1.2	0.8	0.5	1.3	0.7	4ST	4-RIRO	0.55	Adjusted to RIRO
SR 28 and S Union Ave	Intersection 19	1.8	1.0	0.7	0.4	1.1	0.6	4ST	RAB	0.56	Adjusted to RAB
SR 28 and Nature Shore Dr	Intersection 20	0.4	0.2	0.2	0.1	0.2	0.1	3ST	3-RIRO	0.55	Adjusted to RIRO
SR 28 and Columbia Cove Ln	Intersection 21	0.4	0.0	0.2	0.0	0.2	0.0	3ST	n/a	0	Intersection deleted
SR 28 and Riverside Pl	Intersection 22	0.7	0.4	0.2	0.1	0.4	0.2	4ST	RAB	0.56	Adjusted to RAB
TOTAL		52.7	30.1	17.3	9.0	35.4	21.1				

* Adjustment factors to convert from 2U to 2D borrowed from analysis of 4U vs. 4D with all other variables equal. KABC adjustment factor is the 0.614, PDO adjustment factor is 0.723.

Legends and Abbreviations:

4U	Four-lane, undivided	RAB	Roundabout
2U	Two-lane, undivided	n/a	Not applicable
2D	Two-lane, divided	HSM	Highway Safety Manual
4SG	Four-leg traffic signal	PACF	Predicted average crash frequency
4ST	Four-leg stop control (on minor streets)	KABCO	All crashes
4-RIRO	Four-leg right-in/right-out	KABC	Injury/fatal crashes
3ST	Three-leg stop control (on minor street)	PDO	Property damage only
3-RIRO	Three-leg right-in/right-out		Segment/intersection outside of study area

High-Speed, Four-Lane SR 28

Project Element	Total Crashes/yr (KABCO)		Fatal and Injury Crashes/yr (KABC)		Property Damage Only Crashes/yr (PDO)		Post Processing				
	Raw HSM Output: Predicted average crash frequency N _{predicted} (KABCO)	Adjusted PACF N _{expected} (KABCO)	Raw HSM Output: Predicted average crash frequency N _{predicted} (KABC)	Adjusted PACF N _{expected} (KABC)	Raw HSM Output: Predicted average crash frequency N _{predicted} (O)	Adjusted PACF N _{expected} (O)	Site Condition		Adj. Factor	Notes	
							HSM	Actual			
INDIVIDUAL SEGMENTS											
SR 28: Grant to 3rd	Segment 1	1.5	0.0	0.5	0.0	1.1	0.0	4U	n/a	0	Removed from study area
SR 28: 3rd to Battermann	Segment 2	19.5	19.5	5.4	5.4	14.1	14.1	4D	4D	1	
Battermann	Segment 3	0.2	0.2	0.1	0.1	0.1	0.1	2U	2U	1	
RIR (East)/Saunders	Segment 4	2.3	2.3	0.8	0.8	1.5	1.5	2U	2U	1	
RIR (West)	Segment 5	2.9	2.9	1.0	1.0	1.9	1.9	2U	2U	1	
INDIVIDUAL INTERSECTIONS											
SR 28 Spur and Grant Road	Intersection 1	2.3	0.0	0.8	0.0	1.5	0.0	4SG	n/a	0	Removed from study area
SR 28 Spur and 3rd St SE	Intersection 2	1.3	1.3	0.4	0.4	0.9	0.9	4SG	4SG	1	
SR 28 and S Mary Ave	Intersection 3	0.9	0.5	0.3	0.2	0.5	0.3	4ST	4-RIRO	0.55	Adjusted to RIRO
SR 28 and S Nile Ave	Intersection 4	1.0	0.5	0.4	0.2	0.6	0.3	4ST	RAB	0.56	Adjusted to RAB
SR 28 and S Tyee Ave	Intersection 5	1.2	0.7	0.4	0.2	0.7	0.4	4ST	4-RIRO	0.55	Adjusted to RIRO
SR 28 and Rock Island Rd (West)	Intersection 6	0.1	0.0	0.1	0.0	0.1	0.0	3ST	n/a	0	Removed
SR 28 and Rock Island Rd (East)	Intersection 7	0.6	0.0	0.2	0.0	0.4	0.0	3ST	n/a	0	Removed
SR 28 and Rock Island Dr	Intersection 8	0.7	0.4	0.3	0.2	0.4	0.3	4ST	RAB	0.56	Adjusted to RAB
SR 28 and Battermann Rd	Intersection 9	0.3	0.2	0.1	0.1	0.2	0.1	3ST	3ST	0.67	Adjusted w/ new LT lane
Battermann Rd and Saunders Ave	Intersection 10	0.0	0.0	0.0	0.0	0.0	0.0	3ST	3ST	1	
Saunders Ave and N Garden Ave	Intersection 11	0.0	0.0	0.0	0.0	0.0	0.0	4ST	4ST	1	
Rock Island Rd (West) and S Nile Ave	Intersection 12	0.4	0.4	0.1	0.1	0.3	0.3	4ST	4ST	1	
Rock Island Rd (West) and 8th St SE	Intersection 13	0.1	0.1	0.1	0.1	0.1	0.1	3ST	3ST	1	
Rock Island Rd (West) and 3rd St SE	Intersection 14	0.8	0.8	0.3	0.3	0.5	0.5	4ST	4ST	1	
Rock Island Rd (West) and Grant Rd	Intersection 15	3.9	0.0	1.4	0.0	2.5	0.0	4SG	n/a	0	Removed from study area
SR 28 and Lyle Ave	Intersection 16	0.8	0.5	0.4	0.2	0.5	0.3	3ST	3-RIRO	0.55	Adjusted to RIRO
SR 28 and Perry Ave S	Intersection 17	1.8	1.0	0.7	0.4	1.1	0.6	4ST	4-RIRO	0.55	Adjusted to RIRO
SR 28 and Quincy Ave S/Akamai Way	Intersection 18	2.1	1.2	0.8	0.5	1.3	0.7	4ST	4-RIRO	0.55	Adjusted to RIRO
SR 28 and S Union Ave	Intersection 19	1.8	1.0	0.7	0.4	1.1	0.6	4ST	RAB	0.56	Adjusted to RAB
SR 28 and Nature Shore Dr	Intersection 20	0.4	0.2	0.2	0.1	0.2	0.1	3ST	3-RIRO	0.55	Adjusted to RIRO
SR 28 and Columbia Cove Ln	Intersection 21	0.4	0.2	0.2	0.1	0.2	0.1	3ST	3-RIRO	0.55	Adjusted to RIRO
SR 28 and Riverside Pl	Intersection 22	0.7	0.4	0.2	0.1	0.4	0.2	4ST	RAB	0.56	Adjusted to RAB
TOTAL		48.3	34.3	16.1	10.9	32.2	23.4				

Legends and Abbreviations:

4U	Four-lane, undivided	RAB	Roundabout
4D	Four-lane, divided	n/a	Not applicable
2U	Two-lane, undivided	HSM	Highway Safety Manual
4SG	Four-leg traffic signal	PACF	Predicted average crash frequency
4ST	Four-leg stop control (on minor streets)	KABCO	All crashes
4-RIRO	Four-leg right-in/right-out	KABC	Injury/fatal crashes
3ST	Three-leg stop control (on minor street)	PDO	Property damage only
3-RIRO	Three-leg right-in/right-out		Segment/intersection outside of study area

Intermediate-Speed SR 28

Project Element	Total Crashes/yr (KABCO)		Fatal and Injury Crashes/yr (KABC)		Property Damage Only Crashes/yr (PDO)		Post Processing				
	Raw HSM Output: Predicted average crash frequency N _{predicted} (KABCO)	Adjusted PACF N _{expected} (KABCO)	Raw HSM Output: Predicted average crash frequency N _{predicted} (KABC)	Adjusted PACF N _{expected} (KABC)	Raw HSM Output: Predicted average crash frequency N _{predicted} (O)	Adjusted PACF N _{expected} (O)	Site Condition		Adj. Factor	Notes	
							HSM	Actual			
INDIVIDUAL SEGMENTS											
SR 28: Grant to 3rd	Segment 1	1.5	0.0	0.5	0.0	1.1	0.0	4U	n/a	0	Removed from study area
SR 28: 3rd to Battermann	Segment 2	26.6	26.6	7.2	7.2	19.4	19.4	3T	3T	1	
Battermann	Segment 3	0.2	0.2	0.1	0.1	0.1	0.1	2U	2U	1	
RIR (East)/Saunders	Segment 4	2.3	2.3	0.8	0.8	1.5	1.5	2U	2U	1	
RIR (West)	Segment 5	2.9	2.9	1.0	1.0	1.9	1.9	2U	2U	1	
INDIVIDUAL INTERSECTIONS											
SR 28 Spur and Grant Road	Intersection 1	2.3	0.0	0.8	0.0	1.5	0.0	4SG	n/a	0	Removed from study area
SR 28 Spur and 3rd St SE	Intersection 2	1.3	1.3	0.4	0.4	0.9	0.9	4SG	4SG	1	
SR 28 and S Mary Ave	Intersection 3	0.9	0.5	0.3	0.2	0.5	0.3	4ST	RAB	0.56	Adjusted to RAB
SR 28 and S Nile Ave	Intersection 4	1.0	0.5	0.4	0.2	0.6	0.3	4ST	RAB	0.56	Adjusted to RAB
SR 28 and S Tyee Ave	Intersection 5	1.2	0.5	0.4	0.2	0.7	0.3	4ST	4ST	0.4489	Adjusted w/ new LT lanes
SR 28 and Rock Island Rd (West)	Intersection 6	0.1	0.1	0.1	0.1	0.1	0.0	3ST	3ST	0.67	Adjusted w/ new LT lane
SR 28 and Rock Island Rd (East)	Intersection 7	0.6	0.6	0.2	0.2	0.4	0.4	3ST	3ST	1	
SR 28 and Rock Island Dr	Intersection 8	0.7	0.4	0.3	0.2	0.4	0.3	4ST	RAB	0.56	Adjusted to RAB
SR 28 and Battermann Rd	Intersection 9	0.3	0.2	0.1	0.1	0.2	0.1	3ST	3ST	0.67	Adjusted w/ new LT lane
Battermann Rd and Saunders Ave	Intersection 10	0.0	0.0	0.0	0.0	0.0	0.0	3ST	3ST	1	
Saunders Ave and N Garden Ave	Intersection 11	0.0	0.0	0.0	0.0	0.0	0.0	4ST	4ST	1	
Rock Island Rd (West) and S Nile Ave	Intersection 12	0.4	0.4	0.1	0.1	0.3	0.3	4ST	4ST	1	
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SR 28 and Columbia Cove Ln	Intersection 21	0.4	0.3	0.2	0.2	0.2	0.1	3ST	3ST	0.67	Adjusted w/ new LT lane
SR 28 and Riverside Pl	Intersection 22	0.7	0.3	0.2	0.1	0.4	0.2	4ST	4ST	0.4489	Adjusted w/ new LT lanes
TOTAL		55.4	41.6	17.9	13.1	37.5	28.9				

Legends and Abbreviations:

4U	Four-lane, undivided	RAB	Roundabout
2U	Two-lane, undivided	n/a	Not applicable
3T	Three-lane with center turn	HSM	Highway Safety Manual
4SG	Four-leg traffic signal	PACF	Predicted average crash frequency
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3ST	Three-leg stop control (on minor street)	PDO	Property damage only
3-RIRO	Three-leg right-in/right-out		Segment/intersection outside of study area

APPENDIX G

Public Engagement Materials

Social Media Graphics / Flyers

SR 28 Corridor Study

 **Tell us what you think!**

Visit our website and pinpoint map!
<https://bit.ly/2S1nYj1>


¡Visite nuestro sitio completamente en español y nuestro mapa interactivo!
<https://bit.ly/3u2Ci9f>



Are you concerned about safety, traffic congestion, or ways to get to, from, or beyond Rock Island?



ESTUDIO DE LA CARRETERA SR 28

 **¡Cuéntenos lo que usted sabe!**

¡Visite nuestro sitio completamente en español y nuestro mapa interactivo!
<https://bit.ly/3u2Ci9f>



¿Le preocupa la seguridad, las congestiones de tráfico, o las rutas para llegar a Rock Island y más allá?





SR 28 Corridor Study

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Cuéntenos lo que usted sabe!

News Publications

https://www.wenatcheeworld.com/business/residents-pinpoint-safety-mobility-issues-in-highway-28-study/article_9bd9e5c4-fa34-11eb-97c4-9725bd25a726.html

Residents pinpoint safety, mobility issues in Highway 28 study

By Sydnee Gonzalez
World staff writer
Aug 10, 2021

EAST WENATCHEE — Safety concerns and increased traffic are among the grievances individuals who use the portion of Highway 28 between East Wenatchee and Rock Island are bringing up to transportation authorities.

The comments are being gathered as part of a Chelan-Douglas Transportation Council study to improve the Highway 28 corridor between East Wenatchee and Batterman Road near Rock Island.

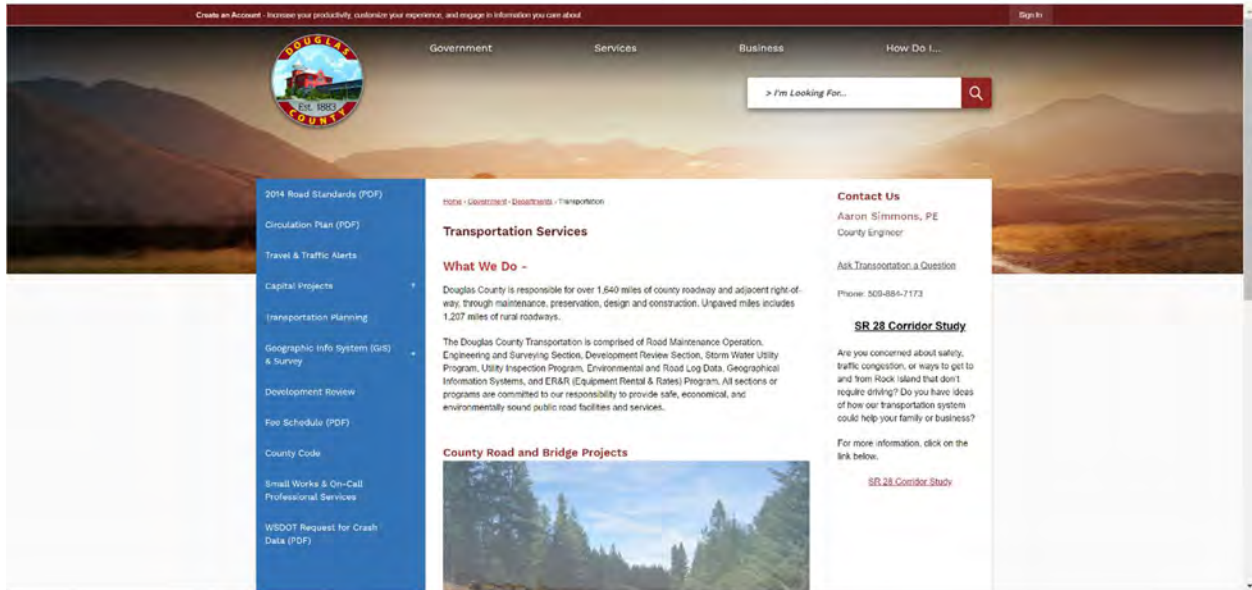
Comments can be added to the map until Aug. 20. Additional feedback surveys will be available on the website around the first week of September, and the study's project manager, Jennifer Saugen with consulting firm Perteet Inc., said an in-person outreach meeting is likely the same month.

Suggestions submitted so far on the online map tool include:

- Increasing the road to four lanes
- Extending the Apple Loop Trail to Rock Island
- Widening the shoulder
- Adding turning lanes, street lights, bicycle lanes, a wildlife crossing and roundabouts

People also shared experiences of near accidents and other safety concerns.

Agency Websites and Social Media Posts





WSDOT

July 1 · 🌐



Hey Wenatchee Valley, are you concerned about safety, traffic congestion, or ways to get between Wenatchee and Rock Island that don't require driving? Do you have ideas of how our transportation system can better support that?

We are working with the Chelan Douglas Transportation Council and other local partners to get a better understanding of the current and future transportation needs on SR 28 and the surrounding road networks. This study will look at ways to improve vehicle safety, traffic congestion, local accessibility, and bicycling throughout the corridor.

Please take a few minutes to visit our website and let us know what you'd like to see on SR 28 between Wenatchee and Rock Island: [https://experience.arcgis.com/.../0927842335284376a4c.../...](https://experience.arcgis.com/.../0927842335284376a4c.../)



Author

WSDOT

También tenemos este sitio web disponible en español:

[https://experience.arcgis.com/.../7e075e15a2394a05a99.../...](https://experience.arcgis.com/.../7e075e15a2394a05a99.../)

EXPERIENCE.ARCGIS.CO
Experience

Like · Reply · See Translation · 10w



Author

WSDOT

Here's a look at the general study area:



Like · Reply · 10w



2



Brian Aarestad

Put another bridge in between rock island dam and Wenatchee. Needed one for years with the growth of Malaga and rock island.

Like · Reply · 9w



3

Like · Reply



City of East Wenatchee, Washington Government

June 18 · 🌐



Are you concerned about safety, traffic congestion, or ways to get to and from Rock Island that don't require driving? Do you have ideas of how our transportation system could help your family or business?

To find ways to address your concerns and ideas, the Chelan Douglas Transportation Council is teaming with local agency partners and other stakeholders to gain a better understanding of the current and future transportation needs on SR 28 and the surrounding road networks. We also want to identify the transportation investments that meet those needs. The study will look at options to improve vehicle safety, traffic congestion, local accessibility, and bicycling throughout the corridor.

Visit <https://bit.ly/2S1nYj1> to view the SR 28 Corridor Study and provide your input!

SR 28 Corridor Study

Are you concerned about safety, traffic congestion, or ways to get to, from, or beyond Rock Island?

Visit our website and pinpoint map!

<https://bit.ly/2S1nYj1>



**Tell us
what
you
think!**



City of East Wenatchee, Washington Government

May 25 · 🌐



Are you concerned about safety, traffic congestion, or ways to get to and from Rock Island that don't require driving? Do you have ideas of how our transportation system could help your family or business?

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SR 28 Corridor Study



Tell us what you think!

Visit our website and pinpoint map!

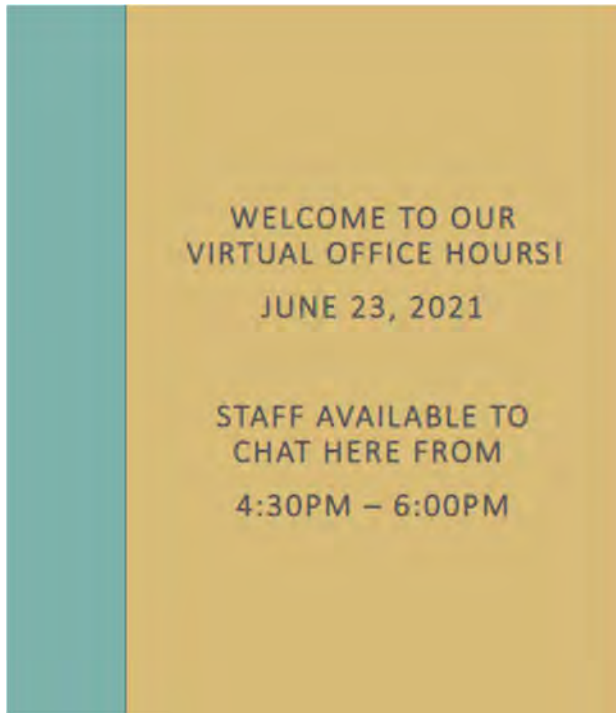
<https://bit.ly/2S1nYj1>



Chelan-Douglas
TRANSPORTATION COUNCIL
CDTC

Are you concerned about safety, traffic congestion, or ways to get to, from, or beyond Rock Island?

Virtual Open House



SR 28 Corridor Study

Survey for Community Event



¿Le preocupa la seguridad o las congestiones de tráfico en la carretera SR 28? / Are you concerned about safety or traffic congestión on SR 28?

¿Qué tan seguido usa la carretera SR 28? / How often do you use SR 28?

¡Cuéntenos lo que usted sabe! / Tell us what you know!

Flier for Community Event that the Study Team Attended

CAFE
Center for the Advancement of Family Education

DE MI CORAZON
FROM MY HEART
TO YOURS
AL TUYO

CSC COMMUNITY SERVICES COALITION

8/03/2021
1 - 6 PM

766 S Mission St. Wenatchee, WA

FREE VACCINES

VACUNAS GRATIS

- Bolsas de Comida
- Clinica Movil CVCH - Vacunas Gratis
- Información
- Juegos, Diversión Familiar
- Food Bank
- CVCH Mobile Clinic - Free Vaccines
- Information
- Games, Family Fun

Action Community Development

CVCH

MOLINA HEALTHCARE

COMMUNITY HEALTH PLAN

In-Person Event Booth



¡BIENVENIDO! WELCOME!

Estudio de la carretera SR 28
SR 28 Corridor Study

¿Le preocupa la seguridad, las congestiones de tráfico, o las rutas para llegar a Rock Island y más allá? ¿Tiene ideas de cómo nuestro sistema de transporte podría ayudar a su familia o negocio?

Are you concerned about safety, traffic congestion, or ways to get to and from Rock Island that don't require driving? Do you have ideas of how our transportation system could help your family or business?



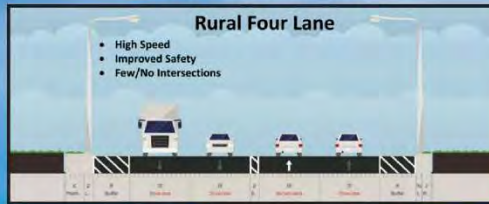
IN COORDINATION WITH



When driving to Rock Island or Quincy –
Which one of these makes the most sense?

Cuando maneja hacia Rock Island o Quincy –
¿Cuál de estos tiene mas sentido?

Cuatro Carriles, Rural



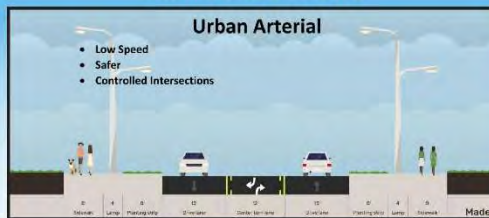
- Alta Velocidad
- Seguridad Mejorada
- Pocos o no intersecciones

Dos Carriles, Rural



- Alta Velocidad
- Seguridad Mejorada
- Uso de derecho de paso para otras mejoras de movilidad

Boulevard Urbano



- Baja Velocidad
- Seguridad Mejorada
- Intersecciones Controladas



IN COORDINATION WITH



STAKEHOLDER INTERVIEW PLAN

123 Ohme Garden Road, Suite 8, Wenatchee, WA 98801 | P 800.615.9900

SR 28 Corridor Study Stakeholder Interview Plan Interview Time: 30-minutes

Purpose

Stakeholder interviews are the first way the project team will reach out to community organizations, schools, special districts, government agencies, businesses, property owners, and residents. During these interviews our team will:

- Introduce the project team
- Inform stakeholders about the study, including the geographic limits we are working within (provide map of study area)
- Gather feedback on priorities for the corridor
- Listen to stakeholder concerns and interests
- Discuss how the community will be engaged throughout the project and gather feedback on that approach
- Obtain contact information and preferences for future communications

Project Overview Script

Hi, my name is _____ and this is _____.

Thank you for taking the time to meet with us regarding the SR 28 corridor study. We will take about 30-minutes to talk together.

The Chelan Douglas Transportation Council is teaming with local agency partners and other stakeholders to study the SR 28 corridor, which includes the adjacent road network, between East Wenatchee and Rock Island. (*share map*) The study is being conducted to gain a better understanding of the existing and future transportation needs within the corridor and to identify the transportation investments that meet those needs. The study will look at options to improve vehicle safety, traffic congestion, local accessibility, and bicycling and walking throughout the study area corridor.

During this phase of the study, our team is meeting with stakeholders and community members along the corridor to further understand your interests, concerns, and priorities related to traveling within the study area. We'd also like to hear ideas from stakeholders about how to engage the broader community, and to learn how you would like to stay informed and engaged during the study process.

We have some questions we'd like to ask you to help us understand your transportation priorities on SR 28 and other roadways, pathways, bikeways, and transit options in the study area.

Stakeholder's Experiences in the Corridor Study Area:

1. Before we get started, are there any questions you have about the corridor study that you would like to make sure we cover?

STAKEHOLDER INTERVIEW PLAN

123 Ohme Garden Road, Suite 8, Wenatchee, WA 98801 | P 800.615.9900

2. Would you consider yourself a “local-trip” traveler in the area, “through-traffic” traveler, or both?
3. What has your experience been in the past while driving, cycling, riding transit and/or walking along or crossing SR 28?
4. What has your experience been in the past while doing the same along Rock Island Road and other roadways or pathways in the study area?
5. Do you have any safety concerns on SR 28, Rock Island Road, or other local roads or pathways in the study area?
6. Have you witnessed any “near-miss” collisions on roadways within the study area?

Stakeholder’s Thoughts on Concepts to Improve the Corridor:

1. What ideas do you have for improving the SR 28 corridor for roadway and pathway users, residents, and businesses into the future?
2. What do you hope the study team prioritizes and considers when developing design concepts for the corridor? *(Example leading questions below)*
 - a. Should new improvements on SR 28 prioritize access to homes and businesses or through trips passing through the study area? Why?
3. Are you aware of any major changes planned in the vicinity (developments, transportation projects, etc) that will help us in our planning for the future?

Community Outreach and Public Participation:

1. The study team is creating a project specific website to share study information and receive feedback from the public. What are elements of a website that would be most helpful to you? Right now we have tools like pinpoint maps (mark your locations of concern), information on the study, and dates/times for future involvement. *(share website address and offer to scroll through it with them if time is available)*
2. As part of our outreach, we will also be meeting with individual community groups. We would like to engage voices that are not traditionally heard due to age, disability, income, or national origin. Are there specific community groups that you would suggest we talk to?
3. What are the best ways to share information with the communities surrounding the study area?
4. What is the best way for us to keep you and your organization informed and engaged throughout the project?

Conclusion and Next Steps:

1. Do you have any remaining questions about the study that we didn’t cover?
2. Do you have any additional thoughts that you want to make sure we capture?

APPENDIX H

Interactive Map Comments and Reactions Summary

Type	Comment	Up Votes	Down Votes
Safety / Seguridad	Need left hand turn lane coming from Rock Island so people entering the park are not in danger of getting rear ended. Many enter here to use the boat launch and traffic is heavy going both directions.	47	0
Traffic / Tráfico	This intersection could use a traffic light or a traffic circle. There is a large mobile home park with over 100 trailers that enter the highway from here, and a new neighborhood development at Nile and Rock island Road that has 400? homes being built that will use this intersection in the future. Traffic flows along HWY 28 at 60-65 miles per hour here. People get impatient and pull into fast moving traffic with little clearance increasing the odds of accidents.	17	15
Other / Otros	Due to very heavy traffic in close proximity to the Aspen Shores development, rumble bars increase the noise level to unbearable decibels. They were finally paved over after multiple complaints. Many homes are within 150 feet of the highway and there is no sound barrier. Please eliminate rumble bars along this development when replacing the asphalt on the highway. Adding cement barriers for safety instead would achieve the safety goals and reduce noise at the same time.	16	0
Safety / Seguridad	lower speed limit to 45 MPH from Rock Island to East Wenatchee. This section is heavily trafficked with multiple side roads intersecting it along the way. It is very difficult to enter the highway from every side road with cars speeding at 60+MPH. It is currently very unsafe for all who live off this section of the highway.	48	86
Pedestrian & Bicycle / Peatones y Bicicletas	Rock Island Road and Highway 28 form a loop of sorts between East Wenatchee and Rock Island. Rock Island Road could be improved with a wider shoulder for safer bicycling.	10	1
Pedestrian & Bicycle / Peatones y Bicicletas	Left turn signal which is used to access the loop trail entrance (called by induction loop) does not detect bikes. Turning movement shown in image. This was communicated to WSDOT earlier in 2021 who have not taken action as of 5/11/2021	24	1
Pedestrian & Bicycle / Peatones y Bicicletas	Extending the bike trail from Hydro Park to Rock Island should be a priority. The popularity of the Rocky Reach Trail is evidence that a bike/pedestrian trail to Rock Island would be a sound decision for transportation and recreation.	56	5
Pedestrian & Bicycle / Peatones y Bicicletas	Stretch of SR 28 from Batterman rd. to Rock Island rd has no dedicated bike infrastructure, separated path could be beneficial since there are high traffic speeds through this area.	31	5
Safety / Seguridad	This is just a stop/yield signal. Very difficult to make left turns at this intersection during times of heavy traffic volume. This intersection should be investigated for an improved traffic signal or another roundabout to complement the Highland Dr/3rd St roundabout.	36	3
Pedestrian & Bicycle / Peatones y Bicicletas	A pedestrian overpass convenient to the mobile home park and the HydroPark could save lives.	9	0
Other / Otros	Transportation is needed along Battermann Road also. However, many cars and trucks come speeding down, sometimes at unsafe speeds. Would be nice to have bus stops along Battermann. Just not sure how feasible or expense-worthy?	5	0
Pedestrian & Bicycle / Peatones y Bicicletas	Recommend a pedestrian/bicycle crossing location somewhere along Hwy 28 in this general area (Mary, Lyle or Nile Ave) - preferably a tunnel or overpass to reduce highway slowdowns. Many new subdivisions are going into this area, so foot and bicycle traffic should be expected to increase substantially in the future.	26	0

Other / Otros	Consider extending/connecting Rock Island Road through this area as a 'frontage road' to Highway 28 for an alternate lower speed auto route and safer pedestrian/bicycle route.	13	2
Safety / Seguridad	The manner in which the road was repaved along the entire corridor (new strips of asphalt in the tire area) makes for an uneven surface which is hard to drive on and makes the driver think it is icy even when it is not, because the uneven patches move the car around.	35	1
Pedestrian & Bicycle / Peatones y Bicicletas	Two teenagers tried to cross the highway in the evening and both were struck by vehicles. One died, one was injured. It was dark and there was a lot of traffic.	4	0
Traffic / Tráfico	This intersection is very dangerous and can get congested when the park is being used.	16	0
Traffic / Tráfico	This intersection can be congested, especially since it seems to be heavily used by trucks that enter/exit frequently.	9	0
Other / Otros	This passing zone is horrible. Slow traveling vehicles enter this passing zone and speed up causing the people trying to pass them to drive well above the speed limit. The slower vehicles slow back down after the passing zone ends. It's extremely frustrating. It's also too short.	38	0
Pedestrian & Bicycle / Peatones y Bicicletas	Put in a roundabout here.	21	16
Safety / Seguridad	Intersection of HWY 28 and Batterman Road needs to be improved. Limited site when West bound traffic turning onto Batterman Road. Also East Bound traffic needs to have a turn lane.	39	0
Traffic / Tráfico	Highway 28 should be expanded to 4 lanes with turn lanes at each intersection.	67	6
Safety / Seguridad	Dangerous intersection when east bound cars trying to turn onto South Nile. At certain times of the year the sun is also in the drivers eyes in this section of the road. There has also been a number of accidents in this area,	17	0
Other / Otros	This intersection can get congested but functions better than any other SR 28 intersection east of Grant Road.	3	1
Other / Otros	Batterman has become my west bound bypass route. It is much safer and less travelled. No high speed tailgaters.	32	0
Other / Otros	The Quincy to East Wenatchee SR28 segment is very unsafe. There seems to be a lot of high speed and risky driving. Hopefully some improvements and widening are being considered.	147	0
Pedestrian & Bicycle / Peatones y Bicicletas	Put a roundabout here.	19	14
Traffic / Tráfico	This spot gets backed up all the time. Also, oftentimes, when exiting 28 by Fred Meyer, it's too hard to get into the corresponding lane going into Wenatchee, due to Fred Mayer traffic having the right of way coming out of the parking lot, thus causing more backups (folks waiting to get into the left lane, blocking other cars from proceeding on).	1	0
Safety / Seguridad	This intersection has the most congestion issues. Roundabout in addition to reducing speed limit here would reduce near misses.	2	16
Safety / Seguridad	Near misses are common in this area... adding no passing has helped reduce some of the near misses but the speed limit needs to be reduced from 3rd street until where SR 28 and Rock Island met again. There are several side streets, a mobile home park and Hydro Park.	22	9
Traffic / Tráfico	This needs to become an alternate route for traffic driving through East Wenatchee with a destination of Odebastian bridge. Even if SR28 was increased to a 4 lane highway the traffic will still and does bottleneck at Grant Road/SR28, Sunset Highway, and George Seller Bridge.	36	0

Other / Otros	Where do you plan to put the trail if you expand it? Could we have a light where we could make a light flash when we are trying to leave the development ? Just ideas	3	1
Safety / Seguridad	I also just want to educate people with signs that say slow down people live here and need to exit or slow down local communities or waterfront communities something that helps people know that we live off the HWY. I put my blinker on early now and gently slow down to educate people that I am turning into my neighborhood and home	3	1
Safety / Seguridad	SR28 from the enter section at BJ Truck stop in Rock Island to the enter section at 3rd street in East Wenatchee is a safety hazard to any car ,Bicycle or pedestrian. Please change the speed limit to 45 miles an hour through this area. The noise level on my property at the peek of traffic volume is so bad that you can be standing next to a person and still not hear what the may be saying. All the studies in the world cannot take the place of the people that have to live with this 24/7 365 days	12	23
Other / Otros	There is a bus stop on Rock Island Road/Quincy. For those living at Aspen Shores, they have to cross the Highway at this point to access the bus. This is often very dangerous to cross to access the bus.	5	0
Safety / Seguridad	Given the volume of traffic, the number of people residing along this thoroughfare, and the carelessness of many drivers, the speed limit between 3rd Street and the Rock Island truck stop should be reduced. This single action alone could address the many other concerns being voiced regarding the safety of pedestrians, drivers, and cyclists, the noise pollution, and the difficulty accessing the highway at certain times of day. A speed limit of 60 mph here is unnecessary and a safety hazard.	15	64
Pedestrian & Bicycle / Peatones y Bicicletas	I'm an avid cyclist and frequently cross the highway from Aspen Shores to Quincy to gain access to Rock Island Road. During the morning and afternoon commute times it's not unusual to have to wait a few minutes for a break in traffic to safely cross the highway.	5	0
Traffic / Tráfico	All it takes is one car going 45 or 50 mph and it's completely backed up, regardless of time of day. So many impaired drivers along this stretch of road either leaving Hydro Park after being out on their boats or picnicking. This should really be a four lane road or lower the speed limit.	2	0
Pedestrian & Bicycle / Peatones y Bicicletas	The bicycle loop trail should come all the way down to Rock Island as it is growing so fast and a really good way to connect the communities. Also, an overpass pedestrian bridge here would be ideal.	18	1
Safety / Seguridad	A slightly wider shoulder would make a turn lane that lets Eastbound cars more safely turn right onto Akamai Way from SR28. This would allow cars to get completely off of the highway as others pass, similar to what is available at Perry and SR28.	9	0
Pedestrian & Bicycle / Peatones y Bicicletas	The shoulder here, past the end of the bike trail, is very narrow and scary to ride a bicycle here. Please extend the bike trail to Rock Island or widen the shoulder so that bicycles can safely travel beyond Hydro Park.	4	0
Safety / Seguridad	Thank you for asking the public about the corridor and the safety of the highway. I have recently been in two very near head on collisions in the curves between the dam and the hill, I would recommend taking out the passing zones in that area. I travel thru there between 5-6am there is a lot of traffic leaving Wenatchee heading towards Quincy at that time of morning and seems some drivers are in a hurry and carelessly pass in that area.	3	0

Safety / Seguridad	A total disregard to the safety of all residents that have to use this highway with the lack of left-hand turn lanes at every intersection from 3rd street all the way to Rock Island with the current 60mph Speed limit. Every intersection should have left hand turn lanes regardless the number of residents using them like the improvements that were made at Aspen Shores. Remove the rumble strips that are deafening and degrading the quality of life in our residential areas.	13	0
Traffic / Tráfico	This passing lane would be better served as a southbound clearing lane leaving East Wenatchee and not the northbound passing lane with less than 5 miles to the light at 3rd Street.	4	6
Safety / Seguridad	Access into the park and boat ramp is especially dangerous when coming north bound from Rock Island with the lack of a left hand turn lane. Personally I feel like a sitting duck stopped in the middle of the road waiting the impact of an inattentive or distracted driver. A deceleration and right hand turn lane south bound into the park would help reduce traffic from stacking up behind a turning vehicle. Remove the rumble strips in population areas to past Rock Island especially the shoulders.	10	0
Pedestrian & Bicycle / Peatones y Bicicletas	Poor bike/ped facilities at this intersection, suggest improvements to provide adequate facilities on 3rd Street SE to Loop Trail connection. Also suggest bike facilities on Rock Island Road.	5	1
Pedestrian & Bicycle / Peatones y Bicicletas	Currently no crosswalk or reasonable bicycle infrastructure to connect westbound 3rd Street SE bicycles to Loop trail. Westbound cyclists become stranded with no crosswalk. Suggest reviewing this area and accommodating bicycles. Use of loop trail and 3rd Street SE is key connection for cyclists accessing East Wenatchee.	3	1
Pedestrian & Bicycle / Peatones y Bicicletas	Consider development of a singletrack recreational trail along the shoreline. Would be nice recreational feature, beautiful views, and could be accessed from the Loop Trail. Possible coordination with Evergreen MTB alliance??	3	0
Pedestrian & Bicycle / Peatones y Bicicletas	Rock Island Road is reasonable bike route for confident cyclists and should be maintained and improved. However, where Rock Island Road coincides with SR28, it is uncomfortable for bikes. Suggest extending loop trail to Rock Island and/or developing protected route parallel to SR28. route with moderate grades, protec	5	2
Pedestrian & Bicycle / Peatones y Bicicletas	Add bicycle and pedestrian crossing of the Columbia River to make a connection to Malaga-Alcoa Highway	17	1
Other / Otros	Numerous wildlife collisions here, beaver, otter, etc. Suggest that revisions to this area include undercrossings for wildlife and possibly recreational boats (kayaks, paddleboards, etc).	15	0
Other / Otros	Add a dedicated right hand lane for the traffic coming into East Wenatchee and turning right up Grant Road	1	0
Other / Otros	Expand SR28 from East Wenatchee to Entiat to 4 lanes. Like Highway 2 heading to Leavenworth from Wenatchee	19	0
Other / Otros	4 lane SR28 to Quincy or add a LOT more passing lanes... in both directions.	81	1
Other / Otros	Oops... I meant expand SR28 to Quincy to a 4 lane limited access divided highway like Highway 2 to Leavenworth. Improve Rock Island Road to serve as the frontage road for local access.	26	1
Safety / Seguridad	Until the highway is expanded to 4 lanes, ALL side road accesses should have both exit lanes, entry lanes and turn lanes. Either make the intersections safe or remove them.	30	0

Traffic / Tráfico	This would be a good location not only for a pedestrian/bicycle access bridge, but a bridge connecting Malaga to SR 28 for improved access to/from Malaga. It would shorten travel times for people commuting east for work and provide another means of connecting East Wenatchee, Rock Island, and Malaga. This bridge could be constructed to accommodate all forms of traffic vs limited use by bicycles/pedestrians which would see minimal use.	38	0
Traffic / Tráfico	The entire length of this survey area needs to be expanded to 4 lanes (2 per direction) plus dedicated turn lanes at intersections. Traffic in this entire corridor has grown to the point that 4 lanes is warranted. Part of Batterman Road is included in this survey, but the entire road should have been included due to it being an alternative route for accessing East Wenatchee connecting directly to Grant Road which is one of the main thoroughfares of the city.	18	2
Pedestrian & Bicycle / Peatones y Bicicletas	We have EBikes and would like to be able to ride our bikes SAFELY from our home in Rock Island to work in Wenatchee, but there is NO safe route to get to the bike trail at the North end of Hyrdo Park from our house. Even being able to ride on the canal road would be helpful, but that is not allowed.	3	0
Traffic / Tráfico	This comment is for the ENTIRE road from East Wenatchee to Rock Island. This road NEEDS to be 4 lanes for safety reasons. If this is not possible, then at least put in a turn lane the entire distance. I have been in 3 near misses of being rear ended by other cars when I try to stop for someone trying to make a left hand turn off of SR 28. In one instance I luckily had enough room to pull to the right side of the road and the car behind me hit the car in front of me.	11	0
Traffic / Tráfico	People on this road CONSTANTLY go 5-15 miles under the posted speed limit. Unknown if this is because they have no insurance and don't want to get pulled over, but it makes other cars get upset and pass unsafely. I have never seen anyone watching for this in the 4 years I have been driving that route to and from work.	1	3
Traffic / Tráfico	Why do we have so many people that CAN'T drive the speed limit? Time and time again these slow drivers (45-55 mph!) clog up the flow of traffic. If you can't drive 60-62 mph than maybe you should keep it on the back roads,,,or get a legitimate valid license	12	3
Safety / Seguridad	I have been driving through here to Rock Island dam for 30 plus years and can't tell how many times I've seen semi trucks and other vehicles pull out onto the highway, forcing the highway traffic to hit the brakes. Especially true for the ones pulling out heading east. The puny lane for west bound to "get up to speed" is laughable at best. An overpass would be great, but the usual response is another traffic light, I sure hope that's not the fix you all have in mind	14	0
Safety / Seguridad	I turn up this road to get home at 5:45-6:00. I feel like this little "turn off" is a dangerous area. I turn my blinker on SUPER early to let the people behind me know. And I try and get on the shoulder as best as I can, but I still have really close calls with people almost hitting me because they're impatient. I have to slow down from 60 mph to make a super tight turn with little to no space to do so. It would be nice to have a bigger turn off area to go up S Nile.	14	0
Traffic / Tráfico	Extending exit lanes should be consider to not slow down highway traffic and also a middle lane for cars can get into high way. Both lanes can be congested with traffic and makes it hard for cars to get in highway.	4	0
Safety / Seguridad	need left turn lanes at the boat launch	8	0

Safety / Seguridad	Huge safety hazard with amount of traffic from hydro park and on the hwy. Many accidents occur in this area and many near misses. I have never felt comfortable or safe enough to cross the hwy by foot from Mary or Nile. With the new development this areas pedestrian and vehicle traffic is going to greatly increase.	3	0
Other / Otros	Widening of lanes, adding exit and entrance lanes and reducing speed would greatly increase quality of life for residents along the entire corridor. The noise from constant traffic 24/7 is terrible and you literally can not hear someone screaming in your ear when you are outside at any time of day/night.	7	0
Pedestrian & Bicycle / Peatones y Bicicletas	Unable to safely get to the link bus stop from Riverside MH park to Rock Island road	5	0
Traffic / Tráfico	A pull off lane is needed here for the MH park. Cars are having to slow down in the 60 mph lane and risk getting rear ended or side swiped by cars passing in the turn lane. I cant count how many times I have almost been hit. It is almost impossible to exit the park at certain times of the day. People complain about "us pulling out in front of traffic". They should try living in the park and sitting there for sometimes 15 minutes trying to get a break in traffic! There are 100+ units in the park	7	0
Safety / Seguridad	The entire length of this highway has been in absolutely horrible, unsafe condition since the "grooving and repaving. The tracks are not straight and it pulls the vehicle all over the road. That problem is even worse when it's icy or the wind is blowing. One of the worst road repairs I have ever seen!	19	0
Traffic / Tráfico	Put in a roundabout here.	6	24
Traffic / Tráfico	Put in a roundabout here.	3	0
Other / Otros	This is a very important wildlife corridor crossing from ponds on both sides of the road.This area has high vehicle collisions with important wildlife in our area. Widening the highway here would decrease successful wildlife passage across the road. Providing an elevated high to allow wildlife passage reducing wildlife deaths and accidents in this area. This has been repeatedly brought forward to the State Transportation Department to address in future highway improvement projects in this area	3	1
Traffic / Tráfico	Left turning movements at this intersection are increasingly becoming a problem. Suggest installation of a roundabout at this location.	37	6
Traffic / Tráfico	Left turning movements along the whole corridor are an issue. Suggest improving the highway to include right in right out restrictions and installing traffic lights w/ u-turn capabilities or roundabouts at key intersections to allow traffic to get turned around safely if needed. Key intersections likely being 3rd Street SE, S Nile Avenue, both Rock Island Road intersections, Rock Island Drive, and Battermann Road.	76	1
Safety / Seguridad	I travel SR28 northbound in the early morning hours. I have almost been hit by oncoming traffic by driver's that are trying to get to Quincy to go to work. I was run off the road twice in one day. I believe that the "passing zone" heading south is too long. Cars are legally aloud to pass on a "blind corner". Also, this area coming right out of East Wenatchee heading South NEEDS TO BE MONITORED BY POLICE IN THE MORNING FOR THOSE THAT ARE SPEEDING.	2	0
Other / Otros	Need 3 to 4 lanes all the way to East Wenatchee	2	1

Traffic / Tráfico	This is a very dangerous area and I have witnessed many near miss car accidents. People are trying to turn into 2nd Hurst landing road and due to speed, tail gating and just plain not paying attention, accidents are almost occurring on a daily basis. I live at 5120 State Route 28 Rock Island and if traveling home east bound, I use the thin shoulder to make a right hand turn into my street. MORE HAZARDOUS is traveling west, crossing traffic and possibly getting rear-ended. Spinning out common.	4	0
Traffic / Tráfico	I live on S Lyle Ave. Traffic on the hiway has gotten continually worse in the last 8 years we have lived here. Sometimes it is almost impossible to get out onto the hiway. The speed limit needs to be lowered from East Wenatchee to the intersection of it and Rock island rd. Also a round about should be added here to slow down traffic, and or at least a longr turn lane left onto S Lyle and addition of one turning onto S Lyle going west.	1	5
Traffic / Tráfico	A round about would be a great addition to this intersection as it is very dangerous!	2	2
Safety / Seguridad	Need to extend the right hand turn lane into the boat launch. To many times do I see vehicles slam on their breaks to avoid hitting someone who's waiting to legally cross the fog line.	5	0
Safety / Seguridad	The right hand turn up to SNile needs to be extended. To many times have I been in head-on collisions close calls because westbound traffic illegally passes someone turning right up SNile while I was waiting to turn left up to SNile off the highway.	1	0
Traffic / Tráfico	Semi-trucks frequently attempt to turn here, yet few can make the turn without scraping power lines or driving through yards. This happens multiple times most days. I have witnessed impatient drivers blindly drive around stuck semi's or through the orchard. Quincy Ave should be designated NOT as a truck route.	1	0
Traffic / Tráfico	This section has a wide shoulder that can be used for slow moving vehicles. I rarely see any vehicles use it. It could be easily changed to a dedicated passing lane.	0	0
Other / Otros	This park and ride is always empty. Not sure what else it could be used for but it isn't getting used for it's stated purpose.	3	0
Safety / Seguridad	This intersection needs to be an overpass with on-ramps.	2	0
Safety / Seguridad	Similar to the comment already made about how vehicles turning west from Rock Island Road to SR 28, they should have a designated lane to turn into that then merges into the "slow lane" at the passing zone just ahead, rather than having to check for traffic on SR28 and join highway speed traffic.	2	0
Traffic / Tráfico	From 3rd Street to Rock Island Road is a 4 mile stretch of SR28 that has 8 intersections. There is also a few private driveways in there too. That's way too many access points to a 60 mph highway in such a short stretch. Acces to SR 28 should be eliminated at several of the intersections such as Tye, Union, Quincy, Perry and Lyle. Divert local traffic to Rock Island Road, which should be expanded. Add traffic light or roundabout at Rock Island Road and Nile intersections.	2	0
Traffic / Tráfico	It seems that what is needed is one more passing lane at least a mile long going west, and at least 2 passing lanes at least a mile long each, going east. This would be a major help in dealing with slower drivers/vehicles. This should also help relieve the continuous traffic that builds behind slower vehicles which makes it impossible to access SR 28 from any of the cross streets, since you wait for a long time to have a pause in the traffic, in order to enter SR 28.	1	1

Traffic / Tráfico	I have seen many near misses, as eastbound traffic uses the center lane in this section of highway to pass a car, when another car traveling west decides to pass a car in the far westbound lane. This notion of being able to use this as a dual passing lane is not the safest. It would be better to have more dedicated passing lanes between Batterman Road and East Wenatchee, and for each direction of traffic.	1	0
Traffic / Tráfico	This intersection leading to the Boat Ramp deserves an Acceleration Lane and a Deacceleration Lane in each direction as well as a westbound turn lane. This would make access when pulling a boat much safer.	2	0
Traffic / Tráfico	Rock Island Road could be widened/improved and add a bicycle lane which could make it much safer for bicyclists and pedestrians. This would be a good alternative for bicycles so that they don't have to use SR28.	2	0
Traffic / Tráfico	Widening the shoulder at all intersections and provide a noticeable deacceleration lane would improve safety significantly all along this stretch of SR 28.	9	0
Safety / Seguridad	My parents live in this mobile home park, i have witnessed cars spinning their tires to try and get on to the highway in between traffic, you can see tire marks from people trying to pull out on to the highway. Reduced speed and/or a roundabout would greatly be appreciated.	0	0
Traffic / Tráfico	Traffic seems to be getting worse as time goes on- whether it is due to people commuting between Wenatchee & Quincy, additional traffic during the summer for recreational opportunities, semi trucks, and/or ag trailers. 99% of slow drivers do not pull over to allow other drivers to drive the speed limit, which leads to driver frustration and to people taking risks. Hoping to see SR 28 widened to 4 lanes from E Wenatchee all the way to Quincy.	4	1
Traffic / Tráfico	Traffic always seems to slow down between the two turnoffs for Hydro Park; a wider road would be especially helpful in this area.	1	0
Pedestrian & Bicycle / Peatones y Bicicletas	Would love to see the Apple Loop trail extended to Rock Island	3	0
Safety / Seguridad	This area is very dark at night, which makes for poor driving visibility. Installation of lamp posts along this area would increase visibility and help prevent accidents- especially accidents involving wildlife.	3	0
Pedestrian & Bicycle / Peatones y Bicicletas	consider widening narrow shoulder sections of highway for safer bicycling.	1	0
Safety / Seguridad	I travel this HWY every day for work. Slow vehicles and or work trucks especially in the morning with no passing lane makes vehicles want to pass on this hill regardless of weather. Some safely and others...not so much. Adding a passing lane would greatly improve safety through out this stretch of hwy.	1	0
Safety / Seguridad	There are a lot of concerns being voiced unnecessarily about speed. This is a hwy! There is however a lot of side streets that empty out on to this hwy that need to be addressed from people that reside on this once quieter hwy. This is a safety concern. People should not be almost being hit trying to enter or exit the hwy. Down at RI (BJ's truck stop) there is an entry lane. lets look at something like that and middle lanes to exit.	3	0
Other / Otros	Have we thought about designated shuttle services to big employers? Maybe getting some of this traffic off the road? How many from each business would be interested? and would it be economical?	1	0
Traffic / Tráfico	A left turn lane would be a big safety improvement here. There are left turn lanes for Perry and Quincy streets, but there isn't one for Rock Island Rd, which probably gets a lot more traffic than the other two.	2	0

Traffic / Tráfico	Since the highway is only one block away, I suggest closing Rock Island Rd to commercial traffic, except for local deliveries. That would decrease the number of trucks trying to turn left onto the highway at multiple intersections. As this area becomes more residential, it should become less commercial. Also, if roundabouts are installed on the highway, we don't want commercial drivers (or any drivers) taking Rock Island Rd to try to avoid them.	0	0
Traffic / Tráfico	Passing lanes. Too many people try to pass and about run people off the road.	1	0
Traffic / Tráfico	It's almost impossible to get back into town from the park in the evenings. Too much traffic to allow a safe left turn. Either need to have a specific turn into lane or something else.	2	0
Pedestrian & Bicycle / Peatones y Bicicletas	It would be great to see the Loop trail extended out to Batterman Rd. Thank you.	0	0
Other / Otros	Please consider a turn lane into KBHP. Lots of accidents and close calls over the years.	0	0
Traffic / Tráfico	suggest roundabout	0	0
Traffic / Tráfico	suggest roundabout	0	0
Other / Otros	this roundabout note was meant to go over by the entrance to the park	0	0
Traffic / Tráfico	Traffic going through East Wenatchee in both directions should be routed below Fred Mayer's to avoid having to deal with Grant Rd.	0	0
Safety / Seguridad	Near-miss wrecks at the Hydro Park all the time! There needs to be a SAFE turn into and out of the boat launch off the highway. Also the number of animals that are killed in that area is tragic! How about while making a safe way to get into the hydro park/boat launch - you put in an underpass for animal safety?	1	0
Safety / Seguridad	Hazardous left turns into Standard Pallet. I'm driving from Rock Island from the truck stop, and just over the first hill is where people wait to cross the highway and drive in to Standard Pallet. There is a bad blind spot, and just as I clear the hill, there's a car in my lane - turning left into Standard Pallet. There have been more than a few rear-end accidents there.	1	0
Safety / Seguridad	Boat Launch entrance/exit off the highway is a huge dangerous spot. There have been more than a few accidents there because of cross-highway traffic. There is also a huge amount of animals killed in this area - how about an underpass for the animals too?>	0	0
Traffic / Tráfico	The entire highway from East Wenatchee to Quincy needs to have a speed minimum enforced! Every day, any time of day is a slow driver holding up more than five cars. If cars were driving 60mph minimum, and it were enforced, then traffic would move much more smoothly.	0	1
Traffic / Tráfico	Add addition money as it comes in to use to 4 lane Hwy 28 to RI/Quincy. Add an additional exit turn lane into the Trailer Parks and Hurst Landing and any other similar places along that route so the Slow or Rest Home type people can get off or on and not get run over. People living along that Route should know by now that it is not a horse and buggy type of road anymore. The State probably owns enough right of way so as not to have to buy additional right a way on each side of the Hwy.	0	0
Traffic / Tráfico	4 lane as much as of Hwy. 28 out to the Oudobashien Bridge as possible. Add in exit lanes as needed but not at every Street as the costs would increase very fast. Most of the traffic is going at least to the Bridge and vise versa.	0	0
Traffic / Tráfico	Take the 4-5 Million Dollars away from that Fool Double Lane Round a Bout that is proposed at Hwy 2 and Easy Street on the Chelan Co. Side and add it to the Hwy 28 Project going South back through and toward the Bob File Boats and on South.	0	0

<p>Pedestrian & Bicycle / Peatones y Bicicletas</p>	<p>As an avid bicyclist, I recommend extending the trail beyond the Hydro Parks to at least Rock Island and all the way to Quincy over time.</p> <p>Highway 28 from East Wenatchee to Quincy is a perilous drive for trucks, cars and most dangerous for bicyclists. Widening the shoulders both directions, particularly in the passing zones, enforcing speed limits, and making entrances and exits onto and off highway 28 would increase safety in this now busy corridor. This safety study is important!</p>	<p>0</p>	<p>0</p>
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APPENDIX I

SAG Meeting Materials

SAG MEETING NO. 1 NOTES

123 Ohme Garden Road, Suite 8, Wenatchee, WA 98801 | P 800.615.9900

Client: Chelan Douglas Transportation Council
 Project: SR 28 Corridor Study
 Date: March 24, 2021
 9:00am – 10:30am
 Location: Virtual – Microsoft Teams
 RE: Stakeholder Advisory Group Kickoff Meeting
 Notes taken by: Enrique Borges, Jennifer Saugen

Stakeholder Advisory Group members present:

Name	Organization	Name	Organization
George Mazur	WSDOT North Central	Aaron Simmons	Douglas County
Randy Agnew	Rock Island	Tom Wachholder	East Wenatchee
Richard DeRock	Link Transit	Matt Shales	Chelan County PUD
Kelly Gregerson	Washington State Patrol	Kurt Davis	R.I. business owner/ freight hauling
Cassidy Cue	Study area resident	Mike Sorensen	Complete the Loop

Project Team members present:

Name	Organization	Role
Jeff Wilkens	CDTC	Project Manager
Riley Shewak	CDTC	Transportation Planning/Review
Peter De Boldt	Perteet	Stakeholder/Community Lead
Jennifer Saugen	Perteet	Project Manager
Enrique Borges	Perteet	Designer/Translator

Meeting Agenda Outline

- Introduce project team and stakeholder team
- Study overview and work tasks, schedule, and public engagement
- Project Resources
- Round Robin
- Next Steps

Jennifer prepared a PowerPoint presentation (slides attached) that were shared during the meeting.

Introductions:

All team members introduced themselves and stated either the agency they worked for, or the group of citizens/perspective they were representing.

Study Overview, Scope and Schedule, Public Engagement:

Overview

Peter shared the study's goal of balancing trade-offs and competing needs for the SR 28 corridor. Some of these included: through-traffic on SR 28; local trip-making for residents and businesses within and nearby the study area; pedestrians; transit; and bicyclists. He then shared the process and tasks

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associated with reaching a conclusion to the study. He noted that the team will prepare three different multi-lane concepts for SR 28 to inform discussion and evaluation of trade-offs. Potential project concepts may also suggest changes on not just SR 28 but also nearby alternative routes. The result of the study may not be a conclusive single “recommendation” for the corridor but would provide scenarios and considerations for balancing needs.

Schedule

Jennifer reviewed the proposed schedule for the study, starting in March and finishing in December. She stated the next Stakeholder Advisory Group (SAG) meeting would be held on May 12th.

Public Engagement

Jennifer reviewed the current Public Engagement Plan. Several SAG members had additional contacts and ideas to reach additional stakeholders including:

- Randy - East Wenatchee to Quincy farms and their agricultural workers who may be commuting.
- Jeff - Suggested PCMS reader boards along corridor, similar to those used by WSDOT on the SR2 Corridor Study directing corridor users to the study website.
- Cassidy - Suggested talking to the Spanish speaking community in the local Mobile home parks that often have residents commuting to Quincy. She suggested Riverside Mobile Home and putting information in one of their monthly newsletters. Cassidy said she would provide Jennifer with contact information.
- George - Suggested WSDOT Facebook and Twitter feeds
- Tom – Stated he has a neighbor that commutes to Ephrata, will chat with him to see if he has any suggestions
- Enrique – stated he will also research Mexican soccer league and local youth soccer association

Project Resources:

Jennifer shared that many agencies had already shared their data regarding development, traffic counts, and future programmed projects. She asked that each agency member prioritize getting that information back to the Perteet team as soon as possible.

The team had additional discussion surrounding data available and the following members had questions or statements:

- Randy – Asked if we could look at a comparison of accidents and deaths on SR 28 to the 4-lane section of SR 2 connecting Wenatchee to Leavenworth. He believes collisions were reduced after WSDOT expanded this similar section of highway to 4-lanes.
- Riley – responded to Randy that the CDTC website tracks collisions per mile and he thinks he can provide that data to Randy.
- Aaron – Mentioned that the County’s development plans, programmed projects, and prior transportation studies would be compiled and sent over soon.
- George – Noted that Census 2020 data would become available later this year. He suggested Perteet’s team save some budget in data collection to collect and review updated census information when available. He noted that with the census data there was a potential for re-districting.

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Round Robin:

Peter asked each SAG member to provide any additional thoughts on the planning process, and to share any questions or concerns about the corridor.

Aaron

- Stated he didn't have any questions or concerns with the process at this time and was happy to be part of any discussion or solutions that come out of the study.
- Douglas County willing to explore connecting the two separate sections of Rock Island Road.

Kurt

- Stated that he was representing a contractor's point of view, and that his business required hauling heavy equipment and turning on/off SR 28 in Rock Island.
- Noted that a 4-lane corridor would be expensive and wasn't sure that it would bring a comparable improvement to the safety of the corridor.
- Stated that existing turning pockets are too abrupt and suggested improving existing turning pockets and improve lighting. Noted that WSDOT had already looked into some of these solutions.
- Wants to ensure we look at solutions with most "bang for the buck" when we look at whether a 3-lane or 4-lane is more practical.

Cassidy

- Stated her areas of concern as a resident of the study area (between Rock Island Road and SR 28) include:
 - Intersection at Hydro Park which has seen increased use over the last 10 years
 - Busy sporting events that run late at night, sometimes including erratic driver behavior
 - Boat launching trailers turning onto a 60-mph highway from a parking lot
 - Riverside Mobile Home Community
 - 100 homes, 2 cars per unit, all turning on/off the highway
 - Agreed with Kurt that turning lanes could be helpful for side streets.
 - Suggested we look into lowering the speed limit.
 - Concerned about environmental issues that come with 4-lane highways
 - Suggested keeping SR 28 2-lane highway and upgrading County or City roads closer to the airport to 4-lanes.
 - Noise
 - Rumble strips
 - Increase in traffic
 - Type of asphalt used in 2008/2009 paving project along SR 28
 - Rock Island Rd is not the best commuter
 - Aaron Simmons (Douglas County) Confirmed there are no current plans to re-pave Rock Island Road in the immediate future.

SAG MEETING NO. 1 NOTES

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Randy

- Stated his preferred solution includes a 4-lane highway, potentially limiting access to increase safety. He pointed out SR 2's transition from 2 to 4-lanes as an example of how SR 28 could function.
- Stressed not to limit our goals based on perceived cost but rather plan for the future, which will include increased traffic.
- Wants to look at consolidating access points where it makes sense.
- Stated that WSDOT has necessary right of way to widen to 4-lane highway.
- Recalled to the team the importance of Rock Island Road that runs parallel to SR 28 as a local connector.
- Brought up Industrial District in Rock Island which has 200 acres available for residential/commercial development. He sees a potential for 200 new jobs.

Matt

- Stated that PUD's concern is mainly the lack of turn pockets into the West Hydro park driveway, like the East Hydro park driveway has.
- Stated he will check data on park use/forecast and provide that information to the team.

Richard

- Stated that transit is currently making 11 trips per day to Rock Island on SR 28, and Link has had requests to provide additional access to Quincy. Current services end at Palisades. There is a gap between there and Grant County Transit.
- Suggested asking other stakeholders specific questions about transit in the area.
- Postulated what infrastructure facilities will look like in the future to support the following:
 - Anticipates increased services to corridor with 28-35 trips per day in the future.
 - Will they need different services – a compromise between residential and commuter priorities? It will be a challenge to serve all the small neighborhoods along SR 28 and surrounding Rock Island.
 - How should we invest in transit moving forward? – Stated that he wants to make sure that investments made by transit function to serve the most users.
- Acknowledged the importance of the study
- Shared that Link's bus camera system could be a potential method to improve traffic data, specifically near-misses caught on the cameras.

Jeff

- Stressed the importance of Rock Island Road as a local roadway serving local trips
 - Currently classified as arterial – implied that it should move drivers from one area to another.
 - Wants to explore what is the role and safety of Rock Island Road?
 - Aaron responded to say that Rock Island Road in Douglas County has more local access characteristics. Need to take different characteristics into account.
- Reminded the SAG that our goal ahead is not to reach a consensus but to develop concepts and evaluate them.

SAG MEETING NO. 1 NOTES

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George

- Stated that WSDOT wants clearer picture of interfacing of development, traffic growth, and travel patterns.
- Current development data shows robust growth, questions what this means?
 - Going to need a convincing, thought-based story to receive future funding. Need to be able to show fact-based information and context for the whole corridor. We may need more information on the “why” for funding.
- WSDOT would prefer to see movement towards a consensus decision within this study if possible.
- There are a lot of high cost projects in region, so wants to consider that when developing projects on SR 28.
- Practical solutions - suggests looking for specific and implementable improvements and policies that could get programmed and built within 5 years as part of our solution.
- Want roads to be used as categorized such as Rock Island Road for local trips. SR 28 is intended to be a regional corridor.
- Consider being a good neighbor, and how adjacent property owners are affected by improvements (noise/and future issues).
- Stated that corridor safety is first and foremost in WSDOT’s desires.
 - Would like to know if there is near-miss data we can review. How can we get a broader idea of safety concerns? Tire marks are a good indicator but they are only there for a few months. Richard offered data set from Link transit’s bus cameras.

Tom

- Provided new information that East Wenatchee is pursuing grant for a traffic signal at intersection of Rock Island Road and 3rd Street SE.
 - The City’s goal is to secure TIB funding this year, design in 2022, and construct it in 2023.
 - Open to a roundabout solution at the intersection if this study also shows need for a roundabout at 3rd Street SE and SR 28.

Randy

- Offered additional insight regarding economic development south of the railroad tracks in Rock Island. Stated the Port district is already talking to one company.

Richard

- Shared that he understands there are already access issues with the adjacent railroad tracks, and they may need to move the access away from its current location to provide room for queuing. If moved away from BJ’s, it would also be moving away from an investment that Link made by purchasing the parcel of land near BJ’s for their bus stop. Stated that he sees there are conflicting goals, but that the agencies need to come up with shared vision for the corridor.

Kelly

- Stated he was just gathering information and listening at this time.
- He isn’t sure there is a method that currently exists to record near misses.

SAG MEETING NO. 1 NOTES

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Mike

- Stated that he appreciates the complexity of the issues surrounding the corridor. He will be looking at solutions from the non-motorized standpoint.

Conclusion and Next Steps

Peter and Jeff thanked attendees for their participation, especially the non-agency folks who were volunteering their time.

Peter asked each member to think about the following issues for the May 12th SAG meeting:

- Provide any missing data to Jennifer as soon as you can
- Think about tradeoffs between different corridor configurations
- Consider how Rock Island Road may be used in the future
- Prepare to collaborate on issues and solutions
- Think about what practical solutions can be implemented in the next 5 years.

The meeting ended at 10:30 AM.

STAKEHOLDER ADVISORY
GROUP KICKOFF
MEETING

MARCH 24, 2021



SR 28 Corridor Study

Meeting Agenda Outline

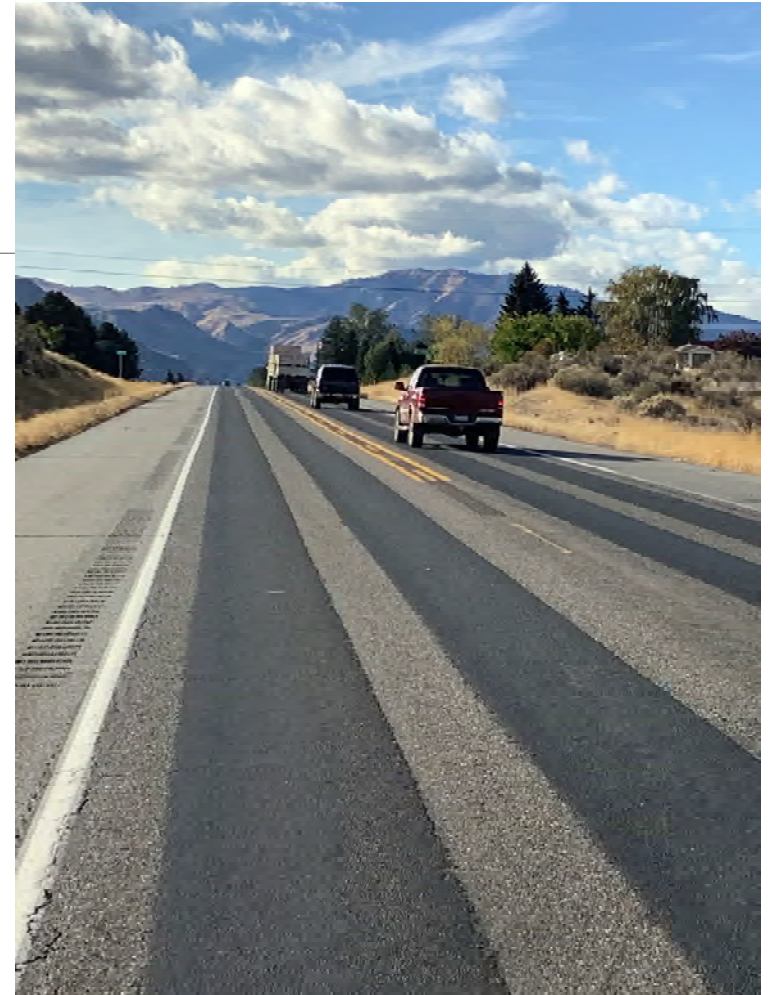
Introductions (20 min)

Study Overview and Work Tasks,
Schedule, Public Engagement (20 min)

Project Resources (5 min)

Round Robin (40 min)

Next Steps (10 min)



Introductions



Riley Shewak

Jeff Wilkens



Peter De Boldt

Jenn Saugen

Enrique Borges

George Mazur

Richard DeRock

Randy Agnew

Aaron Simmons

Tom Wachholder

Matt Shales

Kelly Gregerson

Kurt Davis

Cassidy Cue

Mike Sorensen

Study Overview & Work Tasks



Study Overview & Work Tasks

Goal: Study will inform discussions for balancing the trade-offs and competing needs between through-traffic on SR 28 and local trip making for residents and businesses within and nearby the study area, including multi-modal options

Public and Stakeholder Engagement throughout duration of the study

Current Needs and Planning Context

- Analyze current safety, mobility, and multimodal options
- Needs analysis

Concept Development

- Develop three SR 28 “Scenarios” with opinions of cost
 - 4-Lane SR 28
 - 2-Lane SR 28 with ROW reserved for future widening
 - 2-Lane SR 28 with ROW repurposed to maximize study objectives
- Develop site specific concepts either on SR 28 or other study area, and perform traffic analysis
- Evaluate and compare concepts for mobility, safety, accessibility, cost-effectiveness and non-motorized efficiencies

Draft and Final Corridor Study Report

Public Engagement

Stakeholder Individual Interviews

- Seven to ten individual interviews lasting 30-45 minutes

Project Website(s)

- Share information with the public through the duration of the project study
- Both Spanish and English sites to allow for full participation on both sites
- Post information following SAG meetings
- Provide opportunities for feedback

Community Meetings

- Intent is to go out into the community, at *their gathering places*, to share information and receive feedback on the study.

Virtual Office Hours

- Drop in to talk with project team – several options for times and dates

CDTC Board Presentation

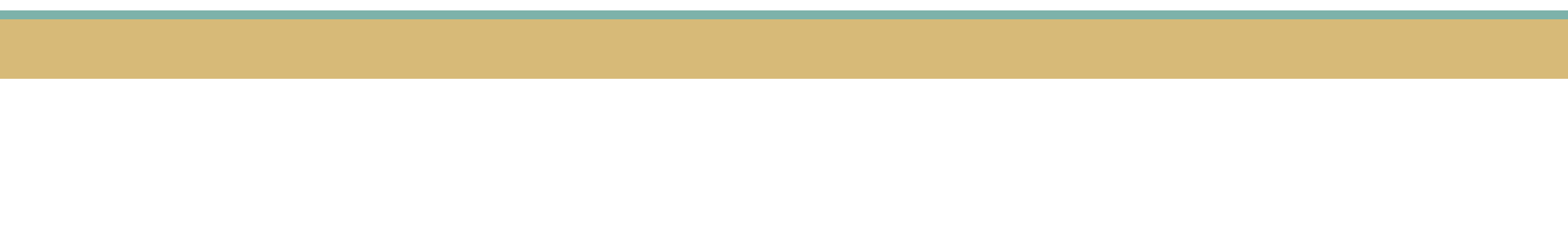
- Present results of draft study

Project Resources

Data collected to date:

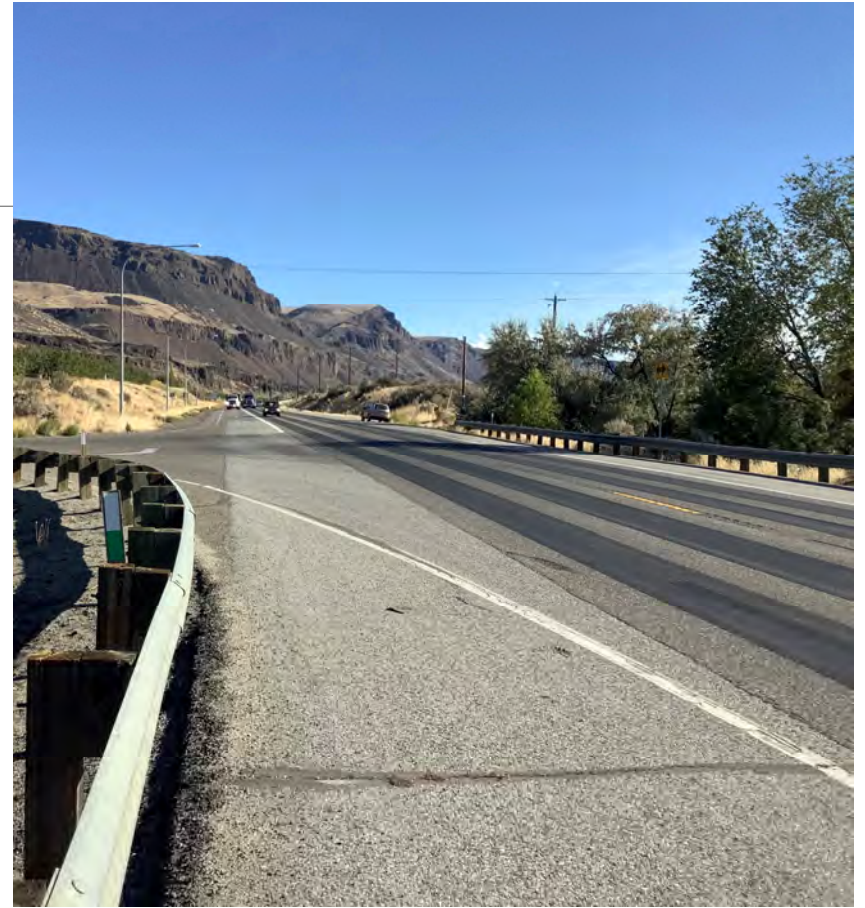
- CDTC's current travel demand model output (origin-destination and volume flows)
- WSDOT traffic volumes and crash history
- WSDOT Active Transportation Plan, Route Development Plan, and previously studied projects
- Future programmed projects on SR 28

Still need:

- Subarea and parcel specific development plans
 - Programmed and planned transportation projects within your jurisdiction
 - Prior or current transportation studies within the study area
- 

Round Robin

- Thoughts on planning process
- Questions and concerns about corridor?
- Ways that this study may connect or conflict with other ongoing projects/studies or regional processes



Advisory Group Next Steps

Stakeholder Team Meeting #2 – Tentatively May 12th at 1:30pm

Review results of individual stakeholder interviews and preliminary feedback from study website

- Review current analysis information including volumes analysis, safety analysis, existing conditions analysis
- Identify current and future priorities for the corridor study area

Subjects to think about for next meeting

Recap Action Items

Questions?

Jenn Saugen

jennifer.saugen@perteet.com

509.619.7032 (direct)

509.699.1180 (cell)

Riley Shewak

riley@chelan-douglas.org

509.663.9059

Peter De Boldt

peter.deboldt@perteet.com

206.436.0532 (direct)

Enrique Borges

enrique.borges@perteet.com

425.322.0262

Hablo Español

SAG MEETING NO. 2 NOTES

123 Ohme Garden Road, Suite 8, Wenatchee, WA 98801 | P 800.615.9900

Client: Chelan Douglas Transportation Council
 Project: SR 28 Corridor Study
 Date: May 12, 2021
 1:30 PM – 3:00 PM
 Location: Virtual – Microsoft Teams
 RE: Stakeholder Advisory Group Meeting #2 – Progress Reporting
 Notes taken by: Enrique Borges, Jennifer Saugen

Stakeholder Advisory Group members present:

Name	Organization	Name	Organization
George Mazur	WSDOT North Central	Aaron Simmons	Douglas County
Randy Agnew	Rock Island	Tom Wachholder	East Wenatchee
Richard DeRock	Link Transit	Matt Shales	Chelan County PUD
Kelly Gregerson	Washington State Patrol	Kurt Davis	R.I. business owner/ freight hauling
Cassidy Cue	Study area resident	Mike Sorensen	Complete the Loop
Max Nelson	WSDOT North Central		

Project Team members present:

Name	Organization	Role
Jeff Wilkens	CDTC	Project Manager
Riley Shewak	CDTC	Transportation Planning/Review
Peter De Boldt	Perteet	Stakeholder/Community Lead
Jennifer Saugen	Perteet	Project Manager
Enrique Borges	Perteet	Designer/Translator
Brent Powell	Perteet	Lead Traffic Analyst
Karissa Witthuhn	Perteet	Lead Designer

Meeting Agenda Outline

- Welcome Back
- Stakeholder Outreach to Date
- Traffic Analysis Review
- Corridor Priorities
- Review Upcoming Consultant Tasks
- Next Steps for SAG

Jennifer prepared a PowerPoint presentation (slides attached) that were shared during the meeting.

Welcome Back:

Peter DeBoldt re-introduced himself and facilitated reintroduction for each SAG team member. Additionally, new Perteet team members Brent Powell and Karissa Witthuhn introduced themselves to the group.

Stakeholder Outreach to Date:

SAG MEETING NO. 2 NOTES

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Jennifer shared that her team had met with three individual SR 28 commuters and two agency officials since the last meeting. The main concerns shared by these five stakeholders included:

- Unsafe passing or crossings maneuvers
- Lack of passing opportunities
- Desire for better intersection connections to the highway
- Slow freight vehicles, but lack of other freight routes
- Desires for increased mobility and safety for all drivers

Jennifer also gave a preview of the study website and asked agencies for help getting the word out to the public by promoting online. Several SAG members asked questions regarding functionality of the website and how to add or “like” comments and Jennifer explained in more detail how it works. Additionally, she shared the two upcoming virtual office hour opportunities, and told the SAG members the already seven individuals had emailed her their corridor concerns.

Traffic Analysis Review:

Brent discussed what would be completed as part of the traffic analysis. He shared that his team had developed corridor volumes for SR 28 for design year of 2045 PM peak hour. The volumes were based on the CDTC travel demand model as a base and showed a 50%-80% growth compared to existing volumes.

Brent also shared that his team had completed a safety analysis using a data driven approach where he compared predicted crash rates from the Highway Safety Manual to observed crash rates on SR 28. The comparisons to predicted crash rates were displayed on a corridor map for the SAG to see and observe that several intersections had higher existing crash rates than compared to predicted, indicating that those locations could be potentially be improved. Perteet’s team will also perform a qualitative safety evaluation as a next step.

Corridor Priorities:

Mentimeter Poll

Peter informed the group that Perteet had prepared a few questions on Mentimeter to help the SAG group gauge their corridor priorities. He and Brent walked through the questions with the SAG group and their answers were recorded on the Mentimeter app, and are attached to these notes. The intent of the Menti poll was not to determine SAG specific corridor priorities, but to get members thinking about what was important to them or their agency moving forward. The strongest responses were for prioritizing safety overall, followed by through-traffic operations and increased multimodal options. This corresponded with thoughts towards prioritizing daily commuters and residents over long-distance commuters and multimodal users. Menti poll results are included as a part of these meeting notes.

Round Robin

Peter led a corresponding round-robin discussion regarding corridor priorities and goals and called on each SAG member to speak and participate. Notes from each member are below.

Mike S.

- Desires a focus on safety

SAG MEETING NO. 2 NOTES

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- Stated he is a “Multi-modal guy” and is interested in a second corridor or multimodal consideration

Richard

- Recognized that each priority has tradeoffs and is conflicted between them all
- For Link there are commuter access issues including considerations of canceling routes due to inability to make corners on local roads, as well as speed along SR 28
- It is important to have access point parallel to SR 28
- Conflict between trying to serve at least three different markets with transit
- Noted that there is no bike path to parks, and no access for local Rock Island residents to parks

Aaron

- Stated that a weighted decision matrix would be great to evaluate options against one another, and the only issue would be finding method of setting weights

Riley

- Reiterated goal of study was not to finalize which is the best alternative but rather to come up with three corridor alternatives

Cassidy

- Agreed it is hard to balance needs
- There are no bus stop for residents of the mobile homes, also sees residents crossing roadway unprotected
- Would prioritize all else over freight, keep SR 28 for local access and commuters. Need both freight and mobility improvements. Wondered if we could route freight elsewhere? Battermann etc?

Kelly

- Stated that it all boils down to safety and what is the safest for all as a whole? Freight, local, commuter etc.
- Balances will come with the dollar signs, and it’s important to find most cost-efficient solution

Kurt

- Freight affects all commuters and he’s seen collisions related to freight. Is there a good way to get them around SR 28? Need to look at freight in regard to roundabouts. Going over RAB bumps could really damage fruit.
- Doesn’t believe using Batterman and driving “in-town” is a bad idea for freight
- Important to focus on freight since they are the largest, slowest and affect everyone on roadway

Matt

- Stated that the polls bring out the tug of war between treatment and effects of treatment

George

- Three ideas 1. Important to recognize overlapping user groups. Volumes don’t illustrate the share of through traffic vs. other OD data that we have? Stated that submarkets can tell us where people are going.
- 2. Can we get the shorter trips off SR 28? About half is through-traffic.
- 3. Treatments – maybe we can rethink the notion of adjacent access and passing areas as tools for creating a safer corridor, speed limits. Maybe not as expensive as intersection improvements or 4-lane.

SAG MEETING NO. 2 NOTES

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Max yielded his time to other stakeholders

Randy

- Stated that highways are like arteries, we don't want to plug them up. SR 28 should be high-speed and throughput traffic in and out as quickly as possible.
- Improve RIR as frontage and local access, and reduce access points to SR 28.
- Provide additional right turn lanes and improve the intersection that still connect.
- Keep bikes and trails off the highway, but definitely need ways for them to cross the highway.
- Another thought – send freight up Battermann?

Riley

- The more he thinks about it, the more he “rabbit-holes”. Can we remove restrictions and provide alternate capacities?
- Stated he can look more at OD data in model. Perhaps there is opportunity for more local access while maintaining high speed on SR 28.
- Could create opportunity for safety improvements on frontage roads as well where active transportation can be considered. Opportunities for bike trails in close proximity to SR 28 might be good.

Tom

- Safety
- How do we balance priorities with WSDOT priorities and their strategic objectives with State Highways.

Richard

- This corridor operates differently due to 24-hour commute. Volumes not high at all times, but at a weird level at 3am. People don't necessarily realize that... We may need to also consider that it operates differently than a “typical” highway.

Cassidy

- Added that Battermann reroute is perhaps not a great idea, but maybe it could connect to 10th Street? A bypass?

Randy

- Agrees. Not the main freight route, but maybe for additional vehicle trips.

Aaron

- Stated that Douglas County has talked about cost of mitigating measures – across plateau and through canyons is SO spendy. It has big topographic challenges.

Randy

- Believes that more and more people will pull out in front of you turning onto SR 28, regardless if you have to slowdown, as they get tired of waiting for a break in the queue.

Cassidy

- Agreed that it's uncommon for someone not to pull up in front of her every day. Notes that there are more people moving into mobile courts off intersection at Nile.
- Asks what WSDOT will do with this study and what the effects are after the SR2 study?

George

- Sees this as a long term blue print for corridor projects that could roll out over long periods of time

Riley

- Validity to what George raised. Is it short distance hops or long distance maneuvers?

SAG MEETING NO. 2 NOTES

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To close the round robin discussion Peter summarized what he heard from all. He stated that he heard that the SAG members are conflicted on the theme of developing alternative routes. They wonder how will it help SR 28, and what population is it serving? He said that members also expressed that perhaps we should look at those that are using the corridor in our limits, and confirm what percentage ends up in Quincy or Wenatchee vs what percentage uses the corridor anywhere between Rock Island and East Wenatchee. If 30% of the traffic is just trying to go between Rock island and East Wenatchee, should/could we develop a local arterial route? If it's only 5% it won't be as helpful. This is the Origin-Destination information that we want, and the "why" for options to develop. Peter reminded the group that at some point they will need to decide "where do we spend our money, and how much do we spend".

Review Upcoming Consultant Tasks

Peter shared upcoming consultant tasks with the group which include the study area Needs Analysis, a potential concept list for short-term and long-term improvements, and performing an operations analysis for existing and future highway strategies.

Next Steps for SAG

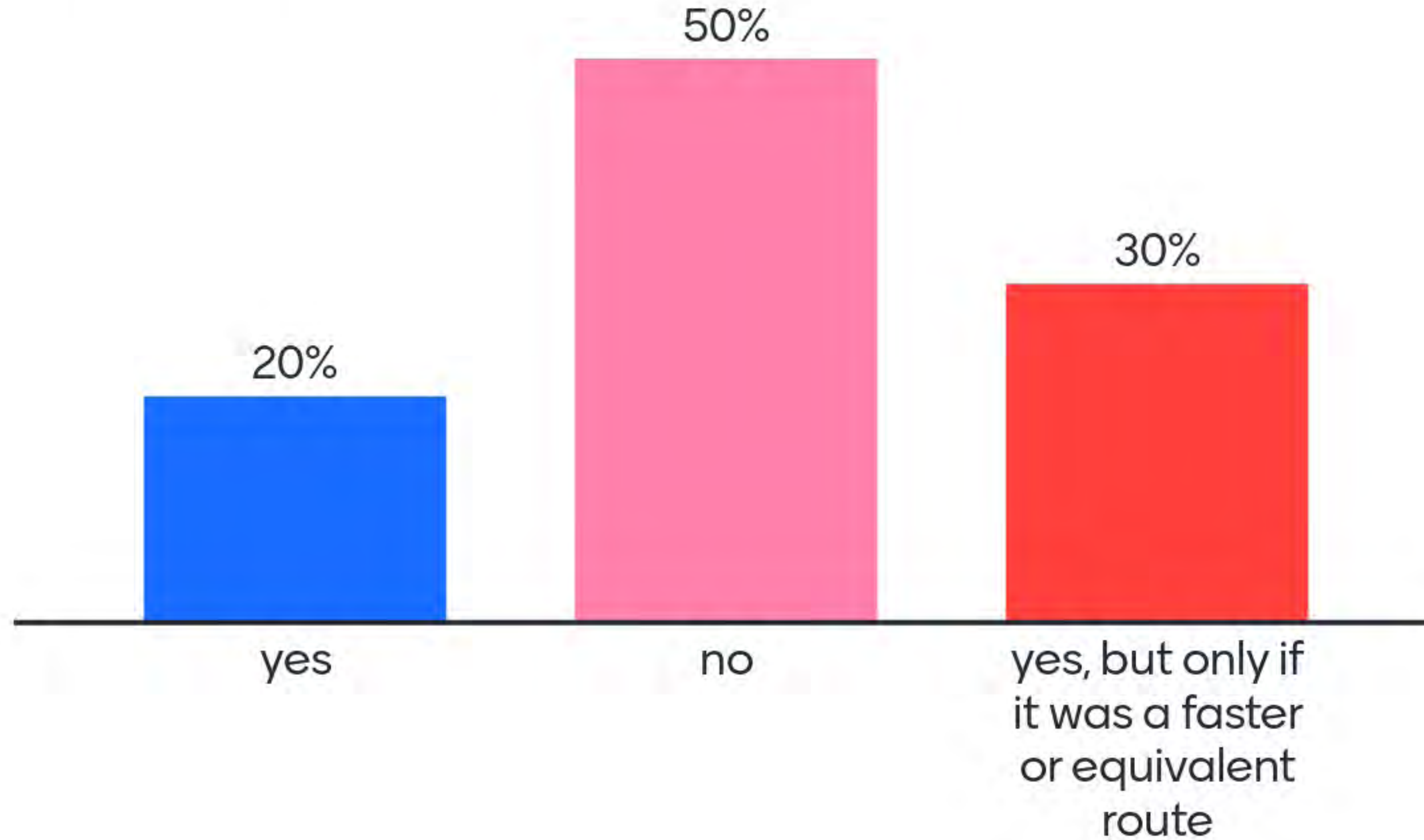
Peter asked the group to consider the following prior to the next SAG meeting:

- Brainstorm additional concepts for improvements in the study area
- Consider the measures of effectiveness for potential concept solutions and how they might enhance corridor priorities
- Determine which corridor improvement concepts or strategies might be good to evaluate with traffic modeling

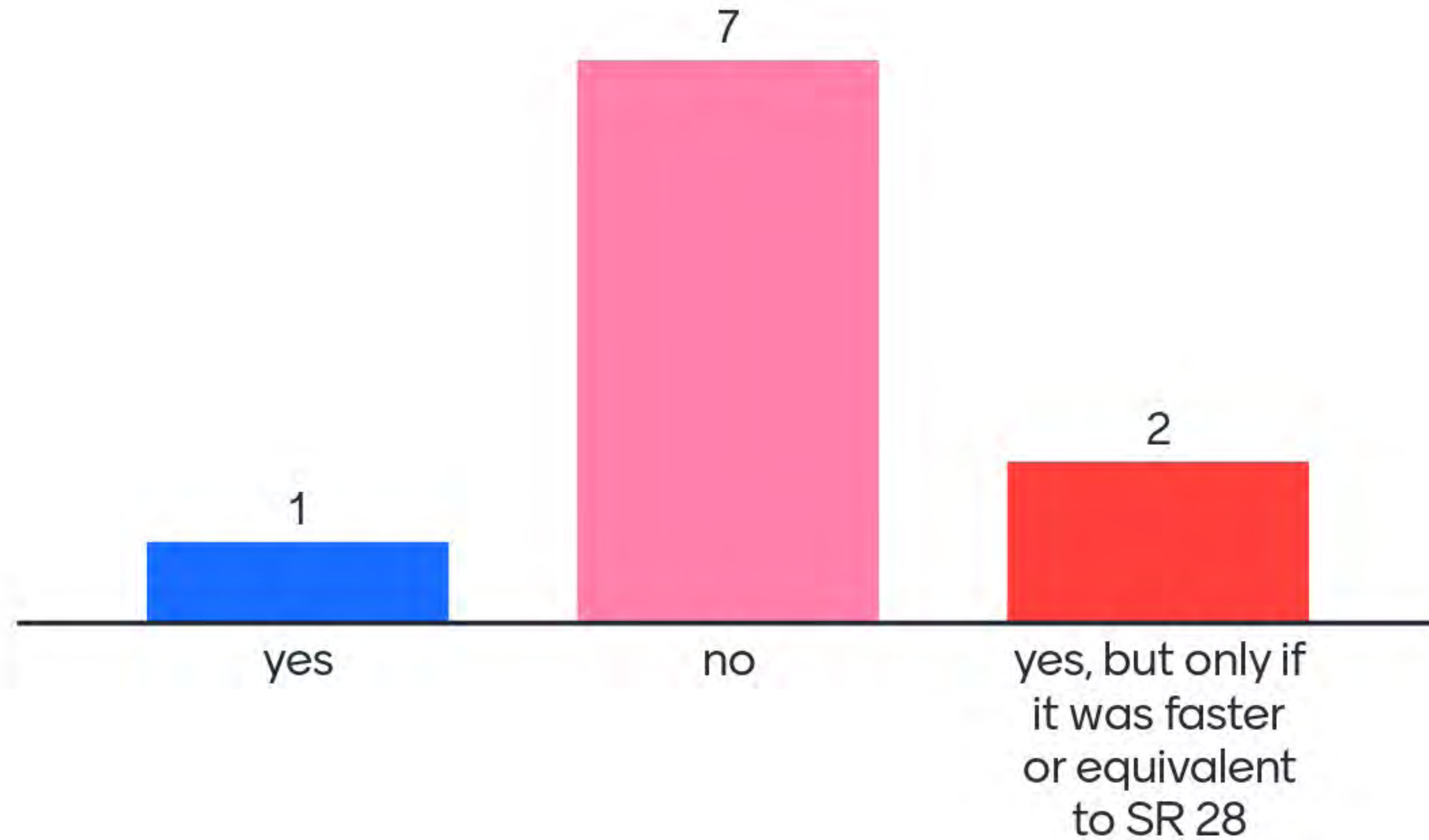
Getting a feel for corridor priorities

6 questions to follow

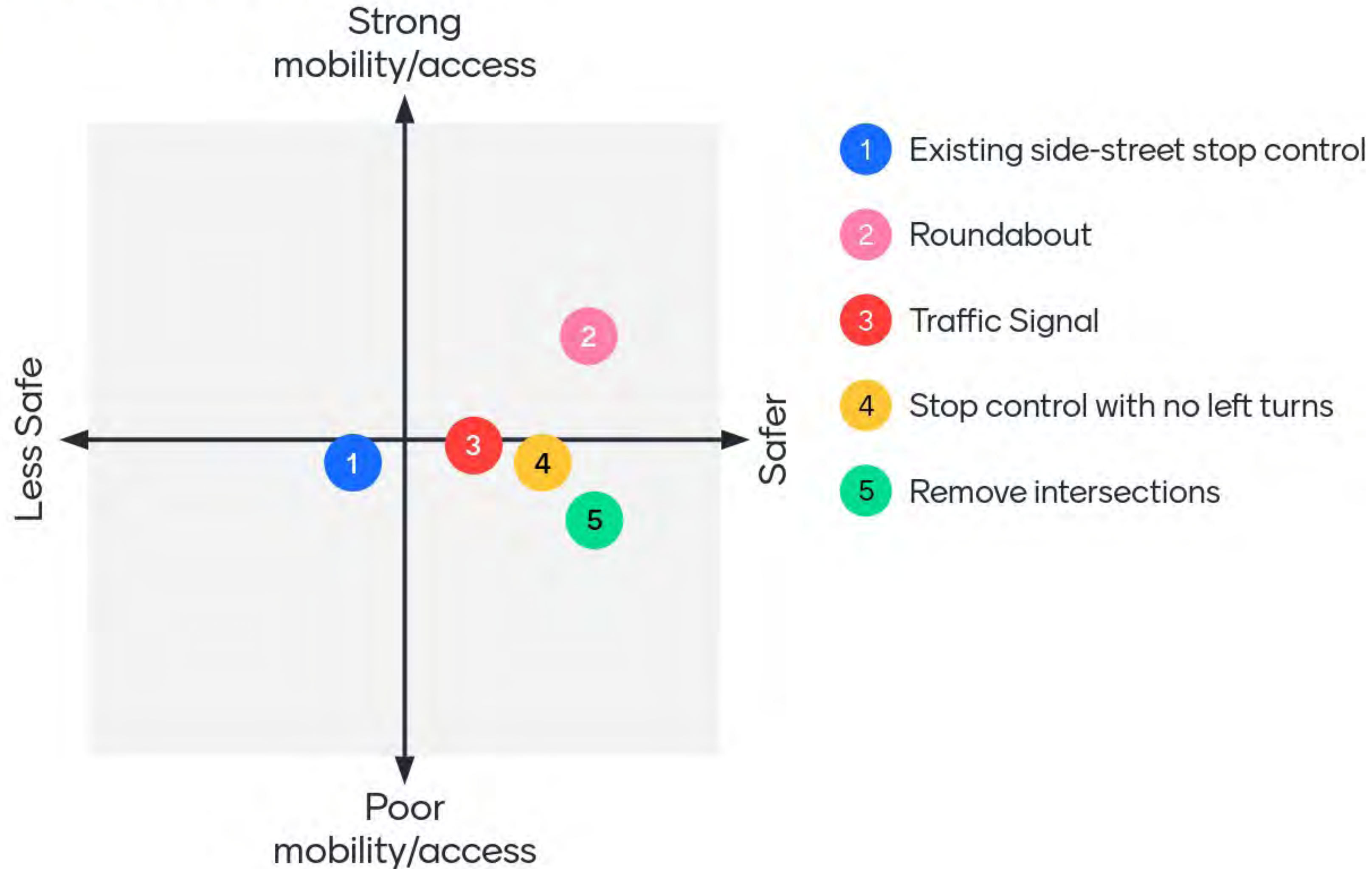
If Rock Island Road were connected as a local alternative road, would you use it instead of SR 28?



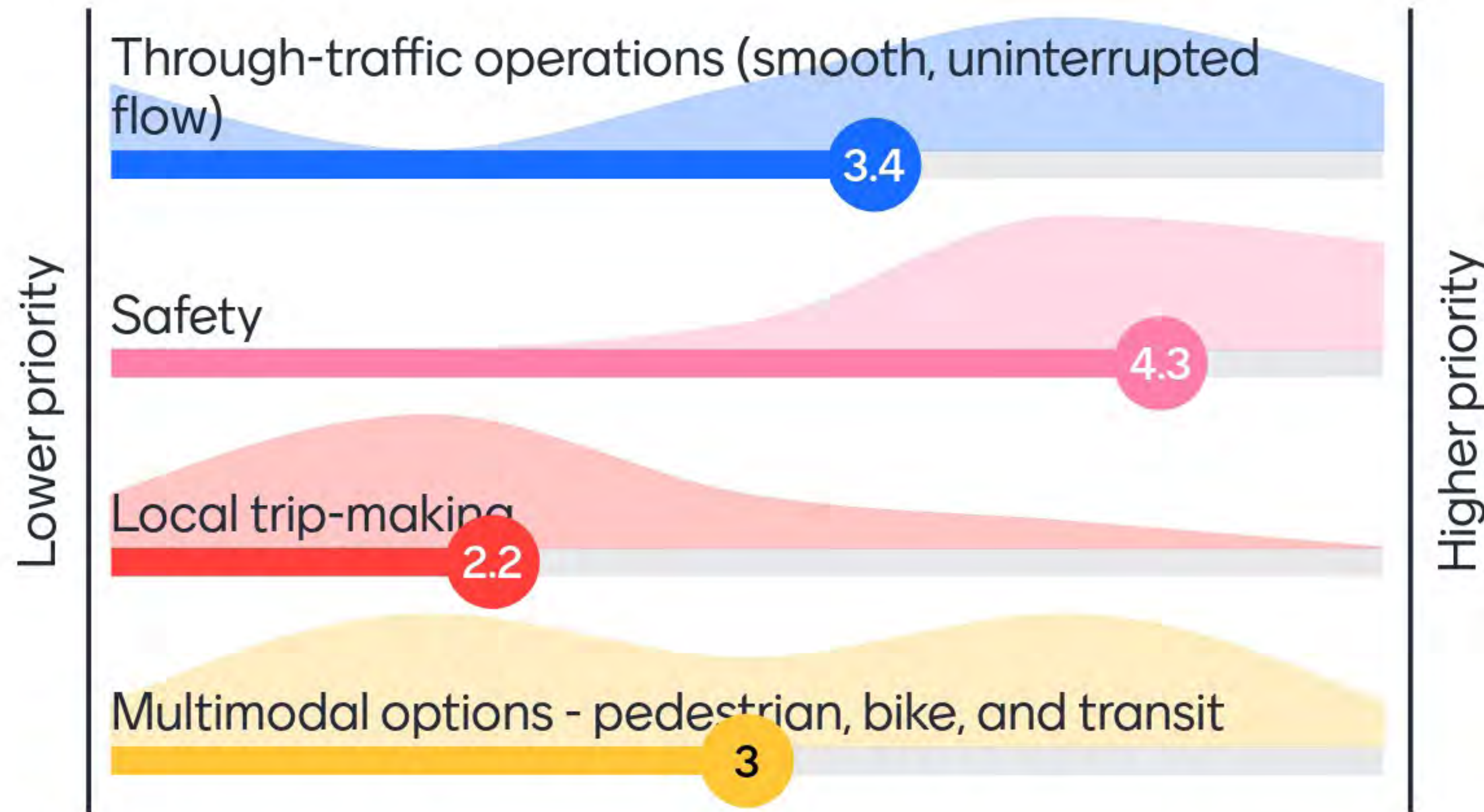
Would you use a frontage road on the southwest/river side of SR 28?



Evaluate treatments for safety improvements at intersections with SR 28



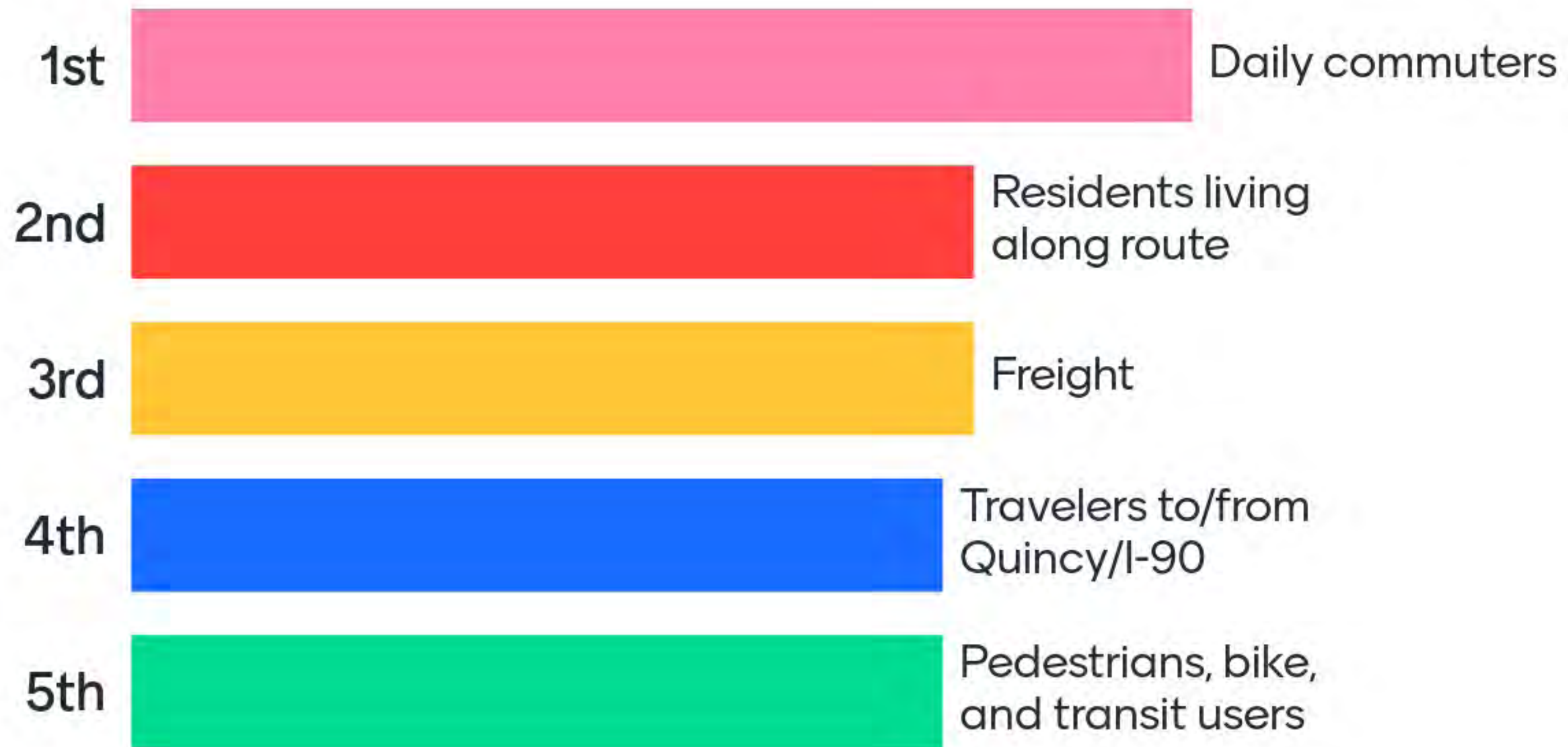
Prioritize these long-term needs: (1 is the lowest, 5 is the highest)



Evaluate benefit of treatments

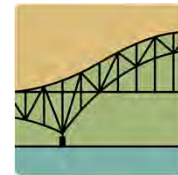


Which group would you or your agency prioritize on SR 28?



STAKEHOLDER ADVISORY
GROUP MEETING #2

MAY 12, 2021



Chelan-Douglas
TRANSPORTATION COUNCIL

CDTC

SR 28 Corridor Study

Meeting Agenda Outline

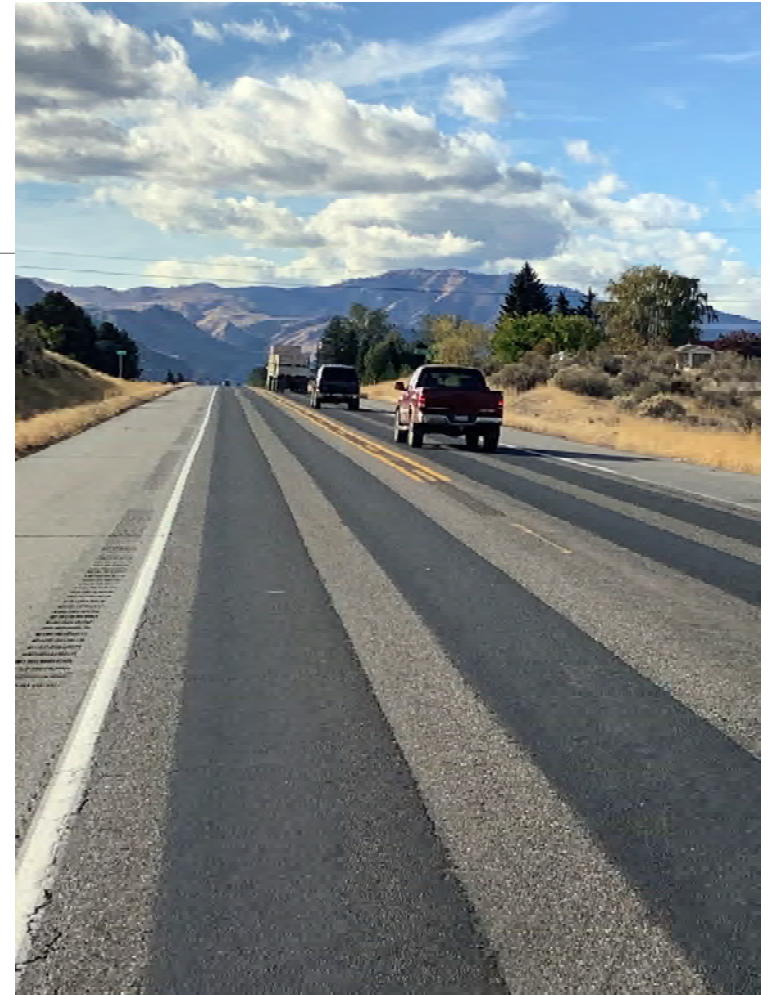
Stakeholder Outreach (15 min)

Traffic Analysis Review (15 min)

Corridor Priorities (30 min)

Upcoming Consultant Tasks (10 min)

Next Steps for Stakeholder Advisory
Committee (10 min)



Stakeholder Outreach Summary

Stakeholder Individual Interviews

Individuals

- Isabel Busch-Vidana - Rock Island resident, commutes to Wenatchee/East Wenatchee
- Cesar Cueves – Leads an orchard team near Crescent Bar
- Aurelio Iniguez – Commutes daily on SR 28 to orchards near Quincy

Agencies

- Cam Philips – Douglas County Fire District #2
- Jim Kunz – Chelan Douglas Regional Port Authority

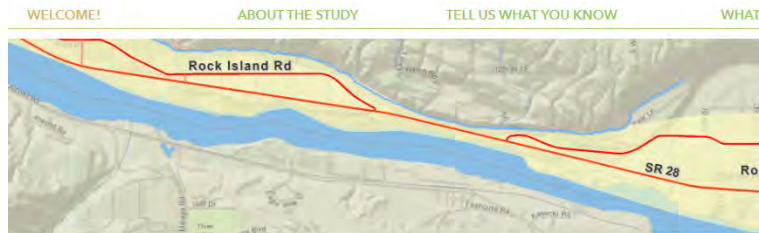
Upcoming Interviews

- Eastmont School District Transportation Group (Bus services)
- Additional commuter to Quincy for construction work

Individual Emails and Phone Messages Received

- Received comments from six residents along SR 28 via email and phone call





SR 28 Corridor Study

Scroll down for: Purpose of study | How to use this website

Welcome to the SR 28 Corridor Study Website!

Haga clic aquí para español

Purpose of the Study

Are you concerned about safety, traffic congestion, or ways to get to and from Rock Island that don't require driving? Do you have ideas of how our transportation system could help your family or business?

To find ways to address your concerns and ideas, the Chelan Douglas Transportation Council is teaming with local agency partners and other stakeholders to gain a better understanding of the current and future transportation needs on SR 28 and the surrounding road networks. We also want to identify the transportation investments that meet those needs. The study will look at options to improve vehicle safety, traffic congestion, local accessibility, and bicycling throughout the corridor.

Stakeholder Outreach Summary

Website

We need your help promoting these two sites:

- English: <https://bit.ly/2S1nYj1>
- Spanish: <https://bit.ly/3u2Ci9f>

Virtual Office Hours

- Drop in to talk with project team –
 - English: Wednesday, **June 9th** - 4:30 pm to 6:00 pm
 - Spanish: Wednesday, **June 16th** - 4:30 pm to 6:00 pm

Individual Emails

- Seven individual residents on the corridor have emailed their concerns.

Traffic Analysis Review

Completed Tasks

Volumes Development:

- 2045
- P.M. peak hour (weekday)
- Basis is the CDTC travel demand model
- 50-80% growth compared to existing

Safety Analysis:

- Data-driven approach
- Compare predicted crash rates from *Highway Safety Manual* to observed crash rates
- Looking at segments and intersections; corridor-wide needs and spot improvements

Upcoming Tasks

- Operations modeling (existing/future)
- Qualitative safety evaluation

Traffic Analysis Review - Safety



Slide 6

- PB10** Suggest using black and white for background aerial, and screening it back a bit. Would help in being able to quickly pickup callouts.
Peter De Boldt, 5/12/2021

Corridor Priorities

1st

Team Questions and Responses!

GO TO: www.menti.com

Enter Code: 6414 5200

2nd

SAG Member Round Robin

Identify your top priorities for the corridor

Slide 7

PB11 In addition to having the poll link in the PowerPoint, can we e-mail to all participants at start of meeting, and then be ready to do so again add to the chat as we reach this stage?

Peter De Boldt, 5/12/2021

JS7 I will add to the chat at the beginning of the meeting and maybe you can mention it during the welcome?

Jennifer Saugen, 5/12/2021

Upcoming Consultant Tasks

Corridor study area needs analysis

- Baseline needs – measurable, with clear purpose (reduce crashes, reduce delay time, extend Loop Trail)
- Contextual – considers community and stakeholder views such as economics, freight mobility, perceived delay, perceived safety
- Multimodal gap evaluation – what is missing for transit, bikes, and pedestrians?
- Will document safety, mobility, multimodal and community needs.

Potential concept list, short- and long-term

- Corridor wide safety strategies including center-line barriers and right-in right-out
- Roundabouts at intersections
- Improvements to sight distance on collector roads
- 4-Lane between East Wenatchee and Battermann Road

Existing and future operations analysis (4-locations)

- Start thinking about what areas you'd like to see further analyzed


Advisory Group Next Steps

Stakeholder Team Meeting #3 – June 24th at 1:30pm

Discuss:

- Safety Analysis
- Needs Analysis
- Draft concept list to meet needs,
 - Add additional concepts based on SAG feedback

Brainstorm:

- Additional concepts for improvements in study area
 - Brainstorm measures of effectiveness of potential concept solutions, and how might they enhance our priorities?
 - Determine which concepts to evaluate with traffic modeling (4 potential intersections)
- 

Questions?

Jenn Saugen

jennifer.saugen@perteet.com

509.619.7032 (direct)

509.699.1180 (cell)

Riley Shewak

riley@chelan-douglas.org

509.663.9059

Peter De Boldt

peter.deboldt@perteet.com

206.436.0532 (direct)

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enrique.borges@perteet.com

425.322.0262

Hablo Español

SAG MEETING NO. 3 NOTES

123 Ohme Garden Road, Suite 8, Wenatchee, WA 98801 | P 800.615.9900

Client: Chelan Douglas Transportation Council
 Project: SR 28 Corridor Study
 Date: June 24, 2021
 1:30 PM – 3:30 PM
 Location: Virtual – Microsoft Teams
 RE: Stakeholder Advisory Group Meeting #3
 Notes taken by: Jennifer Saugen

Stakeholder Advisory Group:

Name	Organization	Name	Organization
George Mazur	WSDOT North Central	Aaron Simmons	Douglas County
Randy Agnew	Rock Island	TBD	East Wenatchee
Richard DeRock	Link Transit	Matt Shales	Chelan County PUD
Kelly Gregerson	Washington State Patrol	Kurt Davis	R.I. business owner/ freight hauling
Cassidy Cue	Study area resident	Mike Sorensen	Complete the Loop

Project Team:

Name	Organization	Role
Jeff Wilkens	CDTC	Project Manager
Riley Shewak	CDTC	Transportation Planning/Review
Peter De Boldt	Perteet	Stakeholder/Community Lead
Jennifer Saugen	Perteet	Project Manager
Enrique Borges	Perteet	Designer/Translator
Brent Powell	Perteet	Lead Traffic Analyst
Karissa Witthuhn	Perteet	Lead Designer

Meeting Agenda Outline:

- Welcome Back
- Stakeholder Outreach to Date
- Needs Analysis
- Concept Discussion
- Concept Measures of Effectiveness
- Next Steps

Welcome Back:

Peter DeBoldt facilitated reintroduction for each SAG member.

Stakeholder Outreach to Date:

Jennifer shared the team’s continued progress on stakeholder outreach since the last SAG meeting. Website statistics showed over 380 visits, and the pinpoint map already has 44 unique comments. She shared that the comments with the most likes / dislikes were

- Lower Speed Limit (40 “like” and 32 “dislike”)
- Left turn lane into Hydro Park NB (20 “like” and 0 “dislike”)

SAG MEETING NO. 3 NOTES

123 Ohme Garden Road, Suite 8, Wenatchee, WA 98801 | P 800.615.9900

- Extend Loop Trail to Rock Island vicinity (26 “like”, 3 “dislike”)
- Batterman Road used as a bypass route (23 “like”, 0 “dislike”)

In addition to the website, Jennifer contacted four community groups and three news sources to share about the study. She also reported that CDTC, City of Wenatchee, and City of East Wenatchee all shared the study on their websites. We are awaiting agency promotion from Link Transit, Douglas County, WSDOT NCR and City of Rock Island. Matt S said that Chelan County PUD had also sent the study website to all internal employees for review.

Needs Analysis:

Brent walked the SAG through the Needs Analysis that his team prepared. This included a discussion of crash modification factors, level of traffic stress (LTS), and the existing origin-destination information for the study area.

The SAG members also discussed what destinations bicycles and pedestrians may be traveling including the mobile home park south of SR 28 and Hydro Park. Currently LTS to access those routes are LTS 3&4 but are desirable to be LTS 1 or 2.

Concept Discussion:

Karissa introduced the three concepts her team would be evaluating. For each, she explained key features of the roadway section:

1. SR 28 rural 2-lane (high speed, improved safety, few/no intersections)
2. SR 28 rural 4-lane (high speed, safer, use of ROW for other mobility improvements)
3. SR 28 urban 3-lane (lower speed, safer, controlled intersections)

Karissa explained that her team would lay out these three concepts for the corridor, including intersection treatments, and then would bring back to the SAG for discussion on the tradeoffs between each concept. There was no further discussion.

Concept Measures of Effectiveness:

Peter began the discussion by presenting potential measures of effectiveness and allow SAG members to comment on whether they agreed or disagreed with what was presented.

Tradeoffs presented included:

- Safety (reduce collisions, reduce severity)
- Mobility (reduce travel time, etc)
- Active Transportation (ped/bike)
- Compatibility w/ Funding Opportunities
- Environmental Impacts

Additional tradeoffs suggested by SAG:

- Compatible with Adopted Plans
- Access to parcels, county roads
- Basic access to transit
- Quality of life for residents
- Route redundancy
- Freight mobility

WSDOT staff also said they supported eliminating any verbiage to “reduce” or “improve” but just compare the tradeoffs for each without targets. Peter said the team would make that change.

SAG MEETING NO. 3 NOTES

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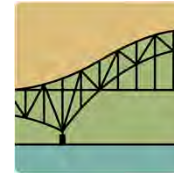
Next Steps:

At the next meeting, Peter asked the group to be ready to discuss the corridor concepts in detail, as well as discuss tradeoffs between each.

STAKEHOLDER ADVISORY
GROUP MEETING #3

JUNE 24, 2021

1:30PM – 3:30PM



Chelan-Douglas
TRANSPORTATION COUNCIL

CDTC

SR 28 Corridor Study

Meeting Agenda Outline

Welcome (5 min)

Stakeholder Outreach Update (10 min)

Need Analysis Review (10 min)

Concept Discussion (20 min)

Concept Measures of Effectiveness (15 min)

Next Steps for Stakeholder Advisory
Committee (5 min)



Stakeholder Outreach Summary

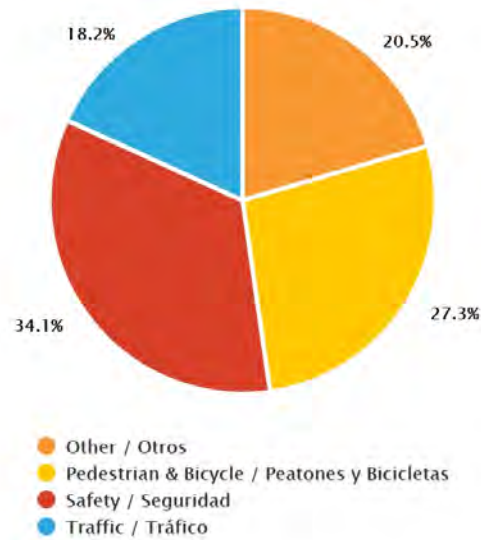
Website Statistics

English Page:

- 228 unique visitors
- 381 page visits

Spanish Page:

- 22 unique visitors
- 58 page visits



Pinpoint Map:

- 44 total comments by 23 users
- 48 unique participants on map (includes like/dislike)
- General comment themes – Mixed!
- Comments with most likes / dislikes –
 - ✓ Lower Speed Limit (40 “like” and 32 “dislike”)
 - ✓ Left turn lane into Hydro Park NB (20 “like” and 0 “dislike”)
 - ✓ Extend Loop Trail to Rock Island vicinity (26 “like”, 3 “dislike”)
 - ✓ Batterman Road used as a bypass route (23 “like”, 0 “dislike”)

Stakeholder Outreach Summary

Other Outreach

Groups Contacted:

- Apple Valley Softball Association
- Wenatchee Soccer League
- Riverside Mobile Home Park
- Eastmont School District – Transportation division
- News tips sent to:
 - Wenatchee World newspaper
 - KPQ Radio
 - Koho Radio

Agencies Who Shared Information:

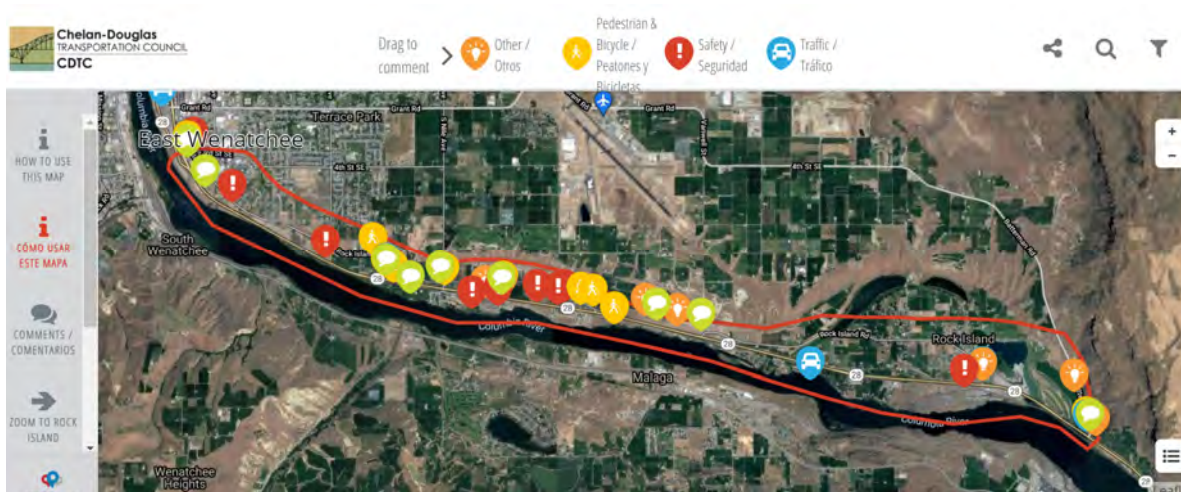
- CDTC posted to website
- City of Wenatchee Facebook page and sent to council members
- City of East Wenatchee press release

Awaiting Agency Promotion:

- WSDOT North Central Region (scheduled for next week)
- Link Transit – Can they send to their mailing list?
- Douglas County – Can they post to their webpage or do a press release?
- Rock Island – Can you post to your webpage or do a press release?

Stakeholder Outreach Summary

Continued Website Advertisement



Set up Radio Interviews with KPQ and Koho

In-Person Event:

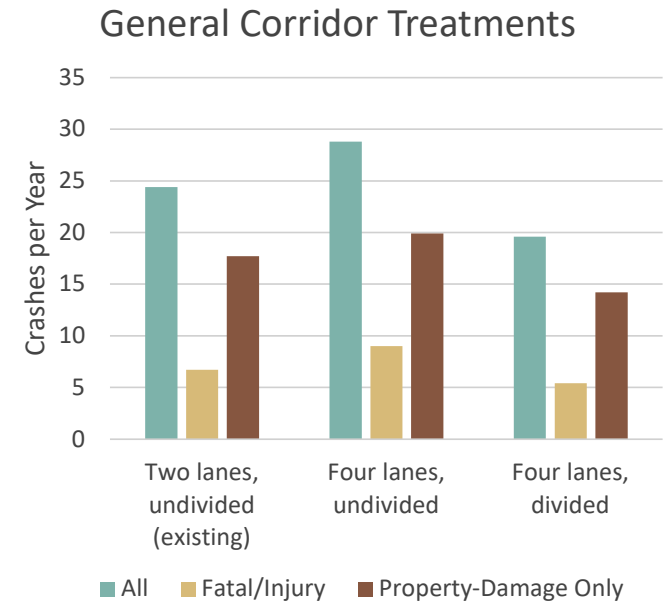
- Tentatively planned for July 16 and/or July 17
- May include:
 - Table at Hydro Park (“Hot Dams” softball tourney)
 - Table at Costco or BJ’s Shell
 - Visit to orchards with known SR 28 commuters
- Do any other agencies want to be involved?

Needs Analysis Review

(What portion of crashes would still occur if treatment were applied)

CMF = Crash Modification Factor

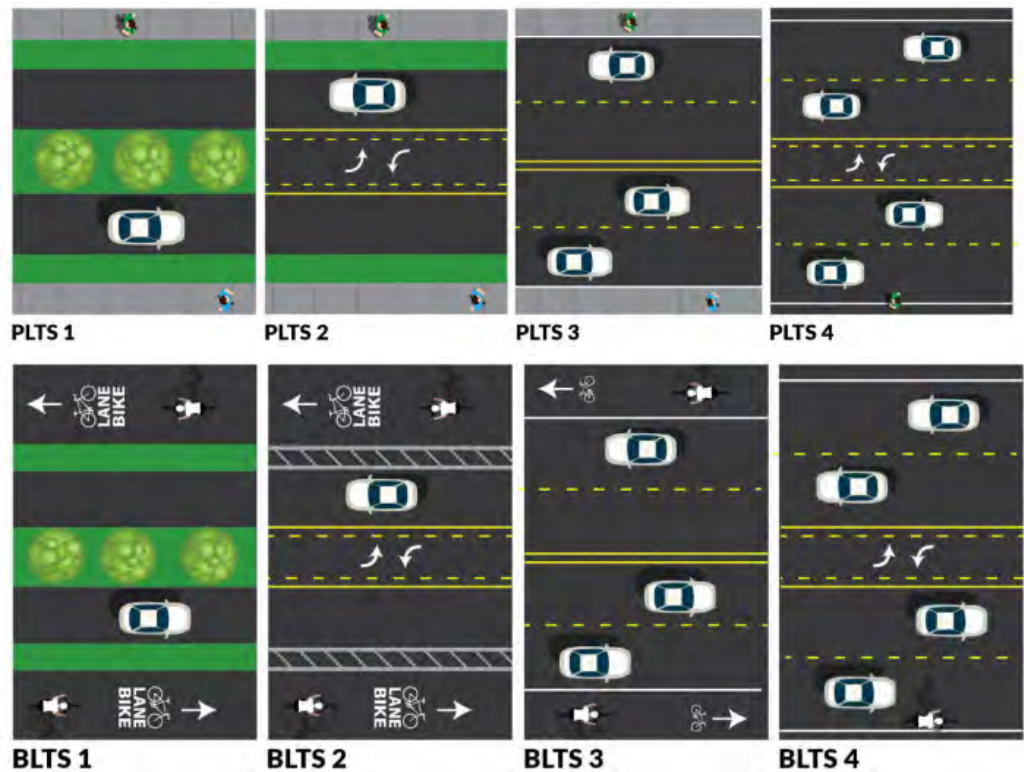
Treatment	CMF
Convert intersection to roundabout	0.52 – 0.56
Install left-turn lanes on major road approaches	0.67
Install intersection conflict warning system	0.73 – 0.74
Provide right-turn lanes on major road approaches	0.74 – 0.96
Provide intersection illumination	0.91
Provide flashing beacons at stop-controlled intersections	0.95
Restrict right turn on red (CMF is per approach)	0.98



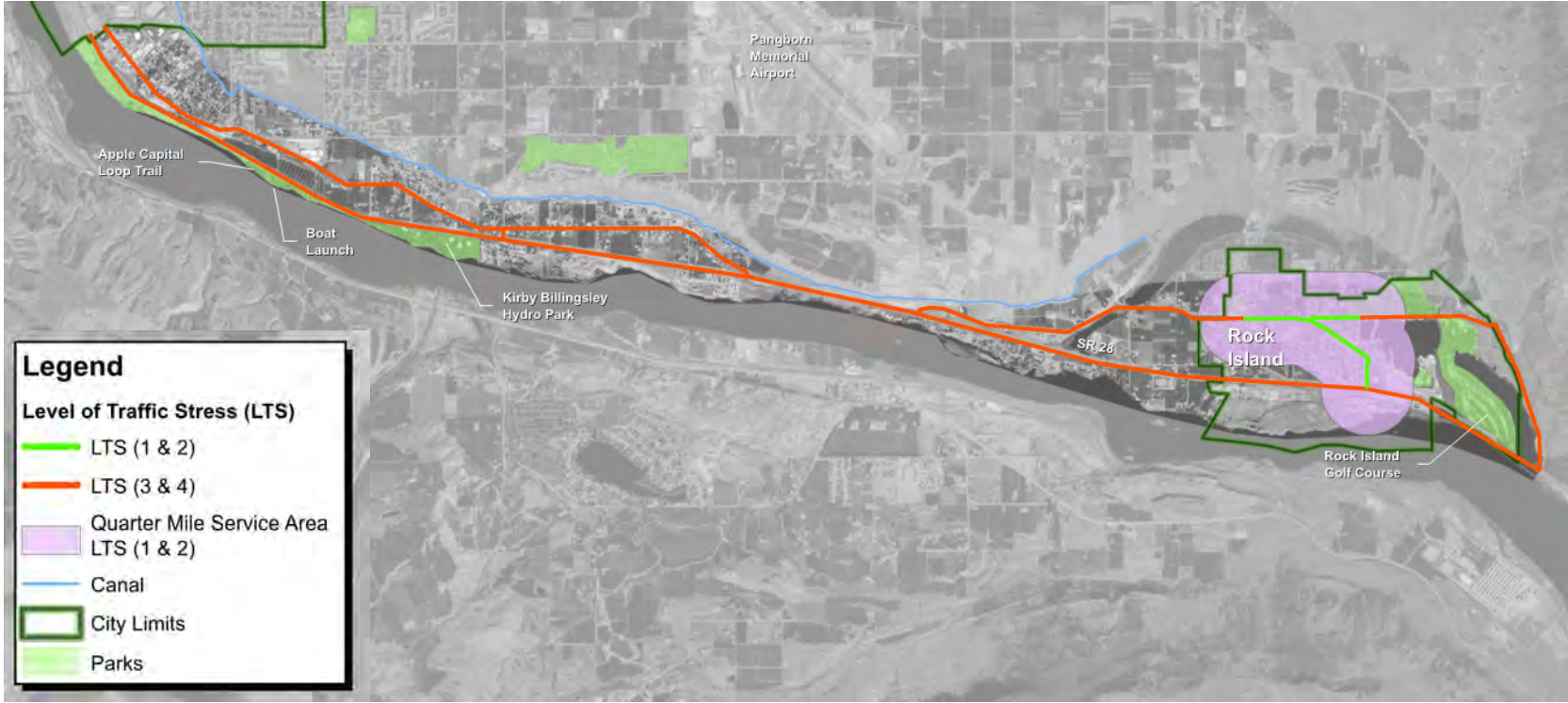
Needs Analysis Review

Level of Traffic Stress (LTS)

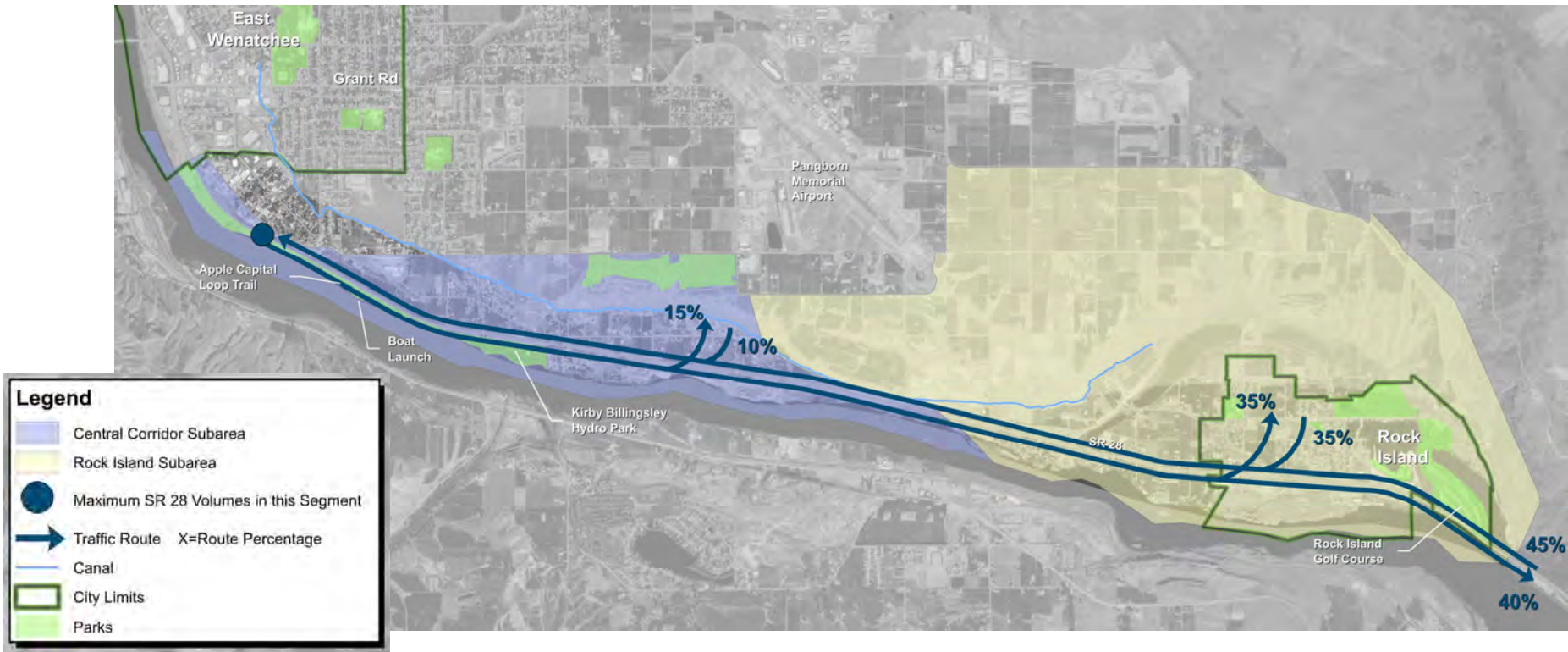
- LTS 1 = lowest stress
 - LTS 2
 - LTS 3
 - LTS 4 = highest stress
-
- Pedestrian Level of Traffic Stress (PLTS)
 - Bicycle Level of Traffic Stress (BLTS)
-
- **Primary contributing factors:** type of ped/bike facility, traffic volume, traffic speed, number of vehicle lanes



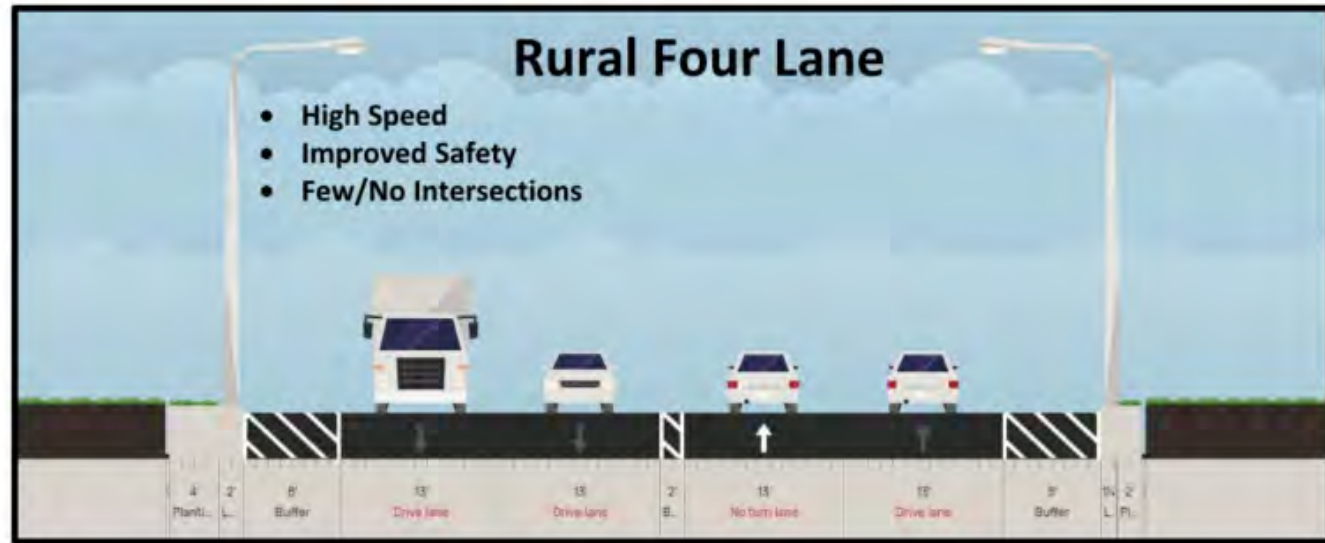
Needs Analysis Review



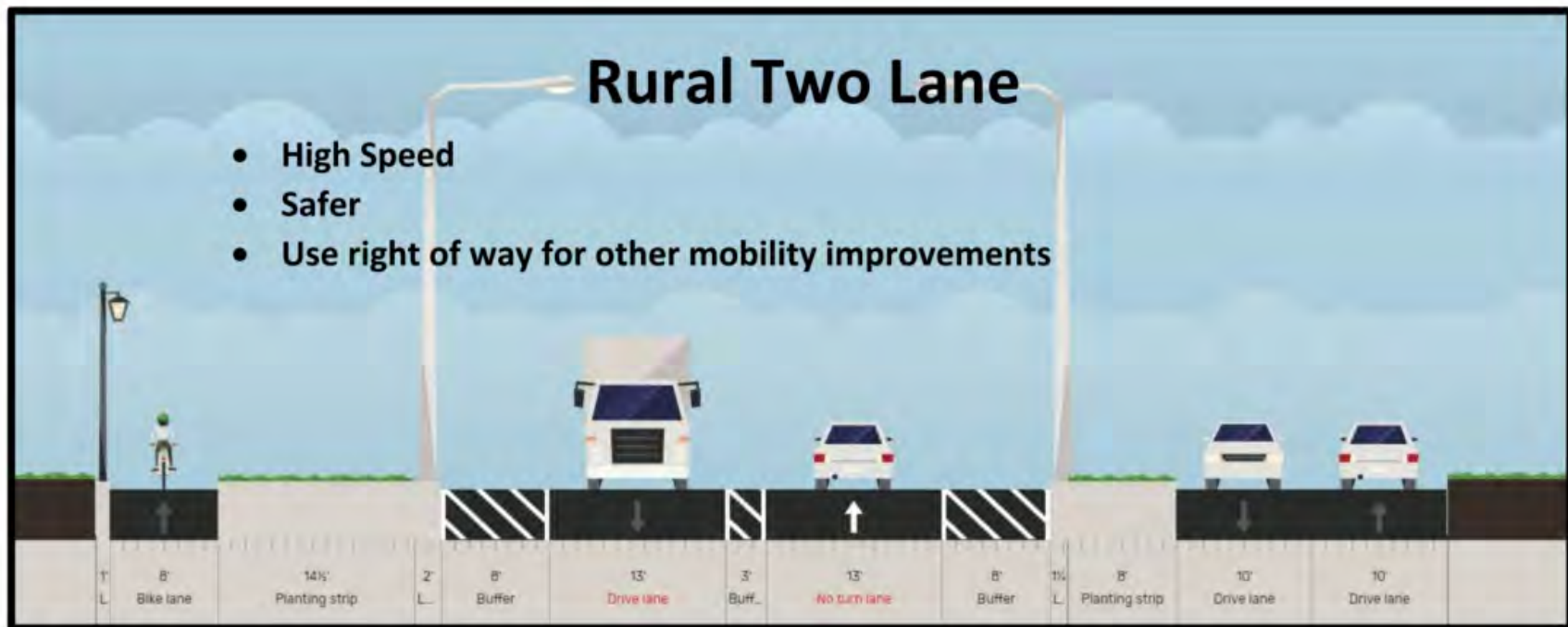
Needs Analysis Review



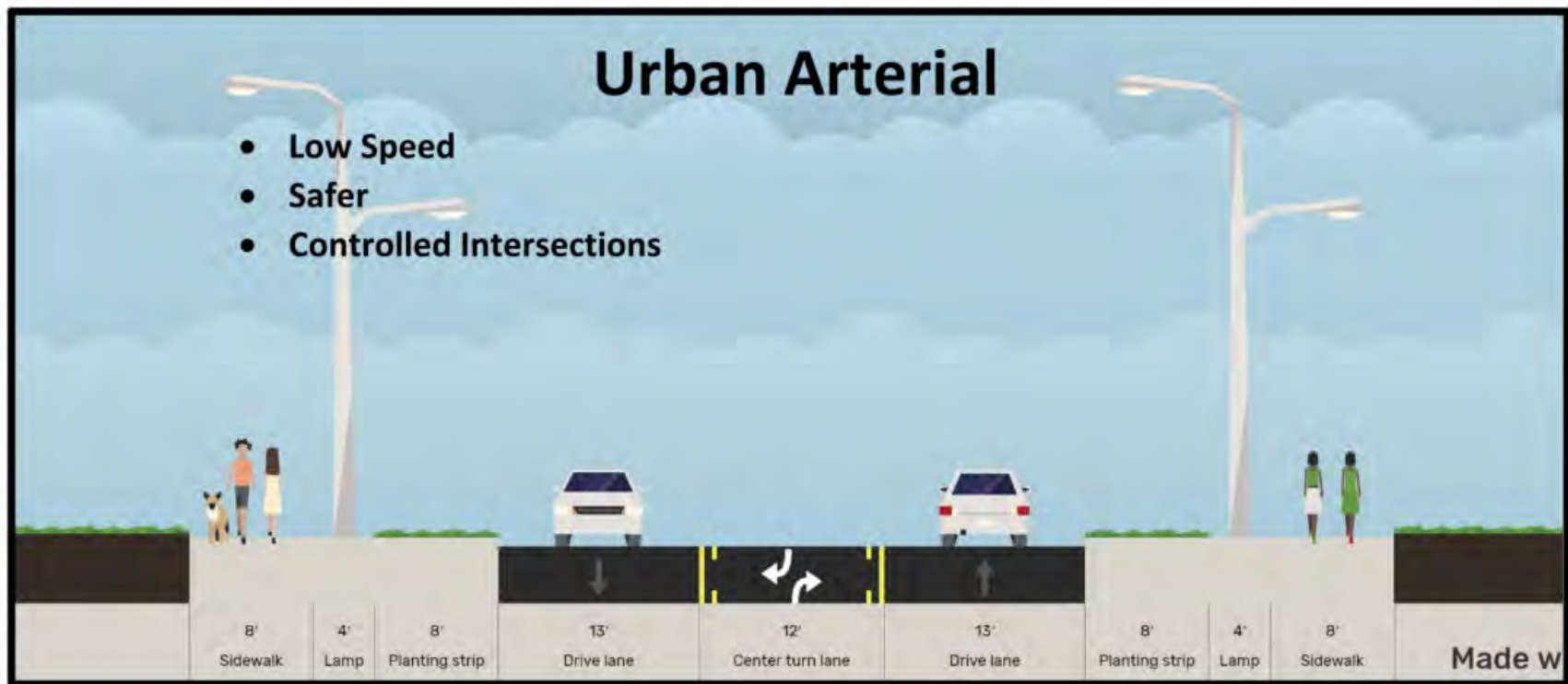
Concept Discussion



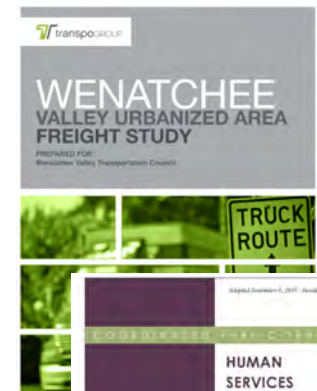
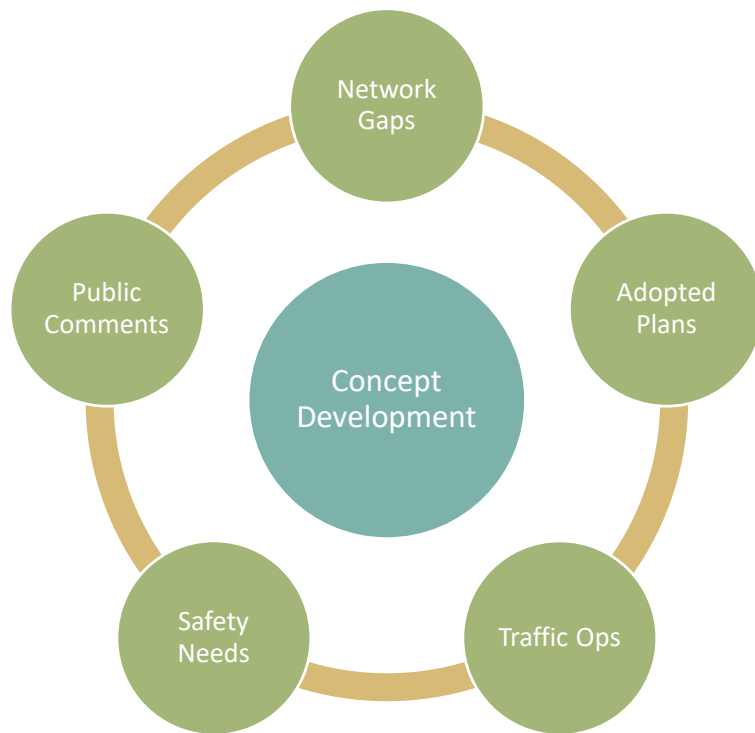
Concept Discussion



Concept Discussion



Concept Discussion



Measures of Effectiveness

Safety

- Reduce the number of serious and fatal injuries
- Reduce the number of collisions

Mobility

- ~~Reduce~~ travel time through corridor
- ~~Added~~ passing opportunities
- ~~Improve~~ “Level of Service” at intersections

Active Transportation

- Reduce level of traffic stress for peds and bikes
- Highway crossing opportunities
- Accessibility to transit

Other Measures

- Compatible with future funding opportunities
- Environmental impacts
- Compatible with adopted plans

The final product will be a high-level comparison of benefits between safety, mobility, and active transportation elements.

Advisory Group Next Steps

Stakeholder Team Meeting #4 – August 18, 1:30 PM

Discuss:

- 2-Lane rural concept
- 4-lane rural concept
- 2 lane urban concept

Review:

- Measures of effectiveness for three corridor concepts listed above
- Measures of effectiveness for standalone projects, including off-highway.

Questions?

Jenn Saugen

jennifer.saugen@perteet.com

509.619.7032 (direct)

509.699.1180 (cell)

Riley Shewak

riley@chelan-douglas.org

509.663.9059

Peter De Boldt

peter.deboldt@perteet.com

206.436.0532 (direct)

Enrique Borges

enrique.borges@perteet.com

425.322.0262

Hablo Español

SAG MEETING NO. 4 NOTES

123 Ohme Garden Road, Suite 8, Wenatchee, WA 98801½ P 800.615.9900

Client: Chelan Douglas Transportation Council
 Project: SR 28 Corridor Study
 Date: August 18, 2021
 1:00 PM – 3:00 PM
 Location: Virtual – Microsoft Teams
 RE: Stakeholder Advisory Group Meeting #4
 Notes taken by: Jennifer Saugen

Stakeholder Advisory Group Present:

Name	Organization	Name	Organization
George Mazur	WSDOT North Central	Aaron Simmons	Douglas County
Randy Agnew	Rock Island	TBD	East Wenatchee
Richard DeRock	Link Transit	Matt Shales	Chelan County PUD
Kelly Gregerson	Washington State Patrol	Kurt Davis	R.I. business owner/ freight hauling
Cassidy Cue	Study area resident	Mike Sorensen	Complete the Loop
Max Nelson	WSDOT North Central	David Kieninger	WSDOT North Central

Project Team:

Name	Organization	Role
Jeff Wilkens	CDTC	Project Manager
Riley Shewak	CDTC	Transportation Planning/Review
Peter De Boldt	Perteet	Stakeholder/Community Lead
Jennifer Saugen	Perteet	Project Manager
Enrique Borges	Perteet	Designer/Translator
Brent Powell	Perteet	Lead Traffic Analyst
Karissa Witthuhn	Perteet	Lead Designer

Meeting Agenda Outline:

- Welcome Back
- Stakeholder Outreach to Date
- Corridor Concepts Review
- Corridor Benefits and Challenges
- Next Steps for SAG

Jennifer prepared a PowerPoint presentation (slides attached) that were shared during the meeting.

Welcome Back:

Peter DeBoldt facilitated reintroduction for each SAG team member.

Stakeholder Outreach to Date:

Jennifer shared progress on stakeholder outreach since the last SAG meeting, including updated website statistics, social media pushes from WSDOT, Douglas County, and the Wenatchee World newspaper, and in-person outreach efforts.

SAG MEETING NO. 4 NOTES

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Jennifer also explained in more detail that she and Riley had attended two events with the Spanish-speaking community from South Wenatchee. First, they attended a Facebook live event called “Un Buen Consejo” hosted by the Community for the Advancement of Family Education, known as “CAFÉ”. Additionally, they attended a community event targeting the Latino/Hispanic community on August 3rd. They received 18 comment cards along with written comments on a large map of the area.

Jennifer noted that the study website would be up for commenting until August 30th. She shared a graphic showing major improvement suggestion themes that had come in through the website, including how many “thumbs up” each had received.

Corridor Concepts Review:

Karissa Witthuhn explained to SAG members how her team had utilized input from several existing plans, CDTC data, public input, and SAG input to create the three corridor concepts including intersection treatments. The three corridors she presented were:

1. SR 28 rural 2-lane
2. SR 28 rural 4-lane
3. SR 28 urban 3-lane

SAG members then had a chance to ask questions and make comments regarding the design.

- David K. asked if we looked at whether a single lane RAB was acceptable, as they had needed 2 lanes in other locations? Karissa said no we hadn't designed to that level of detail.
- George asked if closing access points was a differentiating feature between 2 and 4 lane? Karissa responded that no - they ended up being very similar.
- Cassidy commented that she likes the urban section as access is important. It also preserve the nature of the river and make more urban not just a high speed highway.
- Riley commented that we are not sure exactly what growth and traffic trends will drive the decision between options.
- Aaron stated that for Batterman Road, East Wenatchee side has restricted their freight system in the City. He mentioned it would be great to tie a freight route from Batterman all the way over to Fancher Heights.
- Randy said he echoed Aaron's comments, however thought that then trucks would run down Grant Road. Even with a bypass connection to Odabashion Bridge, they don't want a bypass, he thought they wanted town access.
- Riley stated CDTC is not currently thinking of Batterman as a bypass. More just that's where the land is and need other infrastructure investments.
- Cassidy stated she thinks Grant Road has become deteriorated from heavy trucks. From a development standpoint, it would be great to get industrial out of downtown so other trucks don't have to go in. Or expand 4 lanes going into Grant Road.
- Randy clarified that at Grant Road it already has 4 lanes on the west end.
- Aaron says Douglas County will start looking at improving geometrics on Batterman and clean up areas as they anticipate traffic volumes ticking up a lot in the future and they are trying to get ready for it. Fix up so that number of people in those areas can be accommodated.

Corridor Benefits and Challenges:

SAG MEETING NO. 4 NOTES

123 Ohme Garden Road, Suite 8, Wenatchee, WA 98801½ P 800.615.9900

Peter began the discussion by clarifying the types of tradeoffs that we can compare each option to.

Tradeoffs may include:

- Safety
- Access
- Mobility
- Ped/Bike/Transit
- Funding Opportunities
- Environmental Impacts
- Public Support

SAG members commented their ideas on tradeoffs.

- Aaron said he was trying to think through some ideas here. It's a complicated thing to do as all agencies have our interests. We would like the study to identify these nuances for us. Aaron will defer to the study team.
- George said that maybe our objective shouldn't be to balance. Just report out the implications for each, where a particular concept is different than the other. It's all value judgements. With enough time and money, any concept can be made to excel in any of these metrics. They want to see the metrics – just REPORT it out. Balancing is more of listening to what you value and feel is important.
- Matt stated that PUD's viewpoint is relatively narrow and is focused on ingress/egress to park. Safety and access are their concern.
- David asked regarding the pedestrian trail through the parks plus the extension - who would maintain all of these? It's adding to the existing system. Add maintenance costs as a metric to share the data on.
- Cassidy said she spoke for those living along the roadway – the urban concept is best. It would be difficult to close existing accesses and need to use other opportunities to turn around. Seems safer with slower speed limit as well. As East Wenatchee develops this would be the best way to access.
- Maxwell said that as a representative of WSDOT he was not sure which is the most important. When it comes to the bike/ped side the way he personally sees it, there is a very good connection, but needs to extend further. Currently can't get to any other destinations.
- Riley spoke to Dave's comment on the path - can they just do it with the plow after the highway? Or provide a buffered pathway? Riley said maintenance could jump on at any access roadway (for snow). He also suggested the following additions:
 - ADD trail/access point as a metric.
 - ADD noise pollution as a metric, pulled out from environmental
 - ADD access rights, more broken out
- Riley also asked what interest WSDOT has in maintaining access to like one barn on a roadway?
- David and George stated that this area is within partial limited access control and they will get the ROW plans to the study team. They don't anticipate that HQ would ever give additional access points.
- Peter concurred and said he had never seen them grant a break in access to a private entity once purchased, but maybe for a City or County.
- David asked if we should leave the two-lane road without a center barrier? Seems like we are missing a step when we go straight from what we have now to a barrier divided two-lane option. He's not convinced that having the barrier is necessary.

SAG MEETING NO. 4 NOTES

123 Ohme Garden Road, Suite 8, Wenatchee, WA 98801½ P 800.615.9900

- Brent explained that understanding that we don't have great data around near misses, the team went through the quantitative analysis and there were no trends in terms of locations, but anecdotally there are near misses, shooting gaps, etc. Using crash modification factors and industry standard, the barrier is used to limit left turns
- George said we had potentially sidestepped "Practical Solutions" - is there one that is less of these three concepts? Practical solution phases one of the three concepts or a subset of that. Could just be upgrading RIR with a few other changes. Wants us to mention in the report, even if we say "dealing with it in the next phase".
- Cassidy agreed and said maybe this is how we should be dealing with this? Need to try to describe this in relatable terms in the report. If it's only adding a minute or two of drive time – state that clearly. Also if we change the speed limit, we have to make other changes so people know the whole roadway has changed.

Peter thanked everyone for the discussion and additional ideas and closed out the tradeoffs discussion.

Next Steps:

Perteet will prepare the draft corridor study report. We will meet once more to go over the executive summary of the draft report.

STAKEHOLDER ADVISORY
GROUP MEETING #4

AUGUST 18, 2021

1:00PM – 3:00PM



Chelan-Douglas
TRANSPORTATION COUNCIL
CDTC

SR 28 Corridor Study

Meeting Agenda Outline

- Welcome (5 min)
- Stakeholder Outreach Update (20 min)
- Corridor Concepts Review (45 min)
- Concept Benefits and Challenges (30 min)
- Next Steps for Stakeholder Advisory Committee (5 min)

Stakeholder Outreach Summary

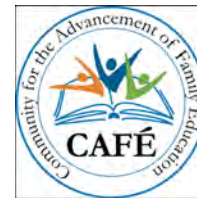
Direct Outreach

August 2nd CAFÉ's "Un Buen Consejo"

- "One thing you should know"

August 3rd Community Event in South Wenatchee

- Perteeet and CDTC joined an existing outdoor event at CAFÉ's South Wenatchee location
- 12:00PM to 6:00PM
- Specifically targeted to Latino/Hispanic Community
- Received 18 comment cards along with written comments on a large map of the area



¡BIENVENIDO!
WELCOME!

Estudio de la carretera SR 28
SR 28 Corridor Study

¿Le preocupa la seguridad, las congestiones de tráfico, o las rutas para llegar a Rock Island y más allá? ¿Tiene ideas de como nuestro sistema de transporte podría ayudar a su familia o negocio?

Are you concerned about safety, traffic congestion, or ways to get to and from Rock Island that don't require driving? Do you have ideas of how our transportation system could help your family or business?

Chelan-Douglas Transportation Council
CDTC

IN COORDINATION WITH

PERTEET WSDOT Link Transit ROCK ISLAND

When driving to Rock Island or Quincy -
Which one of these makes the most sense?
Cuando maneja hacia Rock Island o Quincy -
¿Cual de estos tiene mas sentido?

Cuatro Carriles, Rural

Rural Four Lane

- Alta Velocidad
- Seguridad Mejorada
- Pocos o no intersecciones

Dos Carriles, Rural

Rural Two Lane

- Alta Velocidad
- Seguridad Mejorada
- Uso de derecho de paso para otras mejoras de movilidad

Boulevard Urbano

Urban Arterial

- Baja Velocidad
- Seguridad Mejorada
- Intersecciones Controladas

Chelan-Douglas Transportation Council
CDTC

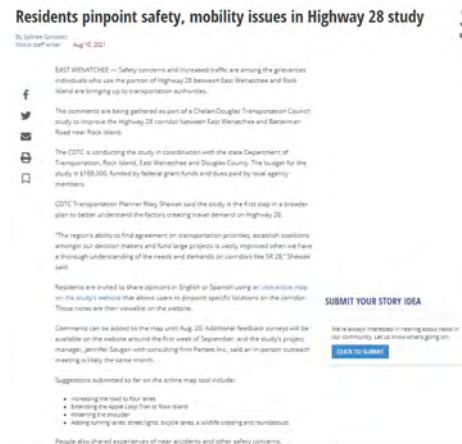
IN COORDINATION WITH

PERTEET Link Transit WSDOT ROCK ISLAND

Stakeholder Outreach Summary

Additional Outreach

- Wenatchee World Article 8/11/21
- Social media push from WSDOT 7/1/21
- Reader boards on SR 28 from WSDOT 7/19/21
- Douglas County posted to website and social media



Website Statistics

English Page:

- 1,000 total visits
- 651 unique visitors
- 513 engaged sessions
- 22 joined the mailing list (total of 30)

Spanish Page:

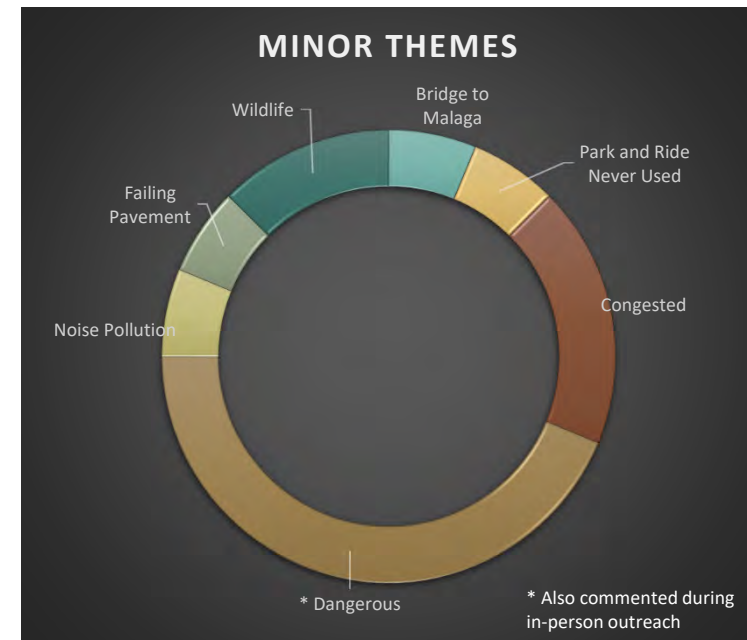
- 32 unique visitors
- 78 page visits
- 1 user had browser language set to Spanish

Stakeholder Outreach Summary

Pinpoint Map Statistics

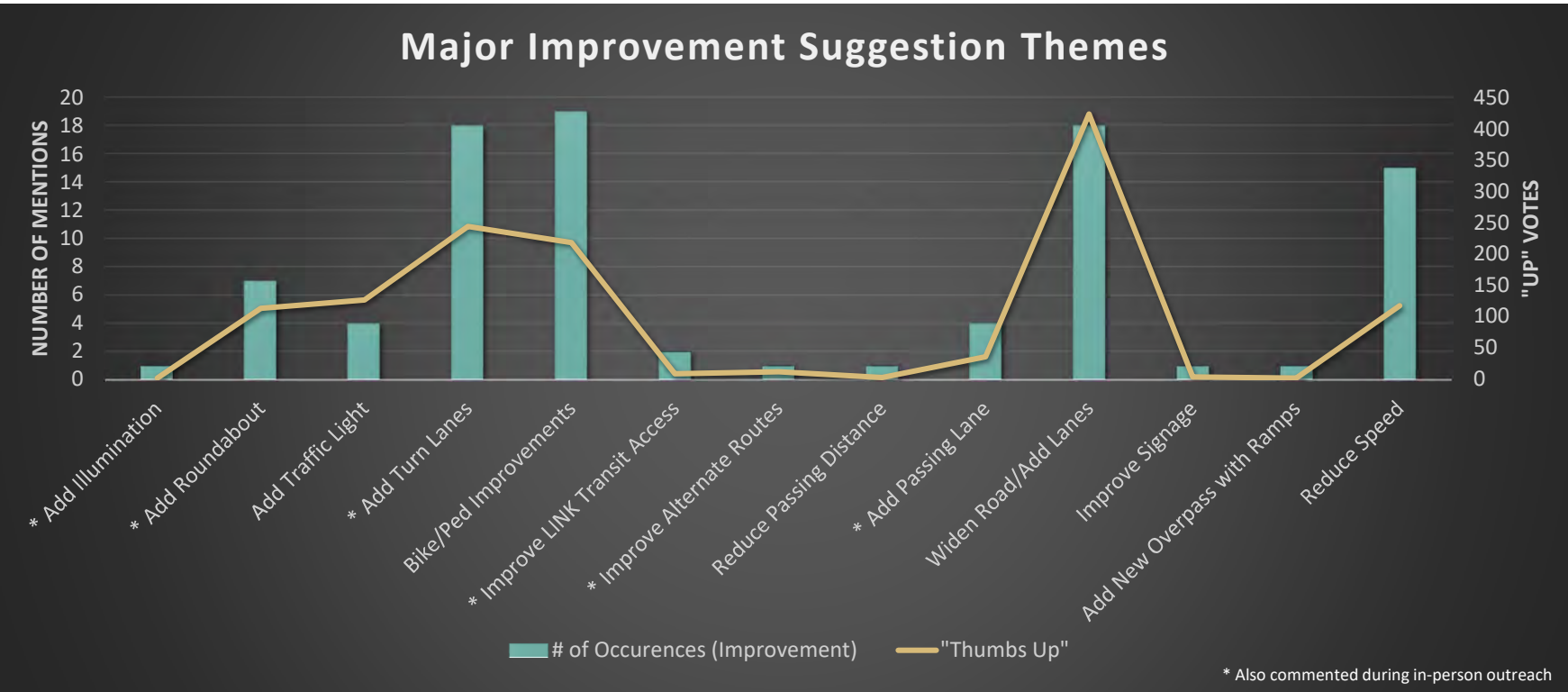
Engagement summary with the online map tool

438	97	2:39	58	117
Total Visits	Unique Users	Average Time	Unique Stakeholders	Comments
The total number of visits to the project site	The total number of unique people viewing the site (generally determined by using the same browser)	The average time people are spending on the site viewing and interacting with the project	The number of people who are interacting with the site (adding comments)	The total number of comments on the site

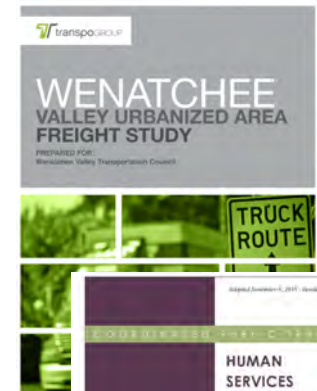
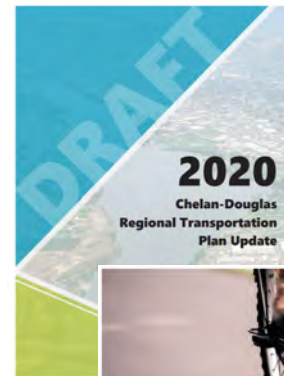
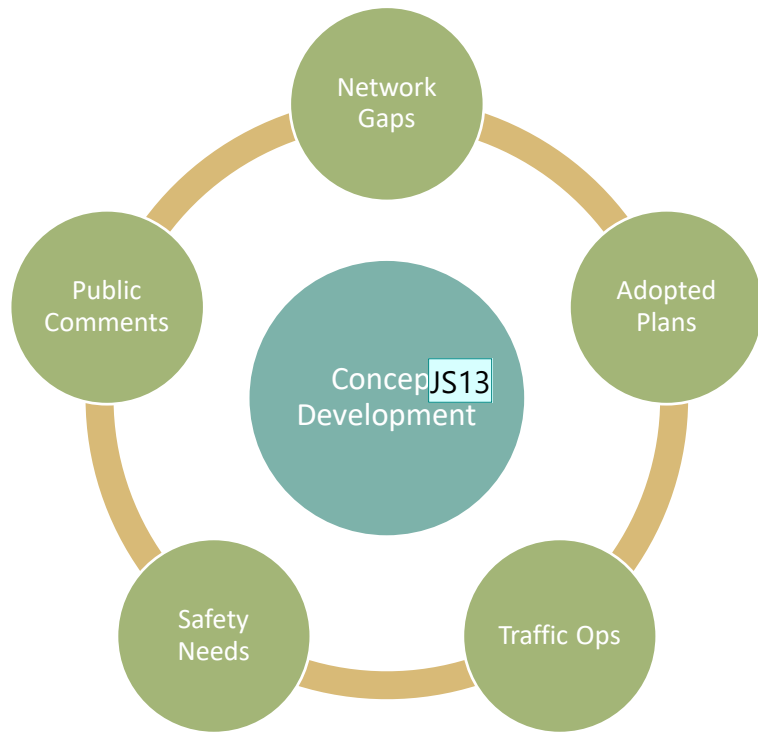


Continued Website Map Commenting until August 20th

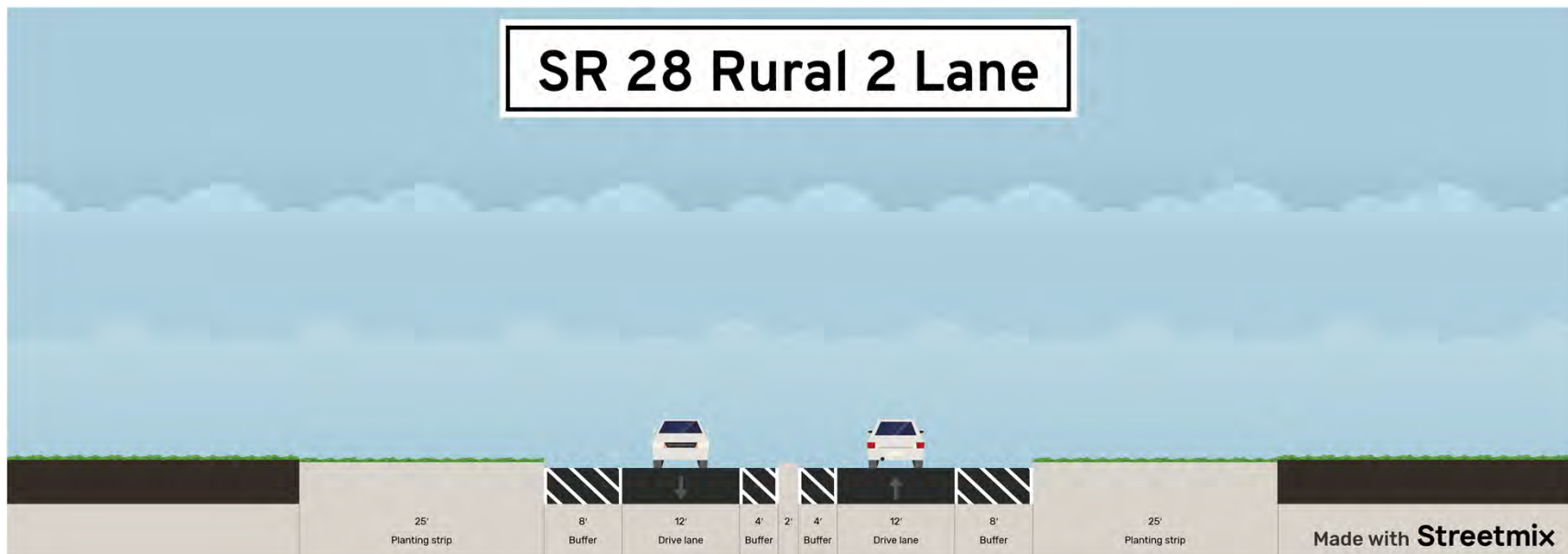
Stakeholder Outreach Summary



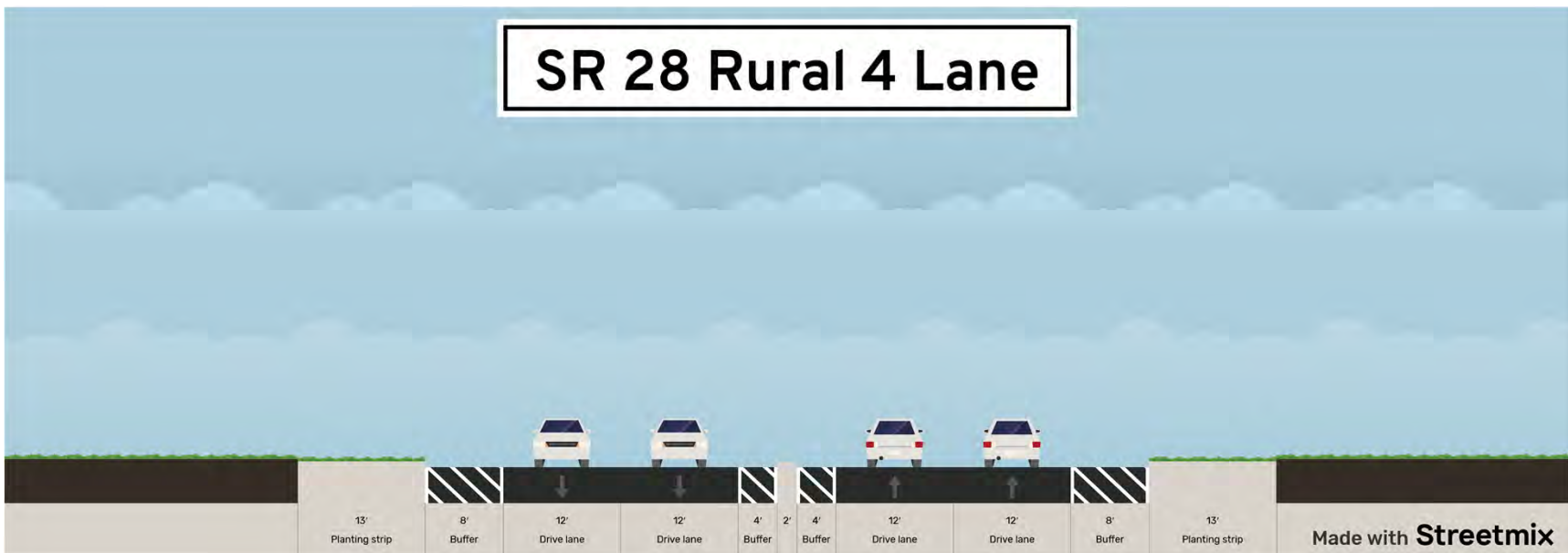
Corridor Concepts Review



Corridor Concepts Review



Corridor Concepts Review



Corridor Concepts Review



Open Discussion - Corridor Concept Tradeoffs to Balance



Safety

- Potential number of collisions
- Potential severity of collisions

Access

- Local street access closures
- Detours

Mobility

- Overall time travelling corridor
- Passing opportunities

Ped/Bike/Transit

- Ped/bike comfort level
- Highway crossing opportunities
- Accessibility to transit

Other

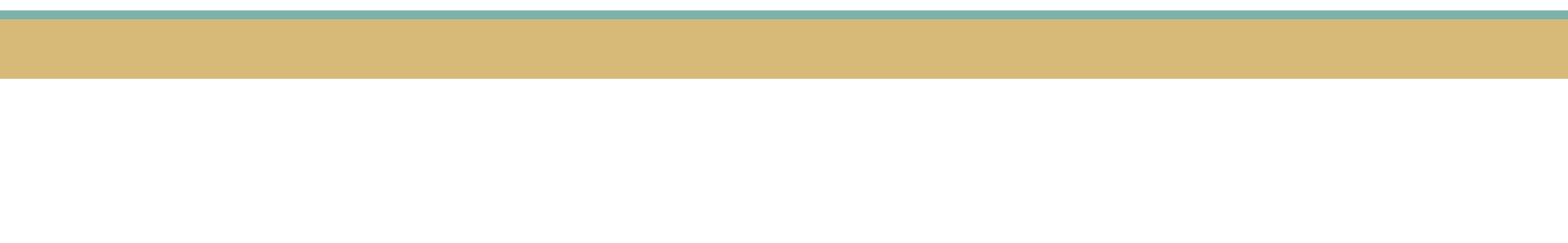
- Compatible with future funding opportunities
- Environmental impacts
- Compatible with adopted plans
- Public support

Advisory Group Next Steps

Next Steps

- Poll sent to SAG by August 23 - please complete by September 1
- Concurrent poll posted to website near August 23
- Perteet will prepare the draft Corridor Study Report

Stakeholder Team Meeting #5 – September 29, 9:00 AM

- Review Draft Corridor Study Report
 - Potentially in-person?
- 

Questions?

Jenn Saugen

jennifer.saugen@perteet.com

509.619.7032 (direct)

509.699.1180 (cell)

Riley Shewak

riley@chelan-douglas.org

509.663.9059

Peter De Boldt

peter.deboldt@perteet.com

206.436.0532 (direct)

Enrique Borges

enrique.borges@perteet.com

425.322.0262

Hablo Español

SAG MEETING NO. 5 NOTES

123 Ohme Garden Road, Suite 8, Wenatchee, WA 98801, P 800.615.9900

Client: Chelan Douglas Transportation Council
 Project: SR 28 Corridor Study
 Date: October 07, 2021
 2:30 PM – 3:45 PM
 Location: Virtual – Microsoft Teams
 RE: Stakeholder Advisory Group Meeting #5
 Notes taken by: Jennifer Saugen

Stakeholder Advisory Group Present:

Name	Organization	Name	Organization
George Mazur	WSDOT North Central	Aaron Simmons	Douglas County
Randy Agnew	Rock Island	Garren Melton	East Wenatchee
Christina Baron	Link Transit	Matt Shales	Chelan County PUD
Kelly Gregerson	Washington State Patrol	Max Nelson	WSDOT North Central
Cassidy Cue	Study area resident		

Project Team:

Name	Organization	Role
Jeff Wilkens	CDTC	Project Manager
Riley Shewak	CDTC	Transportation Planning/Review
Peter De Boldt	Perteet	Stakeholder/Community Lead
Jennifer Saugen	Perteet	Project Manager
Brent Powell	Perteet	Lead Traffic Analyst
Karissa Witthuhn	Perteet	Lead Designer

Meeting Agenda Outline:

- Welcome Back
- Stakeholder Outreach to Date
- Recap Corridor Concepts and Changes Since Last Meeting
- Corridor Comparisons
- Next Steps

Jennifer prepared a PowerPoint presentation (slides attached) that were shared during the meeting.

Welcome Back:

Peter DeBoldt facilitated reintroduction for each SAG team member. Two new agency members joined this final SAG meeting – Garren Melton/East Wenatchee and Christina Baron/Link Transit.

Stakeholder Outreach to Date:

Jennifer shared a final summary of outreach including the project website, fliers, individual stakeholder interviews, agency outreach, direct (in-person) outreach, media, and “virtual office hours”.

Final website pinpoint map statistics showed 448 total visits to the site with 117 comments and 98 unique users. Randy Agnew shared that he had compiled a list of all the comments in an excel spreadsheet and

SAG MEETING NO. 5 NOTES

123 Ohme Garden Road, Suite 8, Wenatchee, WA 98801, P 800.615.9900

had sorted them for comparison. Randy shared his spreadsheet and noted that he interpreted the most favorable comments towards widening the highway to four lanes. He said he'd make his spreadsheet available to the SAG.

Recap Corridor Concepts and Changes Since Last Meeting:

Karissa shared updates to the corridor concepts that had been made per SAG suggestions and additional traffic modeling. Updates included:

- Removing the Rock Island Road connection in the intermediate speed 3-lane scenario, as well as revising that concept to reflect no curb, gutter, or sidewalk.
- For the 3-lane scenario - use planter strips (drainage facility) to separate a shared-use pathway from SR 28.
- Removing the Apple Capitol Loop Trail from the Urban Scenario as it wouldn't be needed with shared use paths on both sides of the highway.
- Adding bike lanes to each county road that connects to RIR for a complete and safer bicycle network.

Karissa also shared the expected ranges of cost for each of the corridor concepts.

Corridor Comparisons:

Brent led a discussion regarding corridor comparisons using the memorandum that had been provided to SAG members prior to the meeting. The memorandum did not identify a preferred alternative but instead provides several data points for consideration. The SAG members each had an opportunity to remark on the data points and Brent answered additional questions regarding data.

Next Steps:

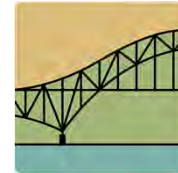
Peter concluded the meeting by thanking each SAG member for taking time out of their schedules to participate in the meeting. They were encouraged to share general information from the study with their peers but remember it's all draft at this point.

A phase II market analysis and opinions of cost for 4-lanes all the way to Quincy are next steps and expected completion is early spring. Peter said that the study team would present the results of both phases to CDTC's Board at that time.

STAKEHOLDER ADVISORY
GROUP MEETING #5

OCTOBER 7, 2021

2:30PM – 4:00PM



Chelan-Douglas
TRANSPORTATION COUNCIL

CDTC

SR 28 Corridor Study

Meeting Agenda Outline

- Welcome (5 min)
- Stakeholder Outreach Update (10 min)
- Corridor Concept Updates & Changes since last meeting (20 min)
- Corridor Comparisons (45 min)
- Next Steps (5 min)

Stakeholder Outreach Summary



Website

- ❖ Active from April 16th through August 20th

Fliers in Community

- ❖ 20 + English and Spanish fliers posted at local businesses in Rock Island and East Wenatchee

Individual Stakeholder Interviews

- ❖ Cesar Cueves 4/27/21
- ❖ Ysabel Busch 4/27/21
- ❖ Aurelio Iniguez 5/7/21
- ❖ Douglas County FD (Cam Phillips) 5/4/21
- ❖ CDRPO (Jim Kuntz) 5/5/21
- ❖ Manny Rivas 6/10/21

Direct Outreach

- ❖ CAFÉ's "Un Buen Consejo" 8/2/21
- ❖ Community Event in South Wenatchee 8/3/21

Agency Outreach

- ❖ City of Wenatchee Facebook Post
 - ❖ Also sent to subscribers of listserv
- ❖ City of East Wenatchee Facebook Post
 - ❖ Also sent to subscribers of listserv
- ❖ Chelan County PUD notified all employees
 - ❖ Also hung up fliers at Hydro Park
- ❖ Douglas County Facebook Post
- ❖ WSDOT Facebook Post 7/1/21
- ❖ WSDOT SR 28 reader boards 7/19/21

Media

- ❖ Wenatchee World Article 8/11/21

"Virtual Office Hours"

- ❖ Spanish Speaking 6/16/21
- ❖ English Speaking 6/23/21

Stakeholder Outreach Summary

Website Statistics

English Page:

- 1,100 total visits
- 699 unique visitors
- 676 engaged sessions
- 30 joined the mailing list

Spanish Page:

- 78 total visits
- 36 unique visitors
- 17 engaged sessions
- 1 user had browser language set to Spanish

Stakeholder Outreach Summary

Pinpoint Map Statistics –

Engagement summary with the online map tool

448	98	2:39	58	117
Total Visits	Unique Users	Average Time	Unique Stakeholders	Comments
The total number of visits to the project site	The total number of unique people viewing the site (generally determined by using the same browser)	The average time people are spending on the site viewing and interacting with the project	The number of people who are interacting with the site (adding comments)	The total number of comments on the site

Other / Otros

The Quincy to East Wenatchee SR28 segment is very unsafe. There seems to be a lot of high speed and risky driving. Hopefully some improvements and widening are being considered.

May 19, 2021 1:26 PM -07:00 | Like (148) Dislike (0)

Traffic / Tráfico

Highway 28 should be expanded to 4 lanes with turn lanes at each intersection.

May 18, 2021 12:38 PM -07:00 | Like (67) Dislike (6)

Other / Otros

4 lane SR28 to Quincy or add a LOT more passing lanes... in both directions.

Jul 19, 2021 4:33 PM -07:00 | Like (81) Dislike (1)

Traffic / Tráfico

Left turning movements along the whole corridor are an issue. Suggest improving the highway to include right in right out restrictions and installing traffic lights w/ u-turn capabilities or roundabouts at key intersections to allow traffic to get turned around safely if needed. Key intersections likely being 3rd Street SE, S Nile Avenue, both Rock Island Road intersections, Rock Island Drive, and Battermann Road.

Jul 28, 2021 4:27 PM -07:00 | Like (76) Dislike (1)

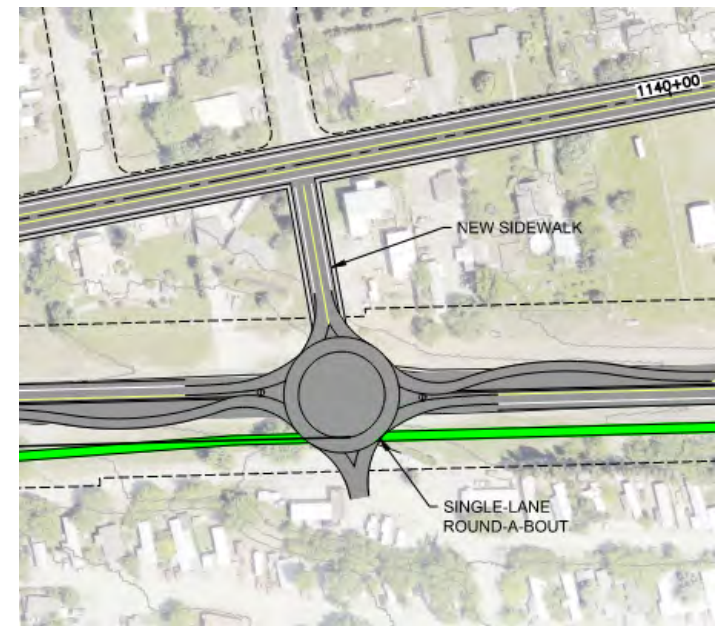
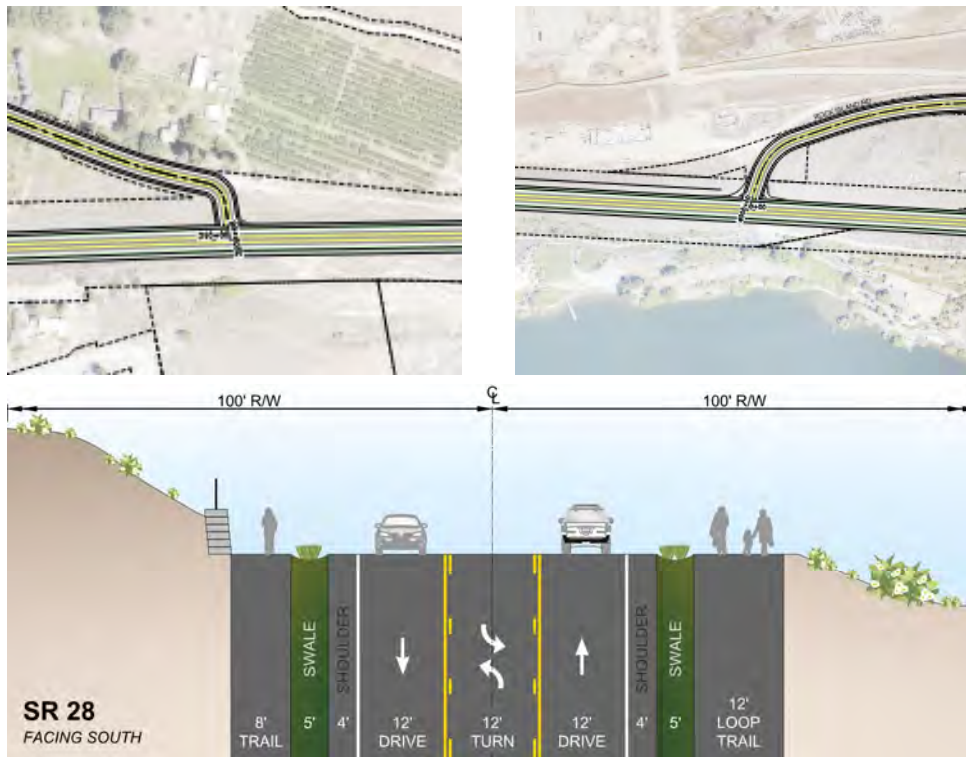
Pedestrian & Bicycle / Peatones y Bicicletas

Extending the bike trail from Hydro Park to Rock Island should be a priority. The popularity of the Rocky Reach Trail is evidence that a bike/pedestrian trail to Rock Island would be a sound decision for transportation and recreation.

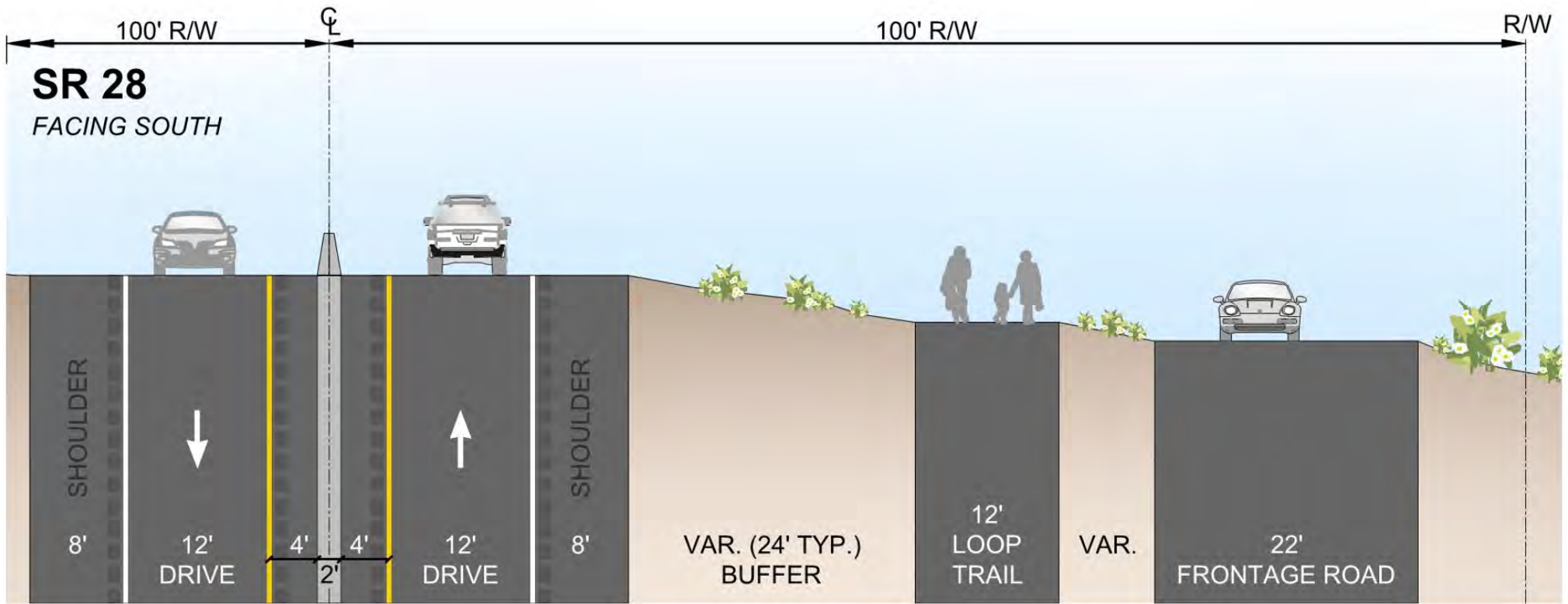
May 11, 2021 9:50 AM -07:00 | Like (56) Dislike (5)



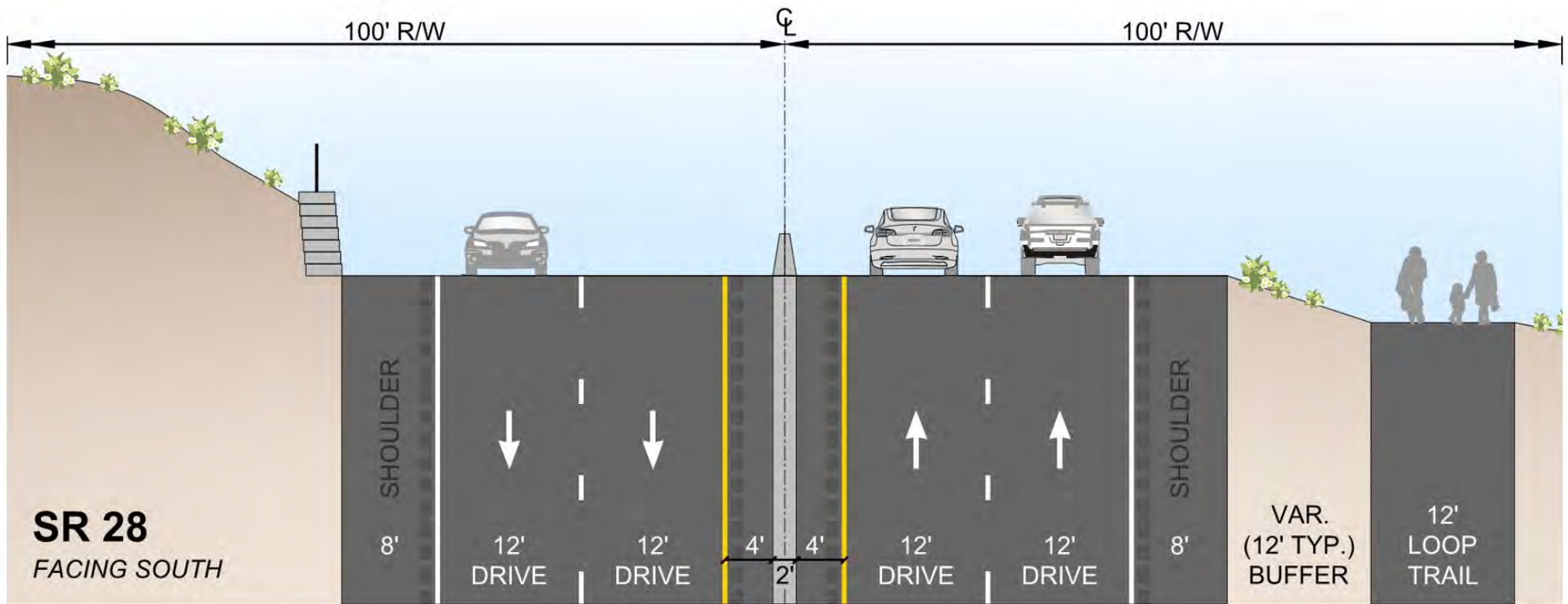
Corridor Concept Changes (since last meeting)



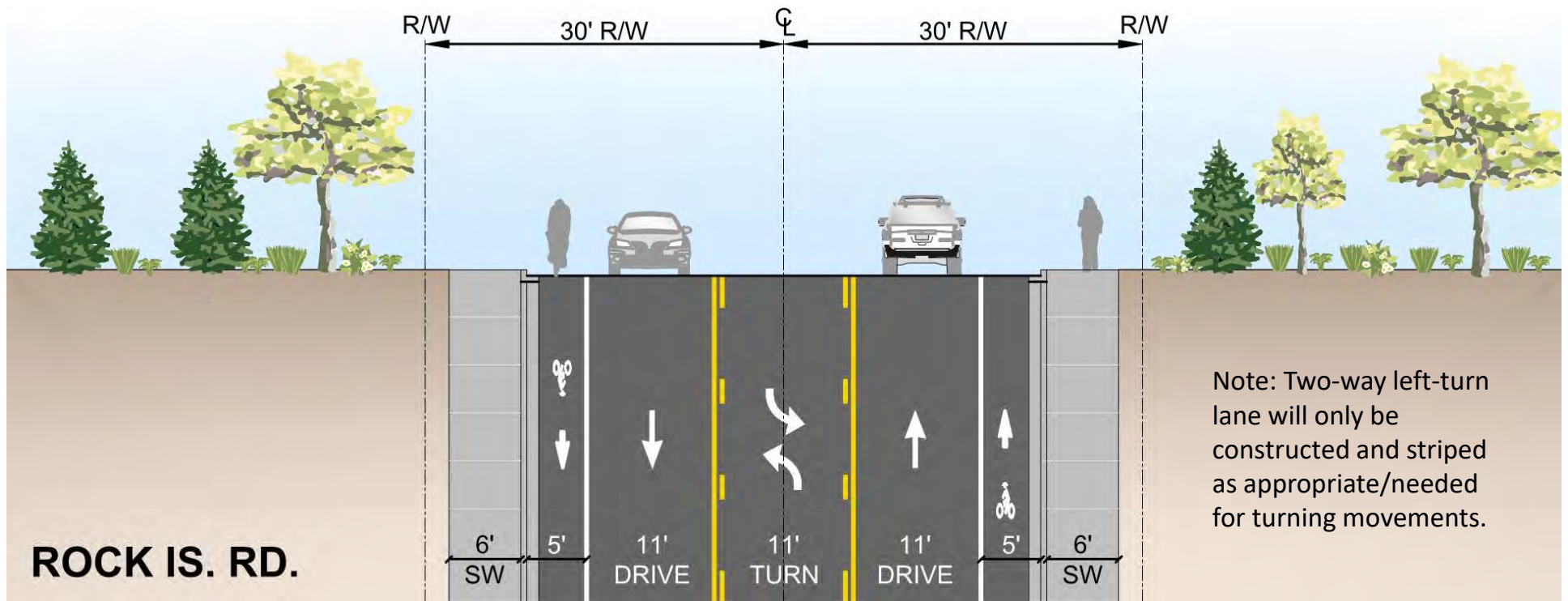
Corridor Recap – High Speed, 2 Lane



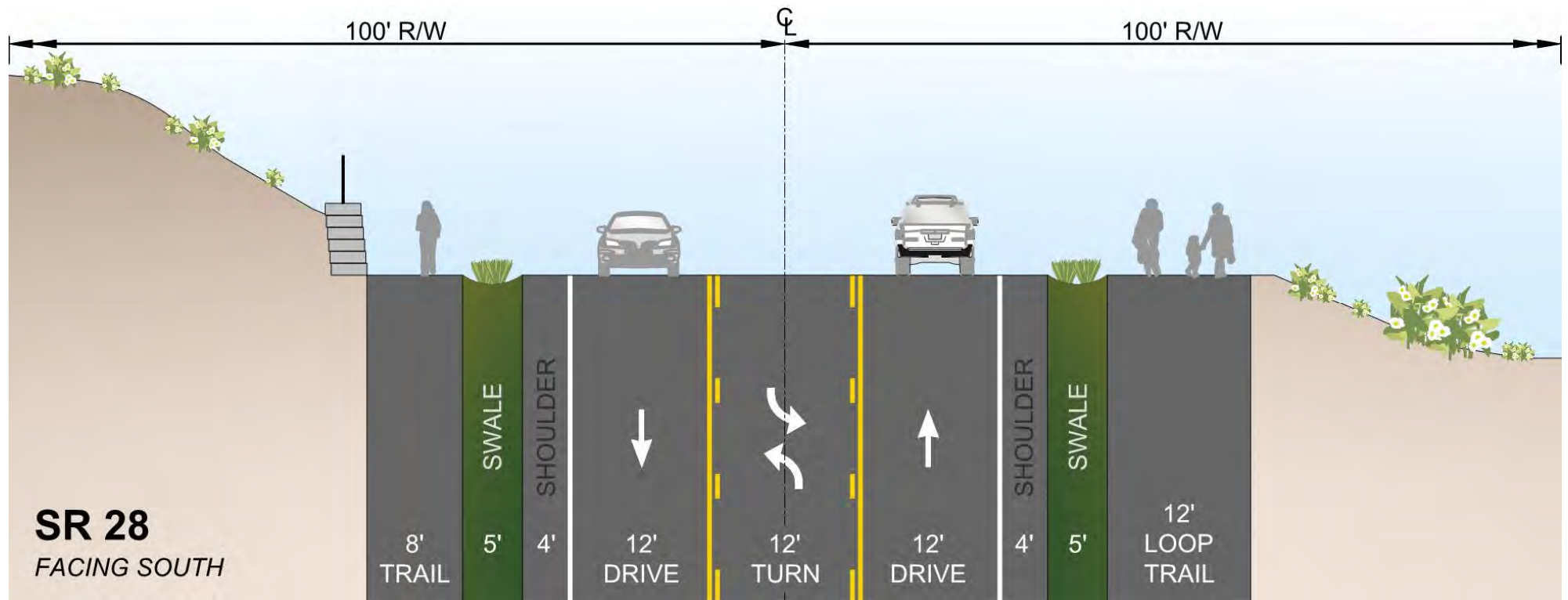
Corridor Recap – High Speed, 4 Lane



Corridor Recap – Rock Island Road



Corridor Recap – Intermediate Speed, 3+ Lane



Concepts Opinion of Cost

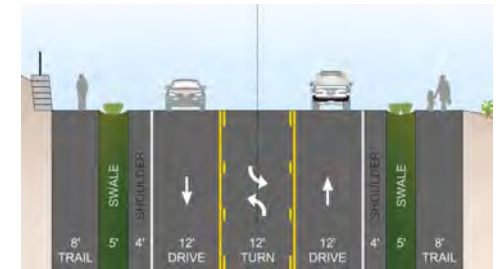
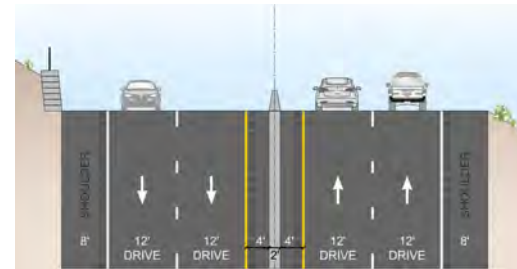
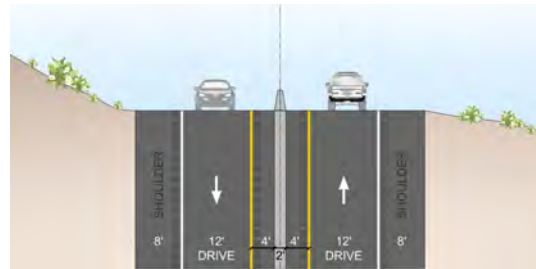
Concept	Range of Cost
High Speed, 2 Lane	<ul style="list-style-type: none">• SR 28: \$90 million• Loop Trail extension: \$12 million• RIR upgrade: \$74 million• RIR connection: \$27 million Total: \$190–220 million
High Speed, 4 Lane	<ul style="list-style-type: none">• SR 28: \$166 million• Loop Trail extension: \$12 million• RIR upgrade: \$74 million• RIR connection: \$27 million Total: \$265–295 million
Intermediate Speed, 3+ Lane	<ul style="list-style-type: none">• SR 28: \$117 million• Loop Trail extension: included above• RIR upgrade: \$74 million• RIR connection: not applicable Total: \$190–220 million

Corridor Comparisons – Safety & Access

Element	High Speed, Two Lane SR 28	High Speed, Four Lane SR 28	Intermediate Speed, Three Lane SR 28
General predicted crash rate	30.1 crashes per year	34.3	41.6
General crash rate compared to existing	34% reduction	24% reduction	8.4% reduction
Injury/ fatal predicted crash rate	9.0 crashes per year	10.9	13.1
Injury/fatal rate compared to existing	39% reduction	26% reduction	11% reduction
General access classification	Partial Control Limited Access	Partial Control Limited Access	Partial Control Limited Access
Access control devices	Concrete jersey barrier or median	Concrete jersey barrier or median	None, left turns allowed
Property access changes compared to existing	Consolidate some existing driveway access points to nearby intersection locations via frontage roads	None	None
Changes in number of intersections/accesses compared to existing	6 fewer	2 fewer	No change
Preliminary SR 28 intersection changes	Five new roundabouts Left-turn restrictions at stop-controlled intersections Closure of SR 28 and Rock Island Road intersections	Five new roundabouts Left-turn restrictions at stop-controlled intersections Closure of SR 28 and Rock Island Road intersections	Three new roundabouts

Corridor Comparisons – Vehicle Mobility

Element	High Speed, Two Lane SR 28	High Speed, Four Lane SR 28	Intermediate Speed, Three Lane SR 28
Corridor travel time (2045 volumes)	SR 28: 9.5 minutes Rock Island Rd (RIR): 12.5 minutes Battermann Road: 8 minutes	SR 28: 8.5 minutes RIR: 12.5 minutes Battermann Road: 8 minutes	SR 28: 18 minutes Battermann Road: 10 minutes
Average speed (2045 volumes)	SR 28: 53 mph RIR: 33 mph Battermann Road: 47 mph	SR 28: 59 mph RIR: 33 mph Battermann Road: 47 mph	SR 28: 27 mph Battermann Road: 45 mph



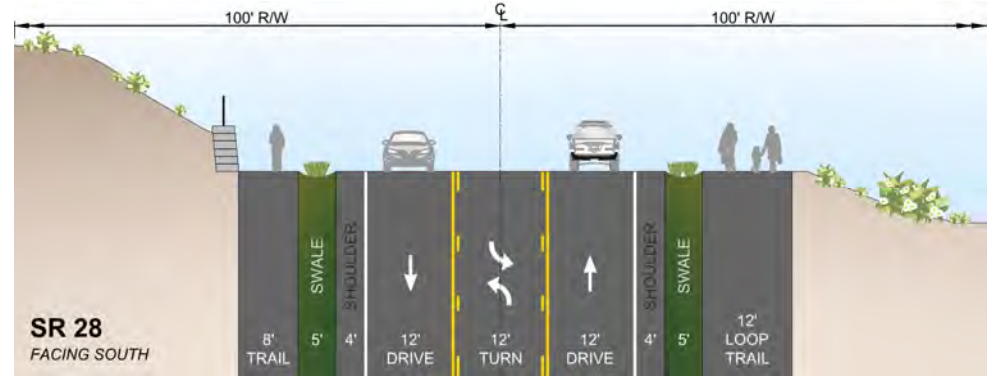
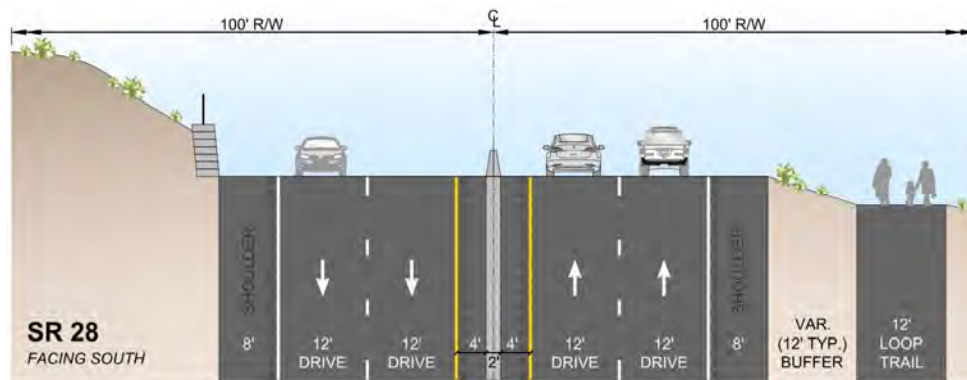
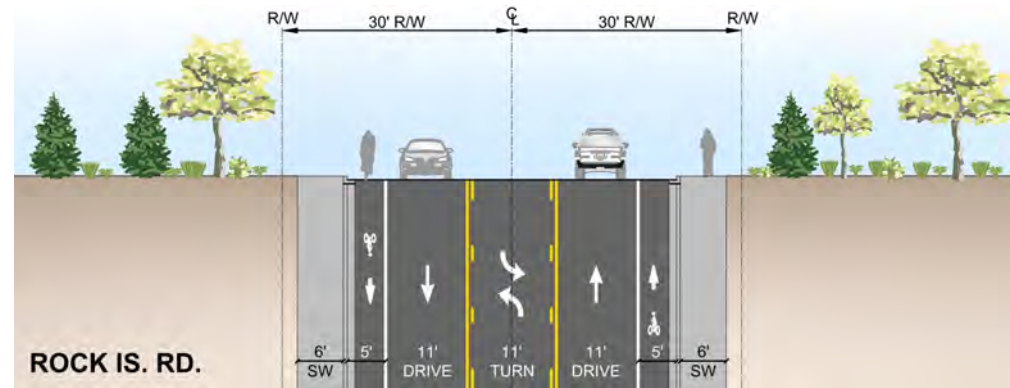
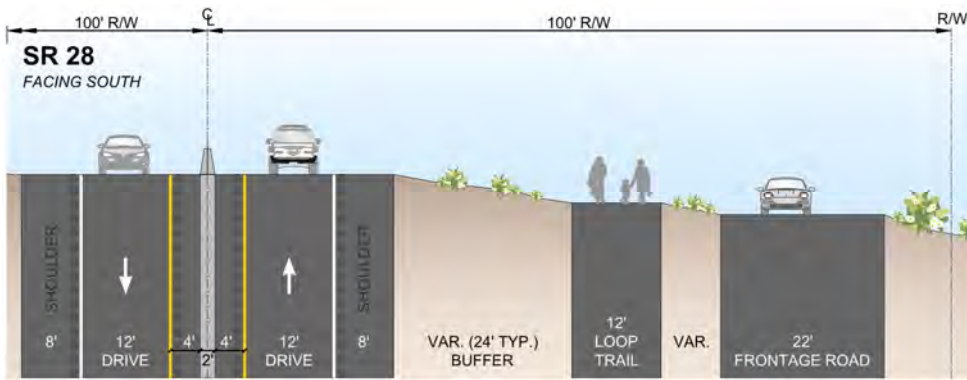
Corridor Comparisons – Ped/Bike Mobility

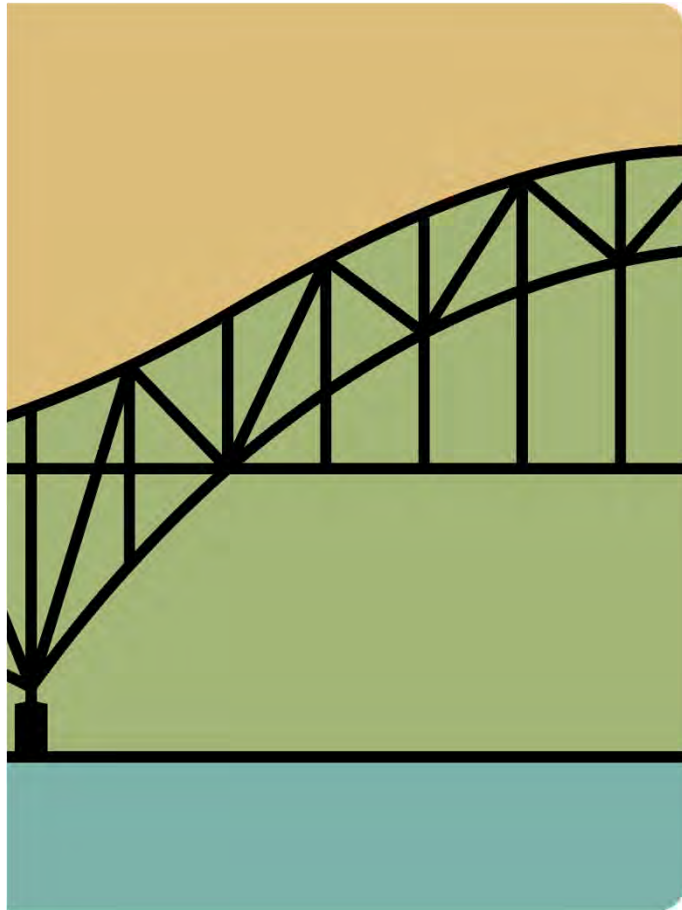
Element	High Speed, Two Lane SR 28	High Speed, Four Lane SR 28	Intermediate Speed, Three Lane SR 28
Continuous routes between East Wenatchee and Rock Island	Loop Trail Rock Island Road bike lanes & sidewalks	Loop Trail Rock Island Road bike lanes & sidewalks	Loop Trail SR 28 shared use paths
Level of traffic stress (LTS) for continuous routes	Loop Trail: Pedestrian (PLTS) 2, Bicycle (BLTS) 1 RIR sidewalks: PLTS 3 RIR bicycle lanes: BLTS 3	Loop Trail: PLTS 2, BLTS 1 RIR sidewalks: PLTS 3 RIR bicycle lanes: BLTS 3	Loop Trail: PLTS 2, BLTS 1 SR 28 paths: PLTS 2, BLTS 1
SR 28 crossing opportunities; control devices	Each roundabout (except at Boat Launch intersection); consider RRFB or PHB treatments at roundabouts or elsewhere	Each roundabout (except at Boat Launch intersection); consider PHB treatment at roundabouts or elsewhere	Each roundabout; consider RRFB or PHB treatments at roundabouts or elsewhere
LTS for SR 28 crossings	Roundabouts: LTS 1 or 2 Rectangular Rapid Flashing Beacons (RRFBs): LTS 2 Pedestrian Hybrid Beacons (PHBs): LTS 1	Roundabouts: LTS 2 PHBs: LTS 1	Roundabouts: LTS 1 or 2 RRFBs: LTS 2 PHBs: LTS 1

Corridor Comparisons – Additional

Element	High Speed, Two Lane SR 28	High Speed, Four Lane SR 28	Intermediate Speed, Three Lane SR 28
Environmental impacts	Potential filling of some of Putters Lake and Hammond Lake east of Rock Island to facilitate roadway widening	Potential filling of some of Putters Lake and Hammond Lake east of Rock Island to facilitate roadway widening	Potential filling of some of Putters Lake and Hammond Lake east of Rock Island to facilitate roadway widening
Property impacts	At corners of roundabout intersections (nominal) For frontage roads in some locations (nominal) For Rock Island Road connection (significant) For Rock Island Road widening (significant)	At corners of roundabout intersections (nominal) For Rock Island Road connection (significant) For Rock Island Road widening (significant)	At corners of roundabout intersections (nominal) For Rock Island Road widening (significant)
Development opportunities	Adjacent to new frontage roads parallel to SR 28	At existing driveway and intersection connections to SR 28	At existing driveway and intersection connections to SR 28
Transit connections and routing	Link Transit could shift to connected RIR Sidewalks provided on RIR provide first/last mile connection; score at PLTS 3	Link Transit could shift to connected RIR Sidewalks provided on RIR provide first/last mile connection; Score at PLTS 3	Route to be maintained via RIR and SR 28 Sidewalks provided on RIR provide first/last mile connection; Score at PLTS 3

Concept Comparison Discussion





Next Steps

- Today is our last Stakeholder Advisory Group Meeting for Phase 1
- Consultant will make changes as requested by CDTC, taking into account what we heard today.
 - Feel free to share general information with others, however recognize it's all DRAFT at this point, and subject to change.
- Phase 2:
 - Market Analysis (Leland Consulting)
 - Opinions of cost for 4 Lanes to Quincy
- Draft Report distributed after Phase 2 work is complete (2022)
 - SAG members will have opportunity to comment
- Presentation to CDTC Board

APPENDIX J

SR 28/281 Rock Island to I-90 Cost Estimating Assumptions Memorandum

MEMORANDUM

123 Ohme Garden Road, Suite 8, Wenatchee, WA 98801 | P 425.252.7700

To: Riley Shewak

From: Brent Powell, PE, PTOE

Date: June 27, 2022

Re: SR 28 Corridor Study, Phase 2 – Opinion of Cost Assumptions

INTRODUCTION

Perteet will develop a planning-level opinion of cost for the following locations/projects as part of the second phase of our SR 28 Corridor Study for Chelan-Douglas Transportation Council (CDTC) in partnership with Washington State Department of Transportation (WSDOT). This memorandum documents the assumptions we plan to use in developing these costs.

Main Corridors

- SR 28 from milepost (MP) 9.15 (Batterman Road) to MP 27.87 (western Quincy city limits)
- SR 281 from MP 0.00 (I-90 interchange) to MP 9.77 (southern Quincy city limits)

Projects within Quincy

- Included in SR 28 cost estimate:
 - Connection from city limits to existing five-lane section in Quincy urban area at 7th Street SW. No upgrades assumed east of 7th Street SW.
- Included in SR 281 cost estimate:
 - Connection to existing five-lane section at N Street SW and heading south (no roundabout or signal included as part of this connection).
 - Upgraded irrigation canal crossing south of N Street SW.

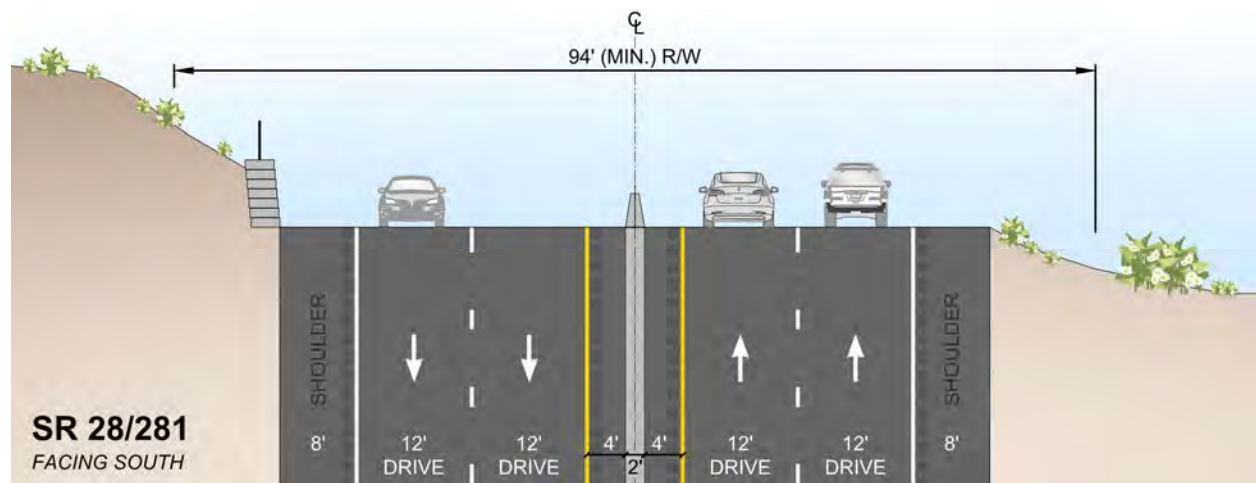


Figure 1. Typical Section for SR 28 and SR 281 (Conditions Beyond Shoulders Vary).

MEMORANDUM

Figure 1, copied from our Phase 1 documentation, illustrates the proposed typical section for both main corridors. Note that right-of-way (ROW) widths and matching conditions outside of the shoulders vary from this figure in some locations.

Our opinion of cost deliverables will separate costs by corridor and will include the projects within Quincy as noted above. The deliverables will not include any subdivision of costs by milepost range or otherwise pursuant to our scope of services.

COST ESTIMATING ASSUMPTIONS

Our estimating assumptions for SR 28 and SR 281 are listed in Table 1. Generally, we will apply the same assumptions to both corridors. We will list each project within Quincy as a lump sum line item that will include all costs for each project.

Table 1. Cost Estimating Assumptions for SR 28 and SR 281.

Parameter/Element	SR 28 Assumption	SR 281 Assumption	Notes
Right of Way			
Minimum ROW width	94 feet including 10 feet beyond edge of shoulder on each side	94 feet including 10 feet beyond edge of shoulder on each side	
ROW acquisition method(s)	Strip acquisition only	Strip acquisition only	Applies where existing ROW width is less than minimum
Temporary construction easement width	None	None	
Acquisition/Negotiation costs	Count of all parcels with strip acquisition plus count of any additional corner parcels at proposed roundabouts	Count of all parcels with strip acquisition plus count of any additional corner parcels at proposed roundabouts	
Pavement			
Total pavement width	74 feet	74 feet	Includes width of center barrier
Existing travel-lane pavement treatment	No treatment; no replacement or overlay	No treatment; no replacement or overlay	
Existing shoulder pavement treatment	Replace with full-depth travel-lane section	Replace with full-depth travel-lane section	
Full-depth travel-lane section	0.67 feet hot mix asphalt (HMA) over 0.75 crushed surfacing	0.67 feet HMA over 0.75 feet crushed surfacing	
New shoulder section	0.5 feet HMA over 0.75 feet crushed surfacing	0.5 feet HMA over 0.75 feet crushed surfacing	
Highway Geometry			
Centerline	Maintain existing	Maintain existing	
Widening method	Symmetrical	Symmetrical	
Profile	Maintain existing	Maintain existing	

MEMORANDUM

Parameter/Element	SR 28 Assumption	SR 281 Assumption	Notes
Superelevation	Maintain existing	Maintain existing	
Intersection Treatments			
Interchanges	None	New roundabout at MP 2.65 at SR 281 Spur; upgraded I-90/SR 281 interchange with four ramps and roundabout intersections	Intersection/interchange costs will be listed as lump sums, inclusive of all construction costs, including paving, illumination, landscaping, etc.
Local roadways	New roundabout at MP 22.31; roundabout widening to dual-lane roundabouts at MP 25.73 and 28.73		Intersection/interchange costs will be listed as lump sums, inclusive of all construction costs, including paving, illumination, landscaping, etc.
Other	Rebuild and lengthen railroad bridge at MP 22.06	None	
Roadside Treatments			
Side slopes	Drainage ditch foreslopes (at 4:1) and backslopes (at 3:1) per WSDOT Design Manual Exhibit 1239-5 "Trapezoidal Ditch" with 2-foot-wide ditch	Drainage ditch foreslopes (at 4:1) and backslopes (at 3:1) per WSDOT Design Manual Exhibit 1239-5 "Trapezoidal Ditch" with 2-foot-wide ditch	Perteet to use 1-foot contour data for corridor analysis with side slopes and ditches in CAD.
Retaining wall thresholds	Elevation difference between existing ground and edge of shoulder at or above 4 feet (cut or fill)	Elevation difference between existing ground and edge of shoulder at or above 4 feet (cut or fill)	Elevation difference measured at edge of shoulder position in cross section. Perteet to use 1-foot contour data for corridor analysis in CAD.
Retaining wall types	Short cut: gravity block Tall cut: soldier pile Short fill: MSE Tall fill: soldier pile	Short cut: gravity block Tall cut: soldier pile Short fill: MSE Tall fill: soldier pile	Short: cut/fill < 6 feet Tall: cut/fill ≥ 6 feet
Other			
Drainage	Ditches on both sides with 18-inch pipes below driveways and cross streets	Ditches on both sides with 18-inch pipes below driveways and cross streets	
Corridor illumination	None	None	
Curbs, gutters, and sidewalks	None	None	
Signing	\$10,000 per mile	\$10,000 per mile	
Culverts	Reconstruct at stream crossings	Reconstruct at stream crossings	Affected culverts based on streams shown in WSDOT GeoPortal using USGS National Map basemap

MEMORANDUM

Parameter/Element	SR 28 Assumption	SR 281 Assumption	Notes
Environmental permitting	Includes applicable local, state, and federal permits	Includes applicable local, state, and federal permits	Based on Perteet assessment to be completed during cost estimating
Percentage-Based Costs			
Temporary water pollution/erosion control	2%	2%	
Traffic control	10%	10%	
Construction surveying	2%	2%	
Mobilization	10%	10%	
Construction contingency	30%	30%	Reflects uncertainty in project scope at planning level
Preliminary engineering	15%	15%	Perteet to update percentage per judgement once full construction costs are estimated. WSDOT currently estimating 40% PE costs.
Preliminary engineering administration	5%	5%	Agency engineering/administrative time during PE phase; Perteet to update percentage per judgement once full construction costs are estimated
Construction engineering	15%	15%	Perteet to update percentage per judgement once full construction costs are estimated
Construction administration	5%	5%	Agency engineering/administrative time during CN phase; Perteet to update percentage per judgement once full construction costs are estimated
Cost Years			
Index (all phases)	2022	2022	
Preliminary engineering	2025	2025	
Right of way	2027	2027	
Construction	2029	2029	
Annual Inflation Rates			
Preliminary engineering	5%	5%	
Right of way	5%	5%	
Construction	10%	10%	Current best estimate for industry; higher than engineering and administrative cost increases
Construction administration	5%	5%	

APPENDIX K

SR 28/281 Rock Island to I-90 Opinions of Cost

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description: SR 28 Corridor Study	Client: Chelan-Douglas Transportation Council
Corridor Section: SR 28: Batterman Rd - Quincy	Date: Apr-22
Location: Douglas County, WA	Date of Cost Index: 2022
	Calculated By/Entered By: HTO/RO
	Checked By: KWW

SR 28 Phase 2

		ITEM	UNIT	ESTIMATED COST	UNIT QTY	COST
I. RIGHT OF WAY						
		RIGHT OF WAY	SF	\$8	421,300	\$3,370,400
		TEMPORARY CONSTRUCTION EASEMENTS	SF	\$2	-	\$0
		ADMINISTRATION (titles, appraisals, negotiations consultant, etc.)	EA	\$15,000	26	\$390,000
		RIGHT OF WAY TOTAL				\$3,760,400
		FUTURE ROW COST BASED ON INFLATION RATE	Inflation 5%	ROW Year 2027	Cost Index 2022	Future Cost \$4,800,000
II. CONSTRUCTION						
1		PREPARATION/GRADING/DRAINAGE				
	1.1	PREPARATION				
		CLEAR & GRUB, DEMO	ACRE	\$5,000	104	\$520,000
		REMOVING EXISTING PAVEMENT	SY	\$15	242,000	\$3,630,000
		REMOVAL STRUCTURES & OBSTRUCTIONS	LS	\$250,000	1	\$250,000
	1.2	EARTHWORK				
		ROADWAY EXCAVATION INCL. HAUL	CY	\$25	380,000	\$9,500,000
		STRUCTURE EX. CL. A INCL. HAUL	CY	\$45	4,800	\$216,000
		BORROW INCL. HAUL	TON	\$35	78,700	\$2,754,500
	1.3	STORMWATER MITIGATION				
		DETENTION AND TREATMENT	SF	\$10	4,530,240	\$45,302,400
	1.4	STORM SEWER				
		SCHEDULE A STORM SEWER PIPE 18 IN. DIAM.	LF	\$85	8,460	\$719,100
2		STRUCTURE				
		CONCRETE BRIDGES *	SF	\$300	39,800	\$11,940,000
		CONCRETE BRIDGE REMOVAL *	SF	\$35	24,700	\$864,500
		RETAINING WALLS: CUT, GRAVITY BLOCK	SF	\$75	34,000	\$2,550,000
		RETAINING WALLS: CUT, SOLDIER PILE	SF	\$150	118,800	\$17,820,000
		RETAINING WALLS: FILL, MSE	SF	\$75	126,700	\$9,502,500
		RETAINING WALLS: FILL, SOLDIER PILE	SF	\$150	137,700	\$20,655,000
		CULVERT	LF	\$1,750	1,400	\$2,450,000
		CULVERT REMOVAL	LF	\$200	900	\$180,000
3		SURFACING				
		HOT MIX ASPHALT	TON	\$80	238,400	\$19,072,000
		CRUSHED SURFACING	TON	\$35	265,400	\$9,289,000
4		ROADSIDE DEVELOPMENT				
		TEMP. WATER POLLUTION & EROSION CONTROL (2%)	LS	\$3,901,000	1	\$3,901,000
		SEEDING, MULCHING & FERTILIZING	ACRE	\$3,000	50	\$150,000

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description: SR 28 Corridor Study	Client: Chelan-Douglas Transportation Council
Corridor Section: SR 28: Batterman Rd - Quincy	Date: Apr-22
Location: Douglas County, WA	Date of Cost Index: 2022
	Calculated By/Entered By: HTO/RO
	Checked By: KWW

SR 28 Phase 2

	ITEM	UNIT	ESTIMATED UNIT		COST
			COST	QTY	
5	TRAFFIC				
	TRAFFIC BARRIER	LF	\$200	98,900	\$19,780,000
	GUARDRAIL	LF	\$250	43,700	\$10,925,000
	CHAIN LINK FENCE	LF	\$20	14,100	\$282,000
	ILLUMINATION	LS	\$0	1	\$0
	SIGNING	LS	\$188,000	1	\$188,000
	STRIPING	LF	\$2	622,800	\$1,245,600
	CURBS	LF	\$45	-	\$0
	CURB RAMP	EA	\$8,000	-	\$0
	SIDEWALKS	SY	\$65	-	\$0
	TRAFFIC CONTROL (10%)	LS	\$19,505,000	1	\$19,505,000
6	OTHER ITEMS				
	SURVEYING (2%)	LS	\$3,901,000	1	\$3,901,000
	NEW ROUNDABOUT AT MP 22.31	EST	\$1,002,000	1	\$1,002,000
	ROUNDABOUT WIDENING TO DUAL-LANE AT MP 25.73	EST	\$426,000	1	\$426,000
	ROUNDABOUT WIDENING TO DUAL-LANE AT MP 28.73	EST	\$426,000	1	\$426,000
	CONNECTION FROM CITY LIMITS TO FIVE-LANE SECTION	EST	\$3,402,000	1	\$3,402,000
	UTILITY RELOCATIONS	EST	\$0	1	\$0
7	SUBTOTAL (ITEMS 1 THRU 6)				\$222,348,600
8	MOBILIZATION (10%)				
	10% OF ITEM 7	EST	\$22,234,900	1	\$22,234,900
9	CONSTRUCTION SUBTOTAL (ITEMS 7 & 8)				\$244,583,500
10	SALES TAX				
11	AGREEMENTS (Utilities, WSP, etc.)	EST	\$0	1	\$0
12	SUBTOTAL (ITEMS 9 THRU 11)				\$244,583,500
13	CONTINGENCY (30% OF ITEM 12)	EST	\$73,375,100	1	\$73,375,100
14	CONSTRUCTION SUBTOTAL (ITEMS 12 & 13)				\$317,958,600
15	FUTURE CN COST BASED ON INFLATION RATE	Inflation	Const. Year	Cost Index	Future Cost
		10%	2029	2022	\$619,612,000
16	CONSTRUCTION ADMINISTRATION				
	CONSTRUCTION ENGINEERING (15% OF ITEM 14)	EST	\$47,693,800	1	\$47,693,800
	CITY ENGINEERING & ADMINISTRATION (5% OF ITEM 14)	EST	\$15,898,000	1	\$15,898,000
17	FUTURE CN ADMIN COST BASED ON INFLATION RATE	Inflation	Const. Year	Cost Index	Future Cost
		5%	2029	2022	\$89,481,000

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description: SR 28 Corridor Study	Client: Chelan-Douglas Transportation Council
Corridor Section: SR 28: Batterman Rd - Quincy	Date: Apr-22
Location: Douglas County, WA	Date of Cost Index: 2022
	Calculated By/Entered By: HTO/RO
	Checked By: KWW

SR 28 Phase 2

III.	ITEM	UNIT	ESTIMATED UNIT		COST
			COST	QTY	
	PRELIMINARY WORK				
	PRELIMINARY ENGINEERING (15.0% OF ITEM 14)	EST	\$47,693,800	1	\$47,693,800
	CITY ENGINEERING & ADMINISTRATION (5% OF ITEM 14)	EST	\$15,898,000	1	\$15,898,000
	ENVIRONMENTAL PERMITS/DOCUMENTS	EST	\$130,000	1	\$130,000
	FUTURE PE COST BASED ON INFLATION RATE	Inflation	Design Year	Cost Index	Future Cost
		5%	2025	2022	\$73,766,000
IV.	TOTAL ESTIMATED COST (ITEMS I, 15, 17, & III)				
	SUB-TOTAL PROJECT COST (BASED ON INFLATION RATE)				\$787,659,000

TOTAL PROJECT COST RANGE (BASED ON INFLATION RATE)
\$788,000,000

The above opinion of cost is a planning level estimate only. It is based on best available information and scope at the time, not on the results of a detailed engineering study, and is supplied as a budgeting guide only. Perteet Inc. does not guarantee or warrant the accuracy of this planning level estimate.

* Bridge installation and removal items include rebuild of the existing railroad structure at MP 22.06.

** Separate projects in the OTHER ITEMS grouping include all construction costs plus temp. water pollution/TESC (2%), traffic control (10%), and surveying (2%).

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description:	SR 28 Corridor Study	Client:	Chelan-Douglas Transportation Council
Corridor Section:	SR 281: MP 0.00 (I-90 interchange) to MP 9.77 (southern Quinicy limits)	Date:	Apr-22
Location:	Douglas County, WA	Date of Cost Index:	2022
		Calculated By/Entered By:	RO
		Checked By:	HTO/BMP

SR 281

		ITEM	UNIT	ESTIMATED COST	UNIT QTY	COST
I. RIGHT OF WAY						
		RIGHT OF WAY	SF	\$8	15,200	\$121,600
		TEMPORARY CONSTRUCTION EASEMENTS	SF	\$2	-	\$0
		ADMINISTRATION (titles, appraisals, negotiations consultant, etc.)	EA	\$15,000	3	\$45,000
		RIGHT OF WAY TOTAL				\$166,600
		FUTURE ROW COST BASED ON INFLATION RATE	Inflation 5%	ROW Year 2027	Cost Index 2022	Future Cost \$213,000
II. CONSTRUCTION						
1		PREPARATION/GRADING/DRAINAGE				
	1.1	PREPARATION				
		CLEAR & GRUB, DEMO	ACRE	\$5,000	68	\$340,000
		REMOVING EXISTING PAVEMENT	SY	\$15	92,000	\$1,380,000
		REMOVAL STRUCTURES & OBSTRUCTIONS	LS	\$250,000	1	\$250,000
	1.2	EARTHWORK				
		ROADWAY EXCAVATION INCL. HAUL	CY	\$25	230,000	\$5,750,000
		STRUCTURE EX. CL. A INCL. HAUL	CY	\$45	100	\$4,500
		BORROW INCL. HAUL	TON	\$35	6,600	\$231,000
	1.3	STORMWATER MITIGATION				
		DETENTION AND TREATMENT	SF	\$10	2,613,600	\$26,136,000
	1.4	STORM SEWER				
		SCHEDULE A STORM SEWER PIPE 18 IN. DIAM.	LF	\$85	3,900	\$331,500
2		STRUCTURE				
		CONCRETE BRIDGES	SF	\$300	23,000	\$6,900,000
		CONCRETE BRIDGE REMOVAL	SF	\$35	12,400	\$434,000
		RETAINING WALLS: CUT, GRAVITY BLOCK	SF	\$75	200	\$15,000
		RETAINING WALLS: CUT, SOLDIER PILE	SF	\$150	0	\$0
		RETAINING WALLS: FILL, MSE	SF	\$75	0	\$0
		RETAINING WALLS: FILL, SOLDIER PILE	SF	\$150	0	\$0
		CULVERT	LF	\$1,750	600	\$1,050,000
		CULVERT REMOVAL	LF	\$200	-	\$0
3		SURFACING				
		HOT MIX ASPHALT	TON	\$80	138,200	\$11,056,000
		CRUSHED SURFACING	TON	\$35	152,500	\$5,337,500
4		ROADSIDE DEVELOPMENT				
		TEMP. WATER POLLUTION & EROSION CONTROL (2%)	LS	\$1,406,000	1	\$1,406,000
		SEEDING, MULCHING & FERTILIZING	ACRE	\$3,000	26	\$78,300
5		TRAFFIC				
		TRAFFIC BARRIER	LF	\$200	51,600	\$10,320,000
		GUARDRAIL	LF	\$250	50	\$12,500
		CHAIN LINK FENCE	LF	\$20	50	\$1,000
		ILLUMINATION	LS	\$0	1	\$0
		SIGNING	LS	\$98,000	1	\$98,000
		STRIPING	LF	\$2	325,000	\$650,000
		CURBS	LF	\$45	-	\$0
		CURB RAMP	EA	\$8,000	-	\$0

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description: SR 28 Corridor Study	Client: Chelan-Douglas Transportation Council
Corridor Section: SR 281: MP 0.00 (I-90 interchange) to MP 9.77 (southern Quinicy limits)	Date: Apr-22
Location: Douglas County, WA	Date of Cost Index: 2022
	Calculated By/Entered By: RO
	Checked By: HTO/BMP

SR 281

		UNIT	ESTIMATED COST	UNIT	QTY	COST
	SIDEWALKS	SY	\$65		-	\$0
	TRAFFIC CONTROL (10%)	LS	\$7,030,000		1	\$7,030,000
6	OTHER ITEMS					
	SURVEYING (2%)	LS	\$1,406,000		1	\$1,406,000
	CONNECTION TO EXISTING FIVE-LANE SECTION * **	EST	\$10,635,000		1	\$10,635,000
	NEW ROUNDABOUT AT MP 2.65 AT SR281 SPUR *	EST	\$866,000		1	\$866,000
	UPGRADED I-90/SR 281 INTERCHANGE * **	EST	\$6,780,000		1	\$6,780,000
	UTILITY RELOCATIONS	EST	\$0		1	\$0
7	SUBTOTAL (ITEMS 1 THRU 6)					\$98,498,300
8	MOBILIZATION (10%)					
	10% OF ITEM 7	EST	\$9,849,900		1	\$9,849,900
9	CONSTRUCTION SUBTOTAL (ITEMS 7 & 8)					\$108,348,200
10	SALES TAX					
11	AGREEMENTS (Utilities, WSP, etc.)	EST	\$0		1	\$0
12	SUBTOTAL (ITEMS 9 THRU 11)					\$108,348,200
13	CONTINGENCY (30% OF ITEM 12)	EST	\$32,504,500		1	\$32,504,500
14	CONSTRUCTION SUBTOTAL (ITEMS 12 & 13)					\$140,852,700
15	FUTURE CN COST BASED ON INFLATION RATE	Inflation	Const. Year	Cost Index		Future Cost
		10%	2029	2022		\$274,483,000
16	CONSTRUCTION ADMINISTRATION					
	CONSTRUCTION ENGINEERING (15% OF ITEM 14)	EST	\$21,128,000		1	\$21,128,000
	CITY ENGINEERING & ADMINISTRATION (5% OF ITEM 14)	EST	\$7,042,700		1	\$7,042,700
17	FUTURE CN ADMIN COST BASED ON INFLATION RATE	Inflation	Const. Year	Cost Index		Future Cost
		5%	2029	2022		\$39,640,000
III.	PRELIMINARY WORK					
	PRELIMINARY ENGINEERING (15.0% OF ITEM 14)	EST	\$21,128,000		1	\$21,128,000
	CITY ENGINEERING & ADMINISTRATION (5% OF ITEM 14)	EST	\$7,042,700		1	\$7,042,700
	ENVIRONMENTAL PERMITS/DOCUMENTS	EST	\$130,000		1	\$130,000
	FUTURE PE COST BASED ON INFLATION RATE	Inflation	Design Year	Cost Index		Future Cost
		5%	2025	2022		\$32,762,000
IV.	TOTAL ESTIMATED COST (ITEMS I, 15, 17, & III)					
	SUB-TOTAL PROJECT COST (BASED ON INFLATION RATE)					\$347,098,000
TOTAL PROJECT COST RANGE (BASED ON INFLATION RATE)						\$348,000,000

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description: SR 28 Corridor Study	Client: Chelan-Douglas Transportation Council
Corridor Section: SR 281: MP 0.00 (I-90 interchange) to MP 9.77 (southern Qunicy limits)	Date: Apr-22
Location: Douglas County, WA	Date of Cost Index: 2022
	Calculated By/Entered By: RO
	Checked By: HTO/BMP

SR 281

ITEM	UNIT	ESTIMATED UNIT		QTY	COST
		COST			

The above opinion of cost is a planning level estimate only. It is based on best available information and scope at the time, not on the results of a detailed engineering study, and is supplied as a budgeting guide only. Perteet Inc. does not guarantee or warrant the accuracy of this planning level estimate.

- * Separate projects in the OTHER ITEMS grouping include all construction costs plus temp. water pollution/TESC (2%), traffic control (10%), and surveying (2%).
- ** Five-lane connection project within Qunicy includes cost to widen crossing of existing irrigation canal.
- *** Interchange costs do not include any bridge structures, only four new interchange ramps and two roundabout nodes.

APPENDIX L

Market Analysis

SR 28 Corridor Study

Economic Analysis

Date August 16, 2022
To CDTC
From Sam Brookham, Leland Consulting Group
Chris Zahas, Leland Consulting Group

Introduction

The Chelan Douglas Transportation Council (CDTC), in coordination with WSDOT, Rock Island, East Wenatchee, Douglas County, and other local stakeholders, is studying the SR 28 Corridor from East Wenatchee to Batterman Road near Rock Island. The Study partners are looking at several long-term options for the corridor to understand the tradeoffs among the following transportation priorities:

- Maintain high-quality traffic operations,
- Improve and maintain the safety,
- Improve accessibility to local roads, and
- Improve pedestrian and bicycle access.

Leland Consulting Group (LCG) was engaged to help the project team and CDTC understand how regional growth and development will impact the specific corridor study area. The focus of LCG’s economic analysis is the Wenatchee Valley urbanized area and areas within greater Quincy and Grant County. The memorandum:

- Provides an overview of the jobs to housing balance between Grant County and Chelan-Douglas counties to characterize interregional commute patterns,
- Identifies future land use opportunities that may respond to potential transportation changes and other infrastructure investments,
- Describes the growth opportunities within the corridor and region more broadly, and
- Provides a forecast of household and employment growth for the corridor and region through 2045.

This memorandum is organized as follows.

Introduction.....	1
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Development Forecast.....	2
National Real Estate Context.....	7
Regional Context.....	9
Market Assessment	22
Land Capacity Analysis.....	42
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Executive Summary

This analysis evaluates past and current development and growth trends to understand patterns of development and to inform an analysis of future development potential. This growth projection is then compared to a land capacity analysis to determine whether there is an adequate supply of land for each land use to meet the market potential.

Some of the key findings from this analysis are:

- There is significant growth across all land uses anticipated throughout the region between 2020 and 2045.
- Almost 10,000 new housing units are expected to be built in the region between 2020 and 2045. Almost 11,000 new jobs are expected during that same time frame.
- The unincorporated urban growth areas (UGAs) have significant growth potential for all land uses and could potentially support about 7,000 new housing units, 4.3 million square feet of commercial development, and 10.5 million square feet of industrial development.
- There is so much demand for industrial development today that there is not currently enough vacant land in incorporated cities to accommodate all that growth, however there is likely a significant excess of commercially zoned land currently.
- As a result of the booming data center industry, the greater Quincy area is expected to capture a disproportionate share of industrial development growth.
- Job growth is expected to outpace household construction as currently planned and zoned in the Quincy urban growth area, creating a jobs-housing imbalance. Long-distance commute trips on state highways to the Wenatchee Valley and other communities in Grant County will increase if housing isn't provided at a rate necessary and appropriate to meet job growth in the Quincy urban growth area.
- Most residential growth is expected to occur within existing cities, and there is adequate land capacity to meet that growth except for the East Wenatchee UGA, where most growth is expected north and east of the incorporated city.
- Generally, past patterns and trends are expected to continue, with accelerated growth in industrial development.

Development Forecast

Forecast Inputs

The methodology includes:

- Documenting household and employment projections from a variety of sources.
- Analyzing historical household, employment, and real estate trends to ensure compatibility with existing projections.
- Estimating regional levels of demand for a variety of land use sectors, including industrial, commercial (retail and office), and residential.
- Identifying prominent projects in the development pipeline and estimating job growth in each relevant TAZ.
- Calculating subarea "adjustment factors" based on overall market demand, development trends, and land availability and applying that factor to the other TAZ projections.

Existing Small Area Projections

As summarized in later pages, the existing TAZ data for the Wenatchee MSA includes household growth projections of 1.16 percent and employment growth at 1.04 percent, adding approximately 9,600 housing units and 11,400 jobs in total, respectively. **The vast majority of projected growth is anticipated within incorporated city limits:** Wenatchee is expected to account for 60 percent of the job growth and 41 percent of the household growth, and East Wenatchee is

expected to account for 28 percent of the job growth and 29 percent of the household growth. The rest of the growth is expected in the unincorporated county (including Malaga) and Rock Island and is primarily residential rather than employment.

Table 1. Area Capture Rate of Existing Projections

Location	Projected % of Total Employment Change	Projected % of Total Household Change
Wenatchee	60%	41%
East Wenatchee	28%	29%
Rock Island	6%	9%
Chelan County	1%	3%
Douglas County	1%	8%
Study Area	2%	8%
Malaga	2%	2%

Source: CDTC

These projections are relatively consistent with regional projections by the Washington Employment Security Department (ESD) and the Washington Office of Financial Management (OFM).

Historical Trends

The past 10 to 20 years have seen jobs increase by 2.06 percent annually in the market area and the number of households by 1.10 percent annually. Northwest Grant County added jobs and households fastest at 3.40 percent and 1.56 percent, respectively. Southwest Douglas County grew second fastest at 2.37 percent and 1.43 percent, and Southeast Chelan County grew the slowest at 1.71 percent and 0.82 percent. Despite the slower rate of growth, Southeast Chelan County remains the dominant area with the majority of jobs and households.

From a real estate perspective, there has been a major upward trend in residential development, with multifamily construction now trending well over 100,000 square feet of development per year and upwards of 300 single-family homes getting built per year. Industrial real estate has generally averaged around 60,000 square feet of development per year, but this is expected to drastically increase as planned industrial projects come online in the next few years. Retail and office, on the other hand, are seeing stagnating trends, with very little development.

Given the long-term nature of these trends and the strength of the industrial and residential markets, LCG assumes a continuation into the future, with significant industrial employment and household growth, especially in Douglas and Grant counties.

Development Project Pipeline

Projects in Douglas and Chelan counties were manually factored into the household and job projections for each TAZ they are located (if deemed to be likely to develop within the planning horizon). These projects, which are either industrial or residential in nature, have been identified in earlier pages of this report.

Proposed projects in Douglas and Chelan counties total almost 2,500 housing units (25 percent of the current projected housing growth for the area) and approximately 2,900 jobs (more than one-third of total employment growth currently projected). An additional 3,250 jobs may be generated by the proposed developments in Quincy and 800 housing units are currently proposed.

The project pipeline includes projects that were built in 2020, 2021, or 2022, as well as proposed projects that will be built through 2025 (and beyond). This five-year increment is one-fifth of the 25-year planning horizon (2045). As such,

the projects should, in theory, total at least 20 percent of the existing projections. At present, total proposed housing and employment projects account for approximately 20 and 24 percent of the projected totals, respectively, with data centers and fruit packing facilities accounting for most of the jobs. Certain areas account for a much higher proportion of existing projected totals. These areas include Pangborn and the northern unincorporated UGA area of East Wenatchee for employment, and East Wenatchee, the unincorporated section of the SR 28 corridor, and several areas in and around Wenatchee (including downtown and the northern unincorporated UGA) for housing.

Land Capacity

LCG conducted a high-level land capacity analysis based on existing uses, zoning, and location for the three-county subareas of Chelan, Douglas, and Grant.

Based on the vacant land within existing city limits, there is enough land to support about 6,360 new housing units, 3.6 million square feet of commercial space, and 3.5 million square feet of industrial space. **The unincorporated UGA areas have significant growth potential for all land uses** and could potentially support about 7,000 new housing units, 4.3 million square feet of commercial development, and 10.5 million square feet of industrial.

There is 5.3 million square feet of industrial development proposed in the market area (both city and unincorporated UGA land). This exceeds LCG's estimate of available vacant industrial land within city limits. As unincorporated UGA land continues to develop with industrial uses, additional industrial land will need to be found, either through the identification of expansion areas or through rezoning other land for industrial uses. **Currently, there is likely a significant excess of commercially zoned land.**

Market-Based Forecast Summary

The following table shows household and employment projections by TAZ groups in Douglas and Chelan Counties based on the known project pipeline and LCG's market-based analysis of opportunities and trends. The development forecast for Northwest Grant County (including Quincy) is only provided in Table 3 at the regional level due to the lack of TAZ shapefiles for the area. **LCG projects significant job growth in Northwest Grant County, largely driven by the continuation of industrial construction led by the data center sector.** Residential construction is also likely to continue but will soon face land constraints as developable land within both the city limits and the unincorporated UGA is developed. **This jobs/housing imbalance will need to be met with housing growth in communities in Grant, Chelan, and Douglas counties.**

A full summary of each county subregion is provided below, which is followed by a map showing the groupings. The full TAZ table is provided as an appendix to this memorandum.

Table 2. Douglas and Chelan County Projections

District	Total Jobs 2045	Total Housing 2045	Job Growth 2020-2045	Housing Growth 2020-2045
Sunnyslope	2,268	2,458	278	711
Olds Station	6,805	7	1,499	0
North Wenatchee Avenue Corridor	3,290	65	805	1
North Wenatchee	1,950	4,751	141	1,016
Wenatchee Riverfront	3,148	1,532	929	1,367
Central Wenatchee Commercial Corridor	3,735	696	411	13
Downtown Wenatchee	4,944	692	351	256
Central Wenatchee	2,105	5,839	176	488
South Wenatchee/Wenatchee Heights	5,162	4,893	701	635
Malaga	1,631	1,026	601	160
Baker Flats	1,293	102	670	0
East Wenatchee - North	1,538	2,966	874	973
Fancher Heights/County Club	245	1,768	0	261
East Wenatchee - Central	2,359	4,986	492	631
Downtown East Wenatchee	4,099	403	472	7
East Wenatchee - South	713	4,660	101	2,682
Rock Island Rd Urban Corridor	472	569	66	75
Pangborn Industrial Area	2,465	56	1,961	9
Greater Rock Island/Batterman Corridor	1,084	1,423	452	696
Total (Excl. Grant County)	49,308	38,891	10,982	9,980

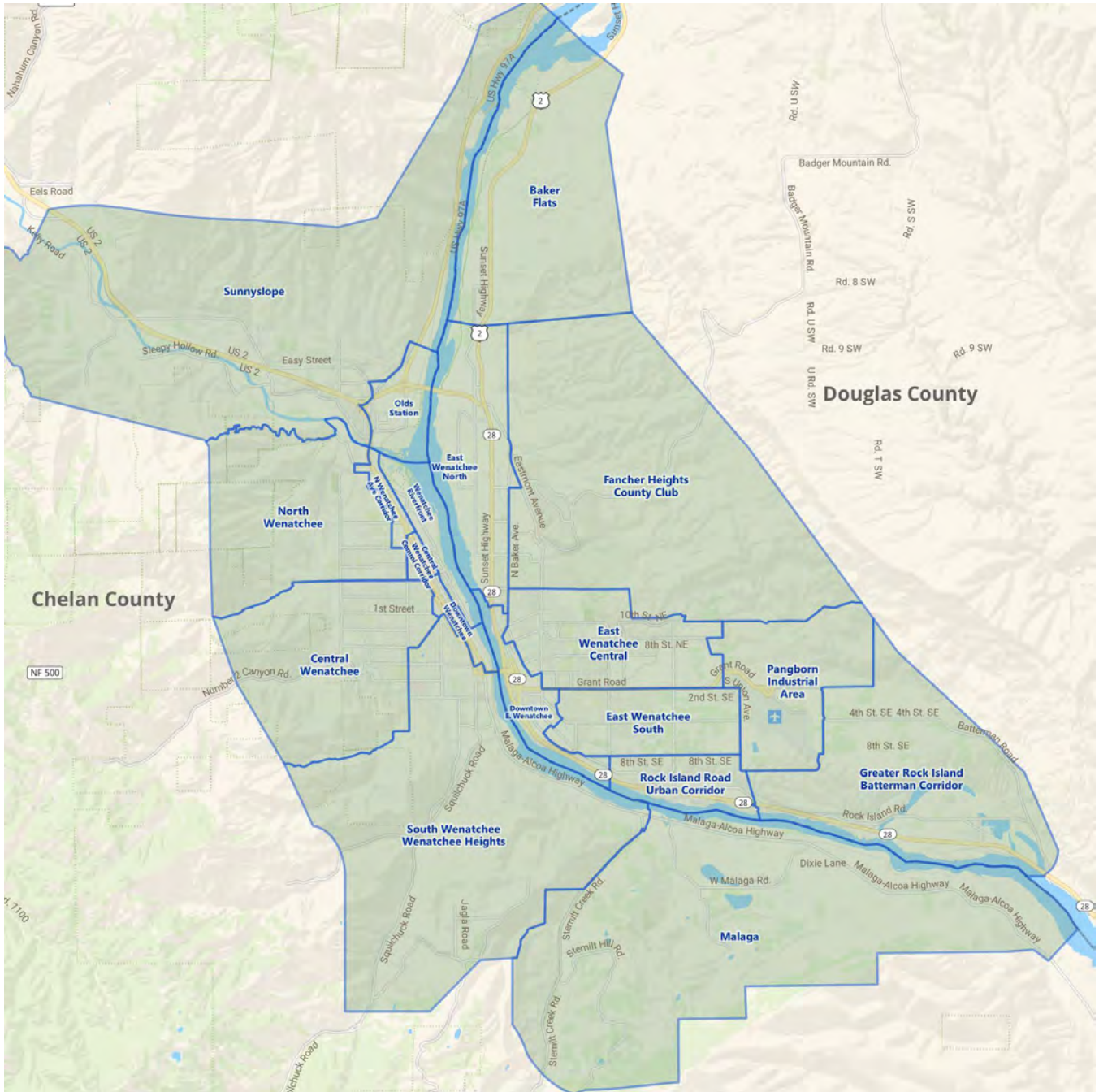
Source: Leland Consulting Group

Table 3. Forecast Summary

Location	Total Jobs	Total Hsg. Units	New Jobs	New Hsg. Units	Annual Growth	Annual Growth	Annual % Growth	Annual % Growth
	2020	2020	2045	2045	Jobs	Hsg. Units	Jobs	Hsg. Units
SW Douglas	9,180	11,599	5,118	5,378	205	215	1.8%	1.5%
SE Chelan	29,146	17,312	5,864	4,602	235	184	0.7%	0.9%
NW Grant	3,900	3,100	3,200	1,700	128	68	2.4%	1.8%
Total	42,226	32,011	14,182	11,680	567	467	1.2%	1.3%

Source: Leland Consulting Group

Figure 1. Douglas and Chelan County Forecast Districts



Source: Leland Consulting Group

National Real Estate Context

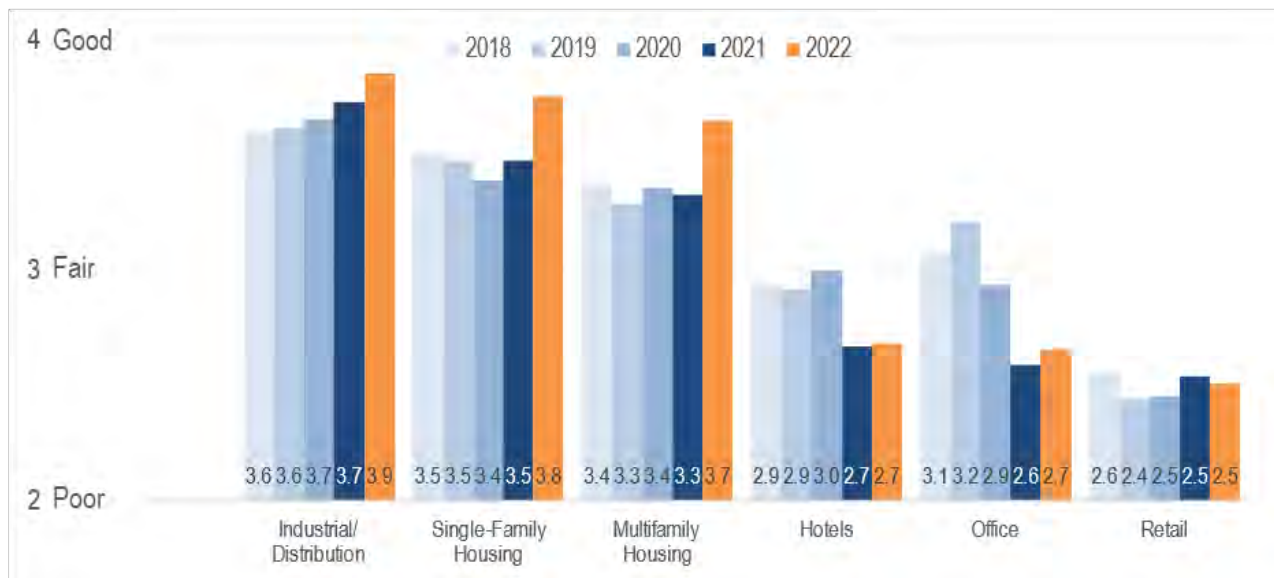
The real estate market is cyclical and typically follows a 20-year timeline. Currently, residential and industrial sectors are strong while commercial market sectors are in recovery mode. This is important to acknowledge because institutional investments and other development patterns tend to align with macroeconomic trends at the national level, which means the residential and industrial real estate sectors will be more likely to attract investment in the future than other real estate sectors. This section provides a high-level overview of these macro-dynamics that will continue to impact real estate and employment trends in the Greater Wenatchee Area.

The Urban Land Institute (ULI) releases an annual report called *Emerging Trends* which highlights real estate trends, prospects, and considerations at the national level and across every major market in the country. The information contained in the report is based on extensive market research and comprehensive surveys of real estate professionals throughout the country.

ULI offers a range of insights into commercial and industrial real estate from the perspective of both developers and investors. For the past five years, ULI has identified the industrial sector as the top-performing sector. This has only intensified since the beginning of the COVID-19 pandemic with the growth of e-commerce, which amplified the need for resilient supply chains and modern stock, which, in turn, has propelled the demand for logistics real estate. According to ULI, demand for industrial space has been deep and diverse across a range of industries. Robust demand, acute scarcity of supply, and rising replacement costs have accelerated rents across the board, reaching historic double digits in many markets, while vacancy rates have fallen to record lows.

The following chart shows development prospects for the six primary real estate classes and how these prospects have changed over the past five years. Industrial and distribution are the only real estate classes whose prospects have increased each year since 2018 while also maintaining the ascendancy relative to other development types, reflecting the strength of the market and the fact that most industrial users remained open throughout the pandemic (as there is no virtual substitute for physical product creation and fulfillment).

Figure 2. Development Prospects by Development Type



Source: ULI

ULI also offers insights into investment prospects for various subsectors. The chart at right shows prospects for 2020 (pre-pandemic) and 2022. Fulfillment again tops the list as ecommerce continues to grow, with warehousing close behind for similar reasons. Residential developments also rank highly.

It is important to note here that while Emerging Trends survey respondents generally agree that industrial is a top investment prospect, there is a significant proportion of respondents who feel that warehouse and fulfillment are overpriced compared with other industrial property types, suggesting that the market is still determining the appropriate risk compensation for these sectors. As more investment is made in these subsectors, it will become increasingly important for developers to be selective on location to both avoid the risk posed by the potential oversupply of new space and achieve a positive return on investment.

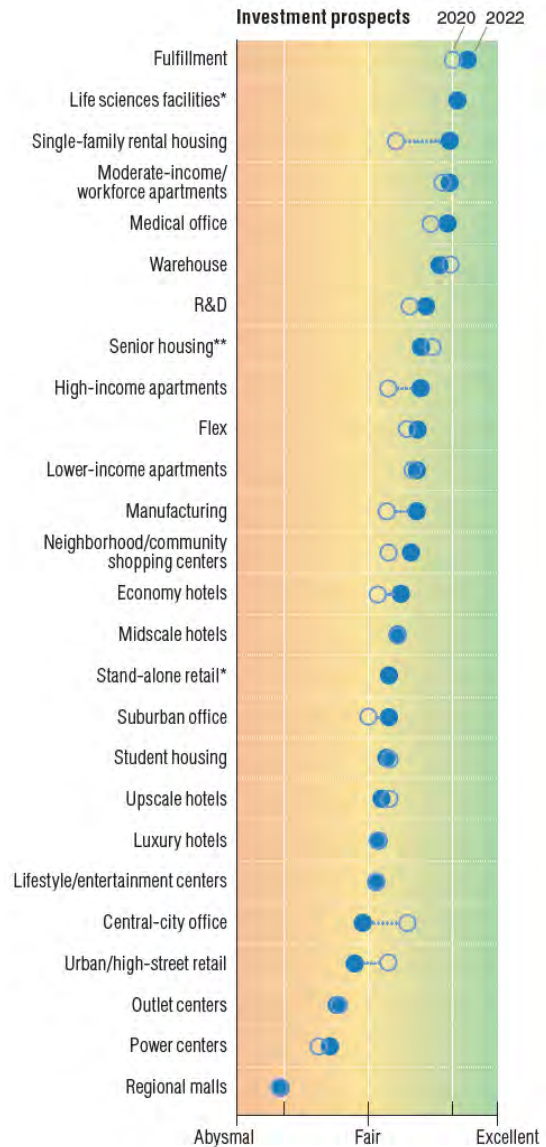
Employment Outlook

According to the U.S. Bureau of Labor Statistics, total U.S. employment is projected to grow from 153.5 million to 165.4 million over the 2020–30 decade, an increase of 11.9 million jobs. This increase reflects an annual growth rate of 0.7 percent, which is higher than recent projections cycles and accounts for recovery from low base-year employment for 2020 due to the COVID-19 pandemic and its associated recession.

For industrial sectors, including manufacturing, transportation, and warehousing, the existing numbers and projections are mixed. While the manufacturing sector as a whole is projected to have some recovery-driven employment growth, it also contains 11 of the 20 industries projected to have the most rapid employment declines and annual manufacturing employment growth is just 0.15%. Factors contributing to the loss of manufacturing jobs include continued global competition and the adoption of productivity-enhancing technologies, such as robotics. Conversely, occupations related to transportation and warehousing are projected to grow by 1.10% annually over the next year, largely due to the trends outlined in the previous section.

As ecommerce continues to drive demand for last-mile facilities and fulfillment, there appears to be no decline in the growth of warehousing and transportation jobs. Conversely, the events of 2020 and 2021 have fueled stronger automation and other cost-saving actions from employers, likely resulting in heightened productivity and fewer workers. Finally, the accelerated digital transformation of both business and consumer activities makes it easier to eliminate routine jobs. Long-term local economic opportunities and trends in the region will generally align with what is happening across the nation. For example, the increasing automation of the manufacturing sector will impact job creation and densities.

Figure 3. Prospects for Commercial Subsectors in 2020 (Pre-Pandemic) and 2022



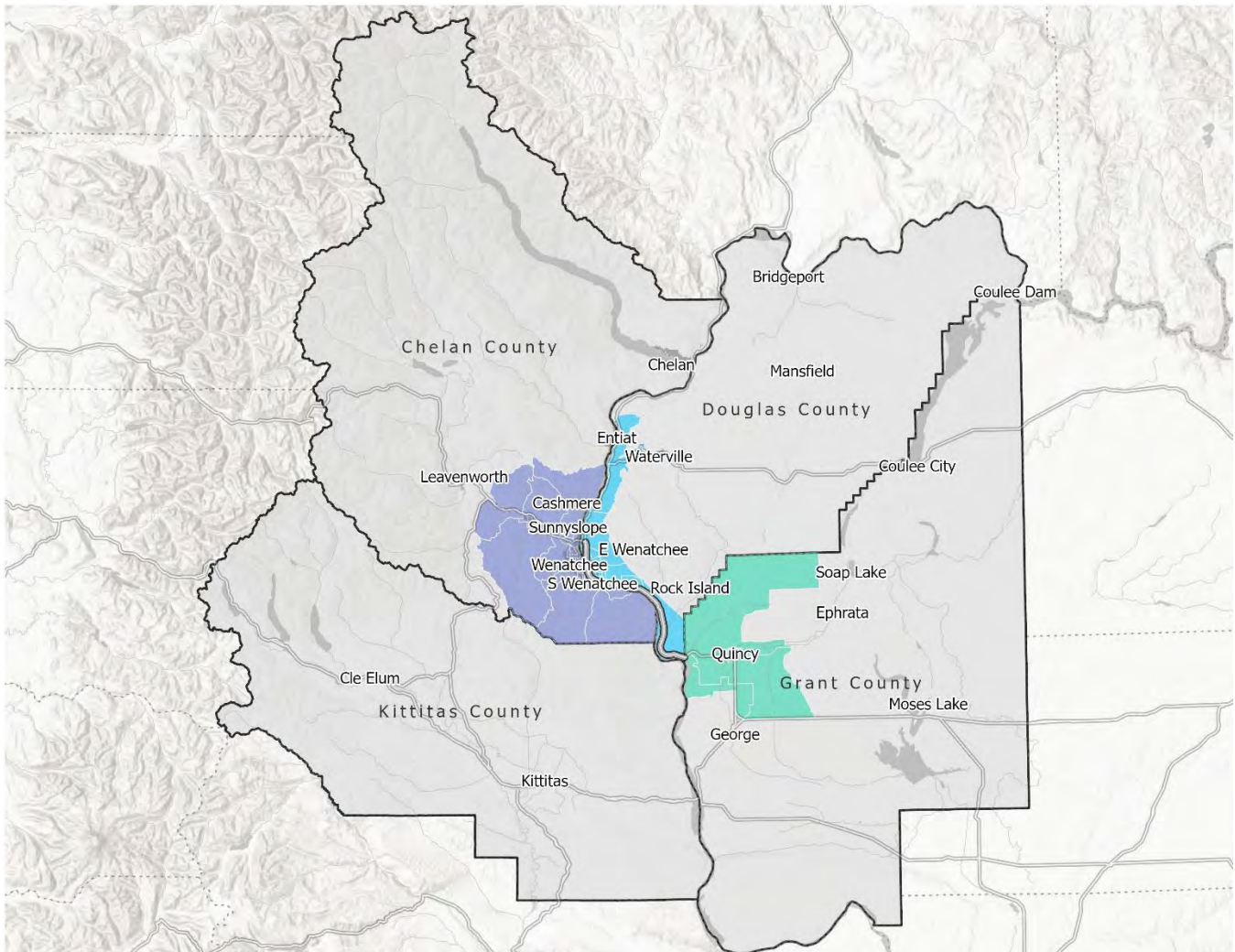
Source: ULI Emerging Trends 2022

Regional Context

This section provides an overview of existing conditions and regional projections in the Wenatchee Valley and the surrounding region. This serves as an important context for LCG's economic analysis and development forecast that is presented in later pages.

The SR 28 corridor and the three-county area are shown below. Also shown is LCG's area of analytical focus, also known hereafter as the "market area."

Figure 4. Study Area Overview



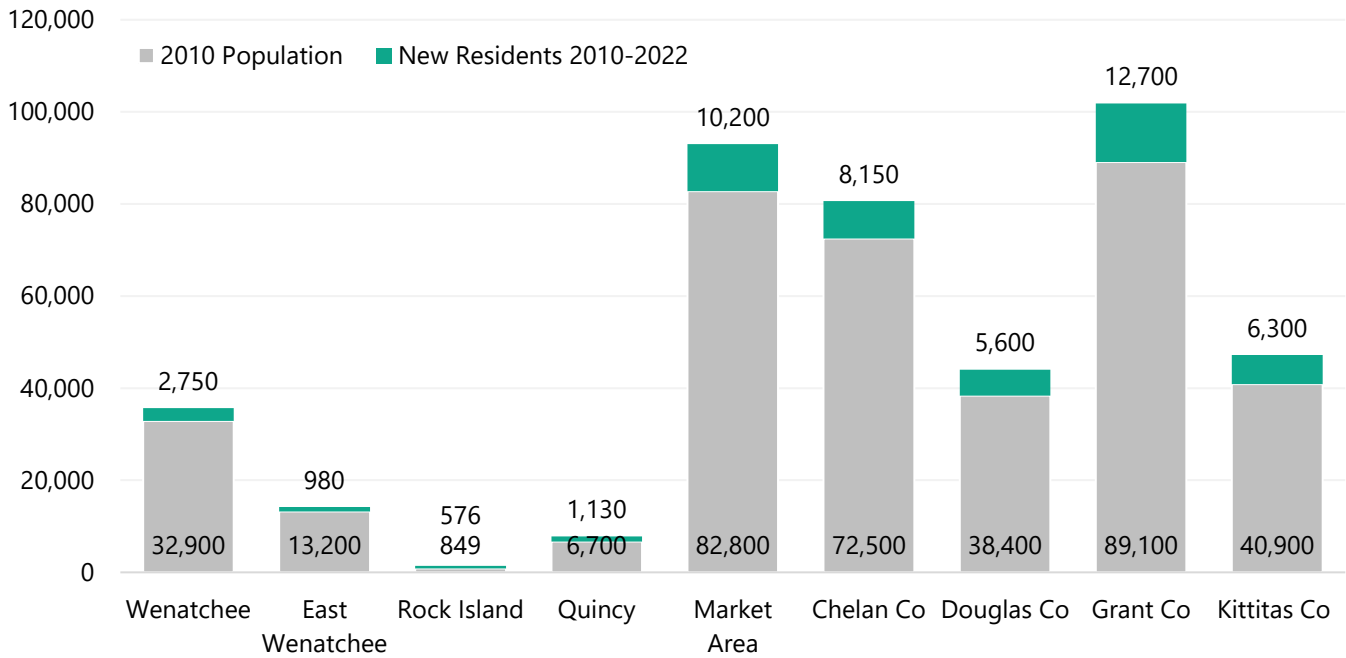
Source: Leland Consulting Group

Population Overview

The data in the following charts correspond to the areas in the map above. The market area population added approximately 10,200 people between 2010 and 2022, an annual increase of about 850 people.

The 2010-2022 growth in the existing cities of Wenatchee, East Wenatchee, Rock Island, and Quincy total about 5,500 people, just over half of all growth in the Greater Wenatchee Valley (or "market area"). This shows the extent of the development in current unincorporated areas.

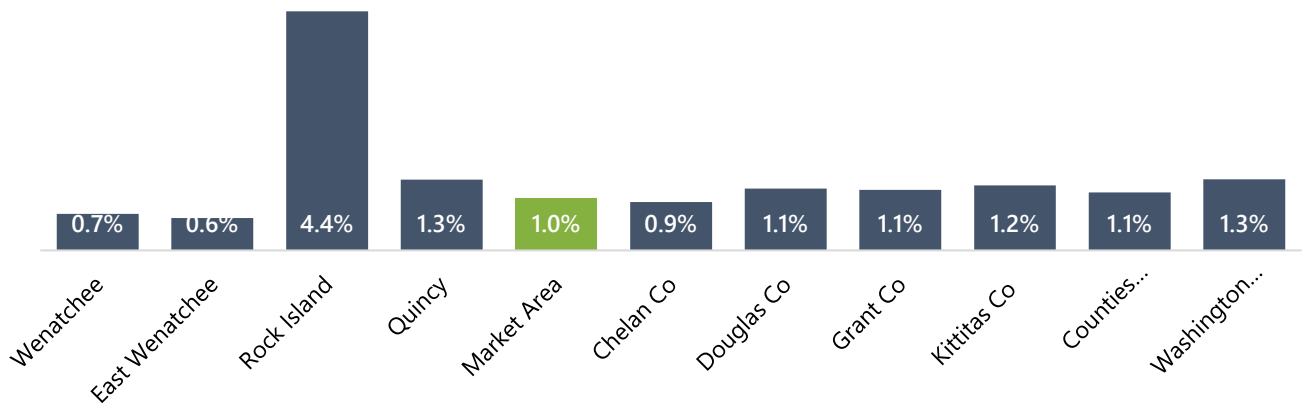
Figure 5. Population Estimates, 2010-2022



Source: WA OFM

- The market area population is largely comprised of Chelan County and only a small fraction of Grant County's total population. About 70% of Chelan County's, 78% of Douglas County's, and 11% of Grant County's population is within the project "market area."
- Southwest Douglas County grew by 1.24% annually, adding almost 2,000 people between 2015 and 2019, Southeast Chelan County grew by 0.56% annually, adding about 1,500 people, and Northwest Grant County grew by 0.25% annually, adding 150 people.
- The Wenatchee Valley is capturing a significant amount of growth in Douglas County, a moderate amount of growth in Chelan County, and a small amount of growth in Grant County. Much of this growth appears to be occurring outside of incorporated City limits as these growth rates are not consistent with the growth rates shown below.

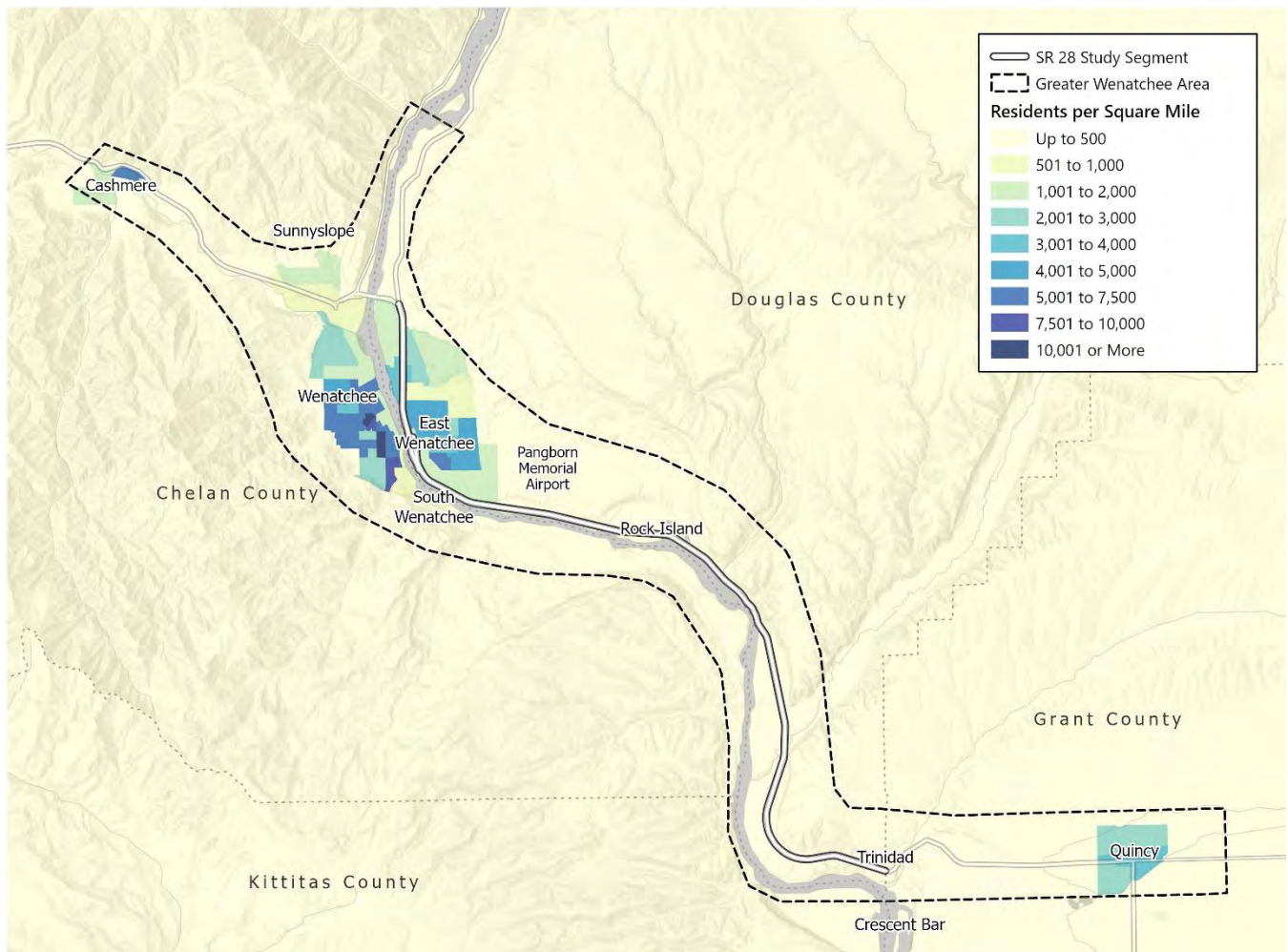
Figure 6. 2010-2022 Compound Annual Growth Rate



Source: WA OFM

The highest population densities in the Greater Wenatchee Area are in Wenatchee. There is very little population clustered between the Wenatchee area and Quincy.

Figure 7. Population Density



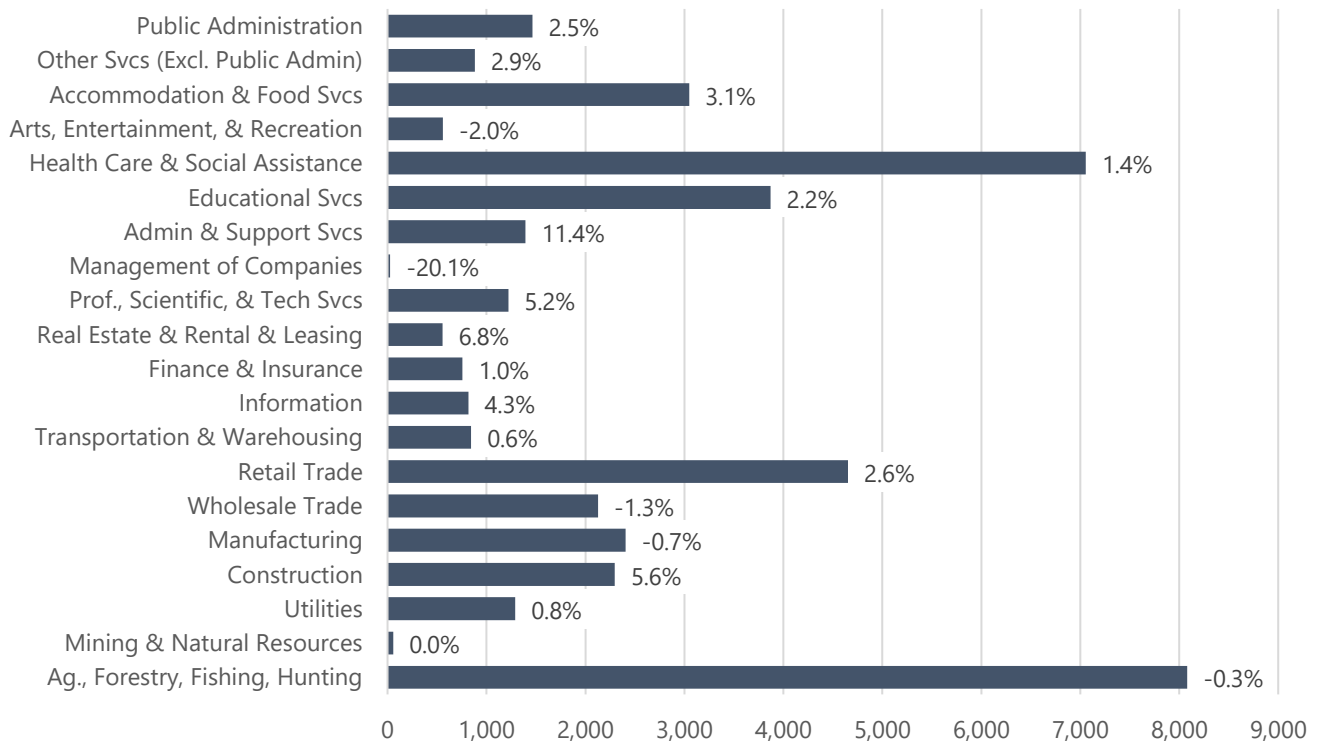
Source: U.S. Census Bureau, American Community Survey (ACS) 5-Year Estimates

Industry Profile

This section provides a high-level snapshot of economic conditions in the Greater Wenatchee Area.

The region is dominated by agricultural jobs, although the industry saw modest losses between 2014 and 2019. Healthcare and education jobs are also prominent and have seen solid growth, as has the retail sector. The fastest-growing industry sectors are information (which typically includes data centers), administrative and support services, construction, and real estate.

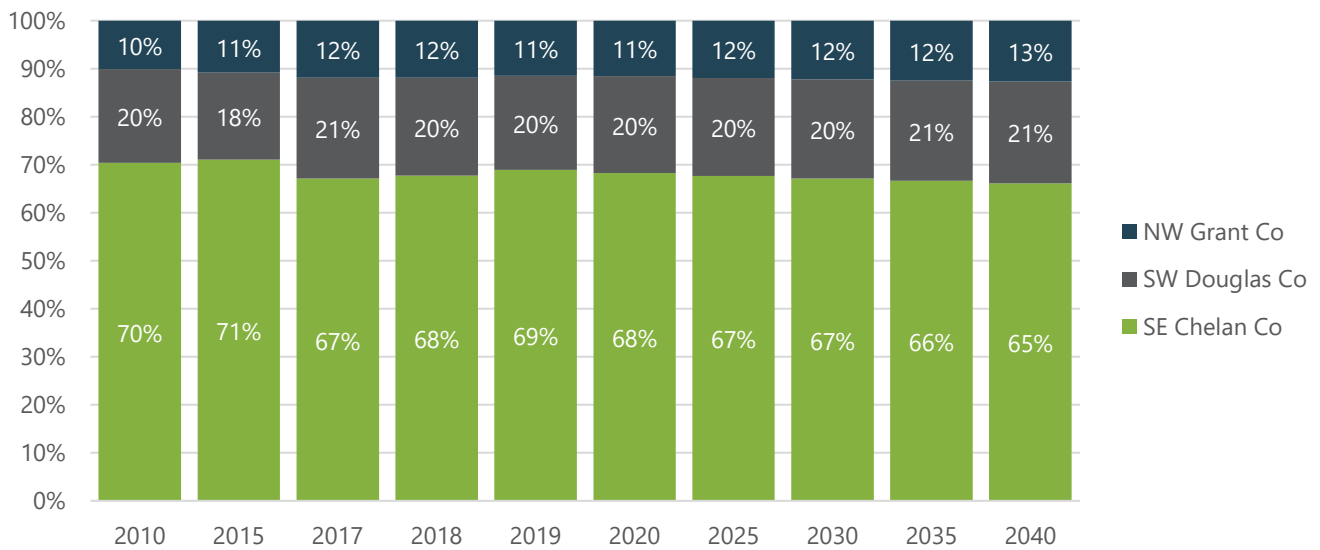
Figure 8. Jobs by Industry (2019) and Five Year Annual Growth, Market Area



Source: LEHD OnTheMap (QCEW)

As the following chart shows, employment concentrations are likely to shift around the region over time as developable land is absorbed and new growth areas emerge. Grant and Douglas counties are expected to add jobs quicker than Chelan County. As later pages will show, this reflects the growth of certain industrial uses and available land.

Figure 9. Employment By County



Source: QCEW, WA ESD

Market Trends: Data Centers

One of the most significant recent trends in Grant and Douglas Counties has been the growth of data centers, primarily in Quincy and the Pangborn Industrial Service Area. This follows major national growth, with demand for data centers reaching another record in 2021, led by large cloud and tech company expansions, despite significant supply chain disruption from the pandemic. In the United States, absorption¹ reached a total of 885.7 MW across 14 domestic markets, a 44.3 percent increase year-over-year. This is because demand for online services is strong and getting stronger, and the pandemic has reinforced the case for a more distributed network of IT infrastructure. As new investors continue to seek access to attractive returns in digital infrastructure, regional markets with business growth and clean energy are poised for growth.

The performance of top major data center REITs, which are the major operators and providers of data center space globally, reflects the reentry and reopening of economies. Residential and retail recorded the highest returns in 2021, while the combination of remote work, projected increases in IT spending, and even e-sports, have contributed to robust demand.

Going forwards, location will be more important than ever. Site selection is becoming a strategic priority and will be contingent on climate concerns, the availability of key resources like power and water, and growing community interest in the local impact of Internet infrastructure. Climate change is a key issue, which is altering the status quo in both real estate and energy sourcing, according to JLL Research. Water scarcity and the supply of renewable energy are the primary concerns for future data center markets.

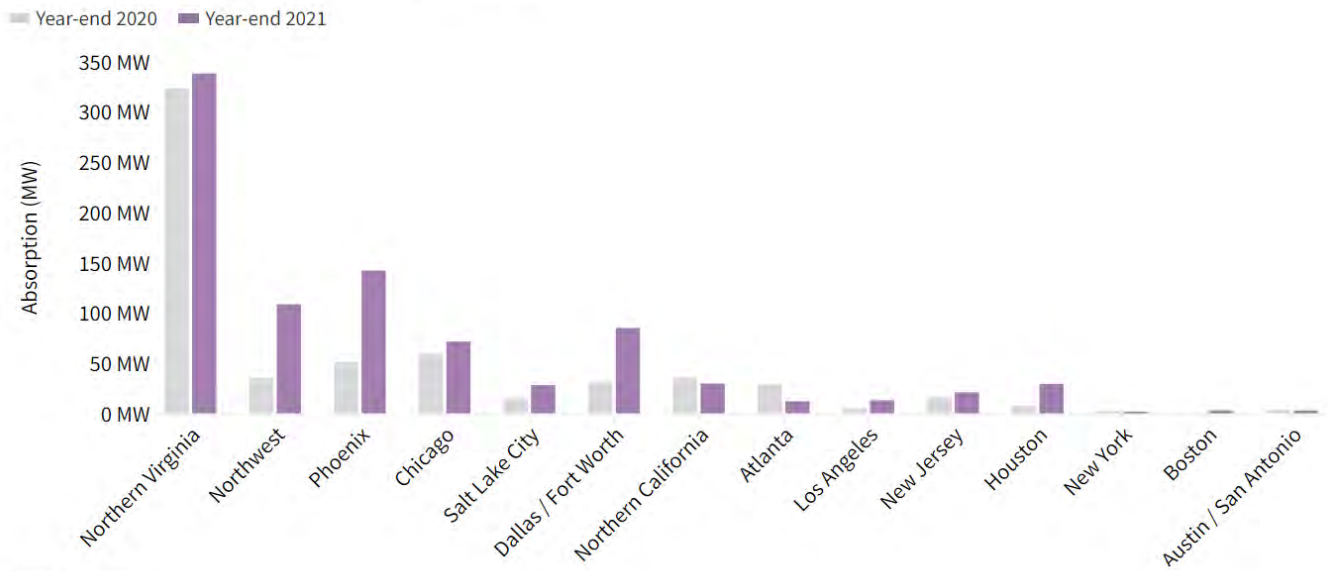
The data center industry is gradually adopting non-water cooling methods, which will reduce the need for large quantities of water for cooling purposes. Several factors are prompting this technology change, including powerful new hardware for AI workloads and growing pressure to eliminate water use in cooling servers. Microsoft has begun using

¹ Absorption is the net change in occupied square footage (or other measures, such as megawatts in the case of data centers) over a period of time, typically year-over-year.

immersion-cooled servers in production and believes two-phase immersion promises major gains in density and efficiency.

The following chart shows power absorption by data centers in several major domestic markets in 2021. Northern Virginia has historically been the epicenter of the data center industry and, while this is likely to remain the case for the foreseeable future, new growth in the Pacific Northwest, Phoenix, and Dallas markets has been significantly higher, representing the increased investment into historically second-tier markets.

Absorption (MW) by U.S. market, YE 2021



Source: JLL Research

Source: JLL Research, [URL](#)

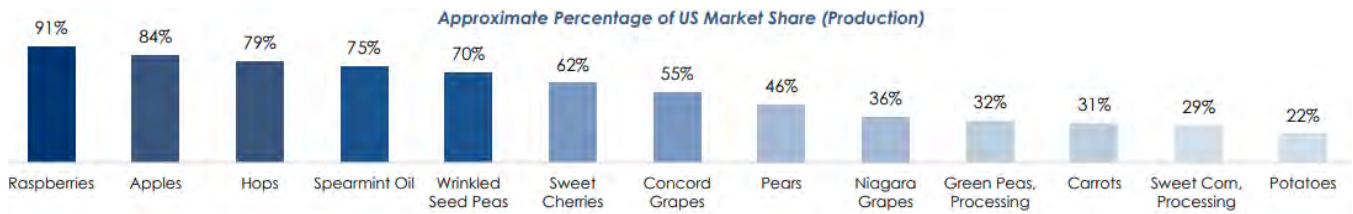
The Wenatchee Valley region is well-positioned with cheap and plentiful hydroelectric power, access to high-quality clean water, developable land, and a political climate that is still welcoming continuing data center development. As the Market Assessment section will show, the region is set to experience an unprecedented amount of industrial development that is primarily tied to the data center industry.

Market Trends: Agriculture

Central Washington is a major agricultural hub, for both growing produce and packing and processing. Favorable climate, soil, and water conditions in Washington create a valuable agriculture market with farmland that is among the highest quality in the world and is poised for significant long-term price appreciation. These favorable conditions are helping Washington eclipse California in terms of agricultural production.

The primary agricultural products in Central Washington are from tree fruit orchards. Washington is responsible for approximately half the apple production in the United States. Washington is the top producing state in the US for apples, winter pears, and sweet cherries, and is second behind California in the production of 'Bartlett' pear. Tree fruit

land has increased by up to 7% in the past 10 years, leading to steady increases in the annual production of apples and pears. Annual sweet cherry production has not shown a clear trend despite increasing orchard land area.



The Washington tree-fruit industry has significantly increased its dependence on international markets in the last 10 years. As production, especially of apples, has grown, international markets have absorbed much or most of the increase. Up to a third of the apple crop is now exported annually.

Looking ahead, the fruit tree sector is expected to continue to consolidate (as it has been for decades) as more growers and packers seek equity for growth for succession planning, recapitalize balance sheets, and achieve the scale necessary in today’s market. Macro trends such as downward pricing pressures, increased capital intensity, rising industry minimum wages, international trade tensions, a tight labor market, and agricultural technology adoption have stressed the balance sheets of sector participants and show no signs of subsiding in the near term. Some in the industry are taking on equity partners to scale and remain competitive, while others are seeking partners to see them through the temporary downcycle. Additionally, mergers and acquisition activity at both the retailer level and crop input level is adding further consolidation pressure at the grower, packer, and sales desk levels.

Mid to long-term macro trends remain favorable. A growing population with limited farmable land, as well as consumers increasing preference for healthy fresh foods will benefit the industry in the long term. Once the downcycle runs its course and the industry-wide consolidation process completes, enterprises will likely emerge larger and more productive as both larger and institutionally-backed players use the downcycle as an opportunity to expand and scale. A key determinant of profitable winners and losers will be a Company’s ability to attract institutional capital as well as acquire quality assets while building a deep and high-quality management team that can integrate technology into operations.

Figure 10. Agricultural Advantages and Disadvantages



Source: [URL](#)

In the Wenatchee region, industry stakeholders interviewed for this project expected limited employment growth despite planned expansions due to consolidation and automation.

Employment and Population Projections

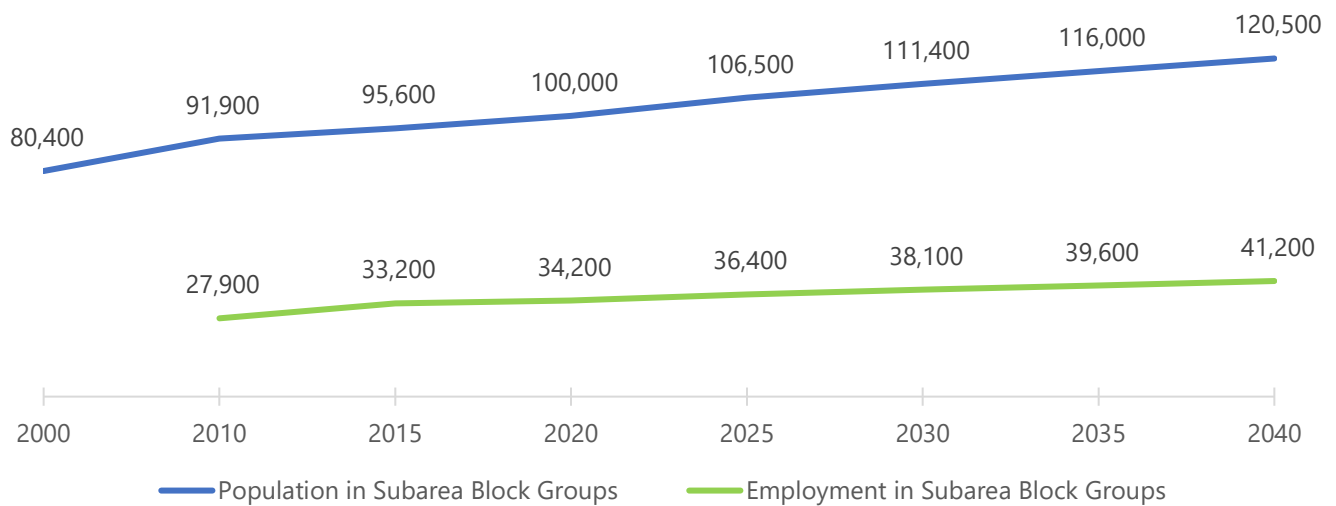
This memorandum will culminate in an overall development forecast that outlines employment and household growth over the next two decades for several areas in the Greater Wenatchee Area (market area). The forecast leans on existing

regional projections to determine the overall growth trajectory for a variety of land use sectors, as well as the areas local decision-makers expect to grow or densify in the future.

The following chart shows population and employment projections, based on existing Office of Financial Management (OFM) population projections that have been manipulated at the block group level by LCG, and LEHD employment data derived from U.S. Census Bureau data. This employment information is simply modeled as a general job to housing ratio (projected through 2040) and likely does not reflect true market conditions and should therefore be considered a "baseline" model.

OFM projections show the population of the three-county areas of Chelan, Douglas, and Grant growing by 1.1% annually between 2020 and 2040, which would add about 25,700 people to the population by 2045. If employment growth continues to follow population growth (approximately one employee per every three additional persons in the population) the market area would add around 8,300 jobs through 2045 (averaging 0.9% annually). If employment growth follows a similar trajectory to growth between 2010 and 2020 (averaging 2.1% annually), the market area would add up to 23,000 jobs through 2045. The remainder of this memo and the development forecast offers a market-based perspective that considers development trends, land availability, and other trends.

Figure 11. Existing and Projected Population and Employment Counts, Market Area



Source: OFM, LEHD, American Community Survey 5-year Estimates

The table below shows a breakdown of projections for each of the three core county areas in the regional market area. Population growth will likely be relatively distributed

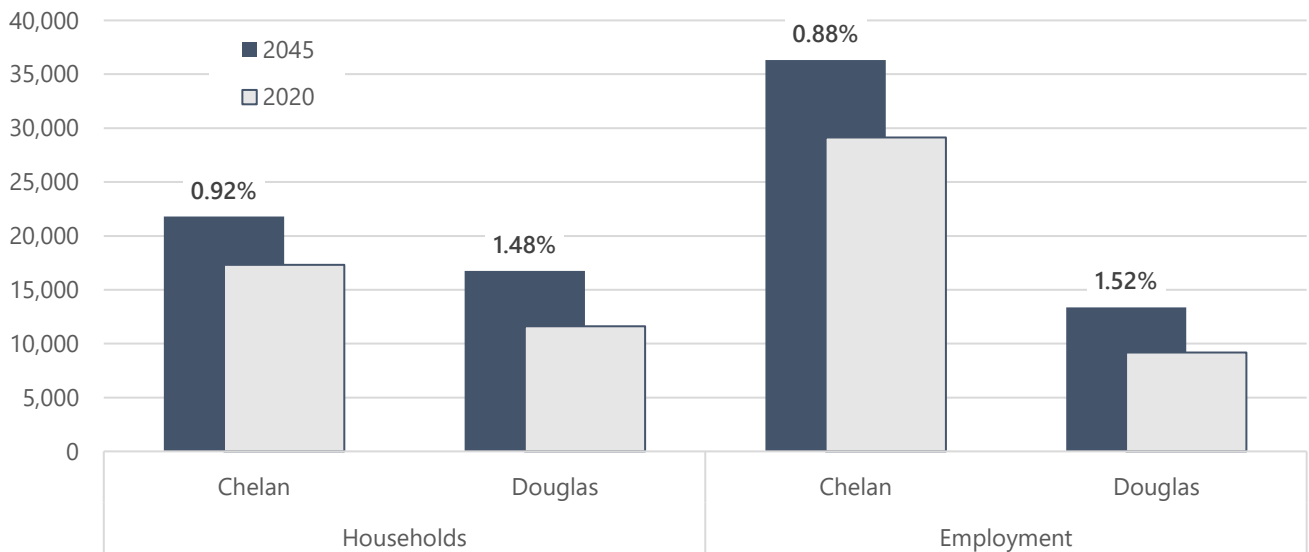
Table 4. Summary of Population and Employment Projections

SE Chelan County	SW Douglas County	NW Grant County	Total
Total new residents between 2020 and 2040			
8,700	8,400	3,500	20,600
Total new households between 2020 and 2040			
3,300	3,000	1,200	7,600
Total new jobs between 2020 and 2040			
3,700	1,700	1,200	7,000

Source: OFM, LEHD, American Community Survey 5-year Estimates

The following household growth projections are from TAZ data for the Wenatchee Valley urbanized area provided to LCG by CDTC. Total households are projected to increase from 29,000 in 2020 to 38,500 in 2045—a compound annual growth rate of 1.16%. Total employment is projected to increase from 38,000 to 49,500 jobs—a compound annual growth rate of 1.04%. This data was only available for Chelan and Douglas counties and does not include Grant County.

Figure 12. Household and Employment Growth, Wenatchee Valley



Source: CDTC TAZ Data

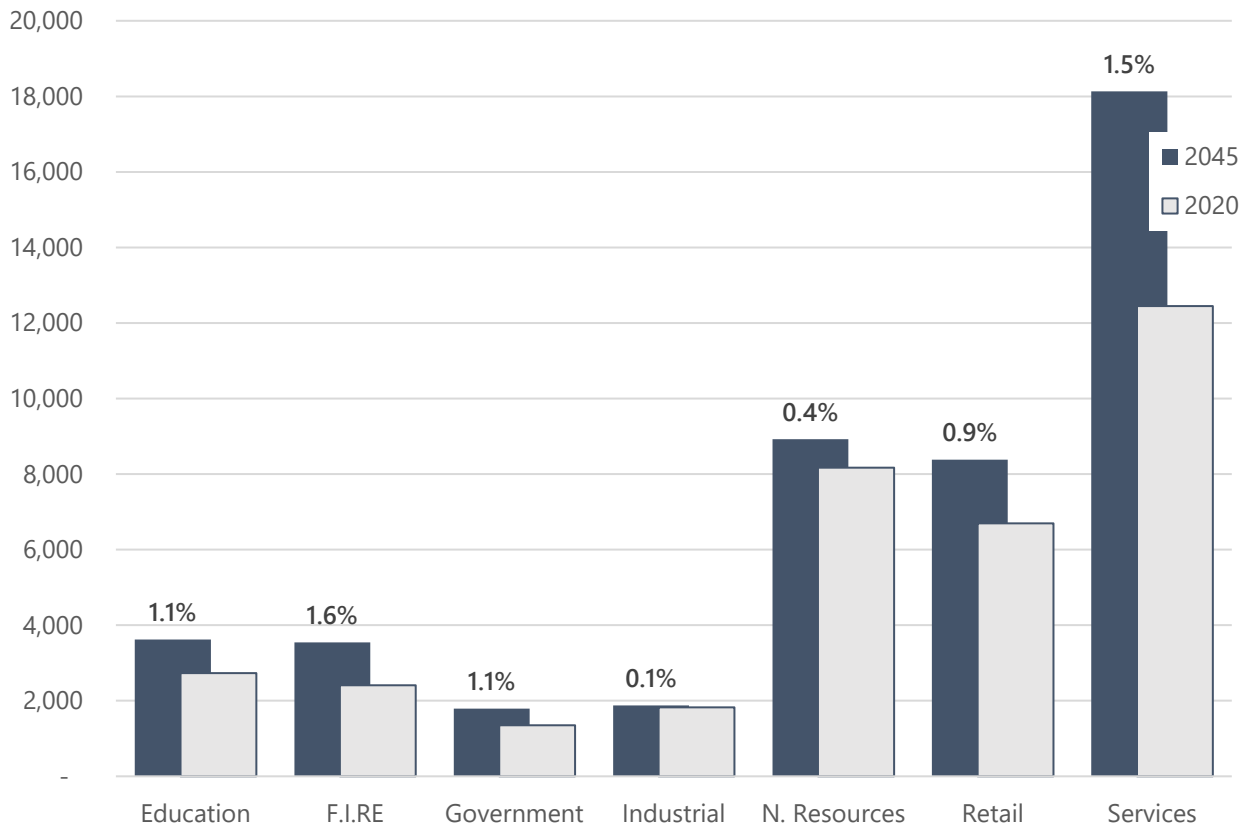
Table 5. Household and Employment TAZ Projections for Chelan/Douglas Counties

	Households		Employment	
	Chelan	Douglas	Chelan	Douglas
2020 Total	17,312	11,599	29,146	9,180
2045 Total	21,792	16,745	36,318	13,375
New Growth	4,480	5,146	7,172	4,195
Annual Rate	0.92%	1.48%	0.88%	1.52%

Source: CDTC TAZ Data

LCG suspects that these employment projections are likely conservative, particularly for industrial uses given the recent and planned data center developments. That being said, the bulk of the employment in these developments (which do not typically employ many people), is more service- and maintenance-oriented, so these jobs may be captured in the "Services" category.

Figure 13. Employment Projections, 2020-2045, Wenatchee Valley Urbanized Area

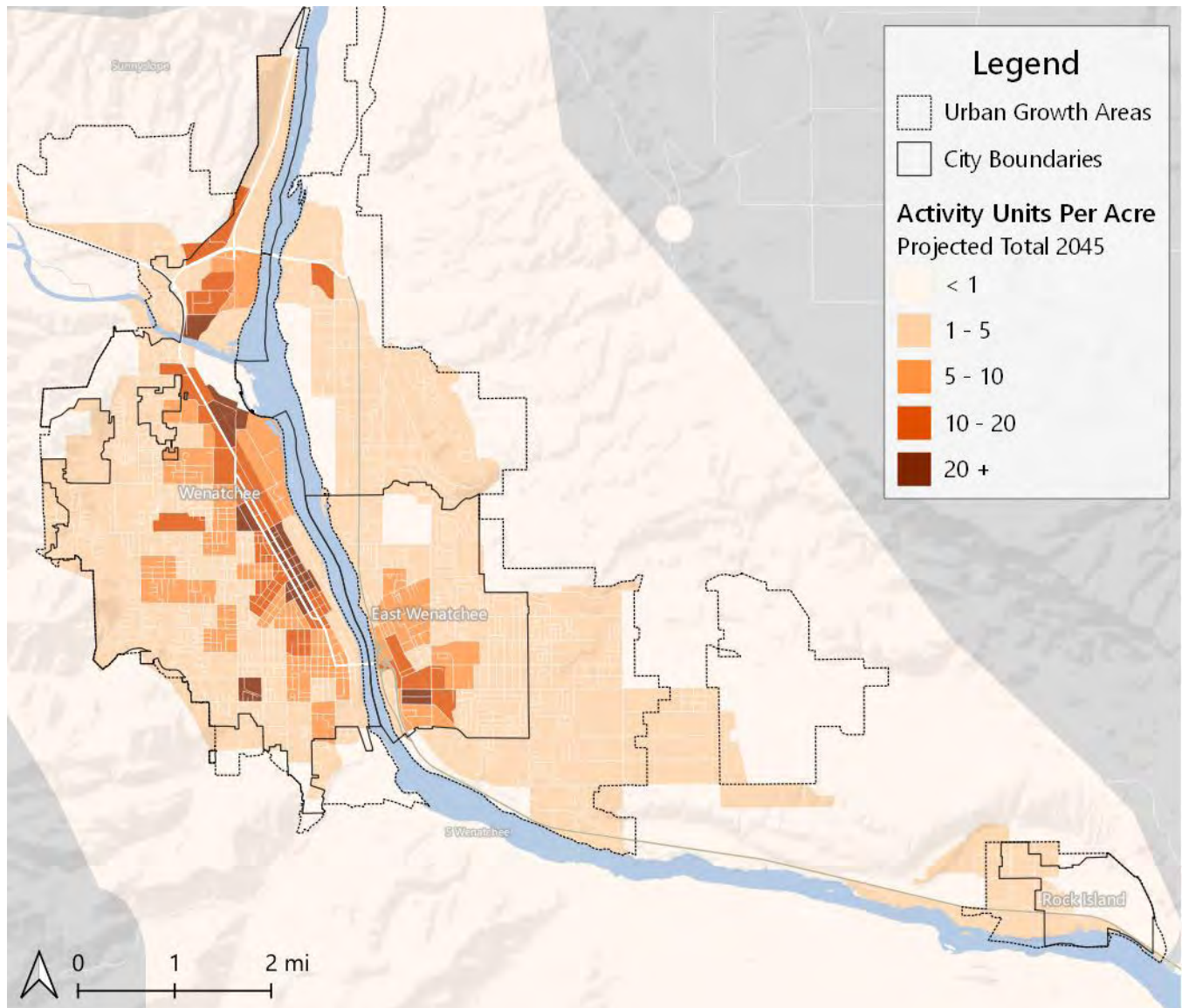


Source: CDTC TAZ Data

The following three maps show activity units (employment plus households) in the Wenatchee Valley Urbanized Area based on this same TAZ data. These small area projections are based on previous trends, land capacity, and local land use policy, among other factors. They, therefore, serve as a useful indication of growth areas over the next 20 years.

Activity unit densities in the area are generally low outside of core areas in Wenatchee and East Wenatchee. Most areas are expected to develop at densities of less than five activity units per acre, which is consistent with larger lot single-family residential development patterns.

Figure 14. Activity Units (Jobs and Households) Per Acre, Projected Total 2045

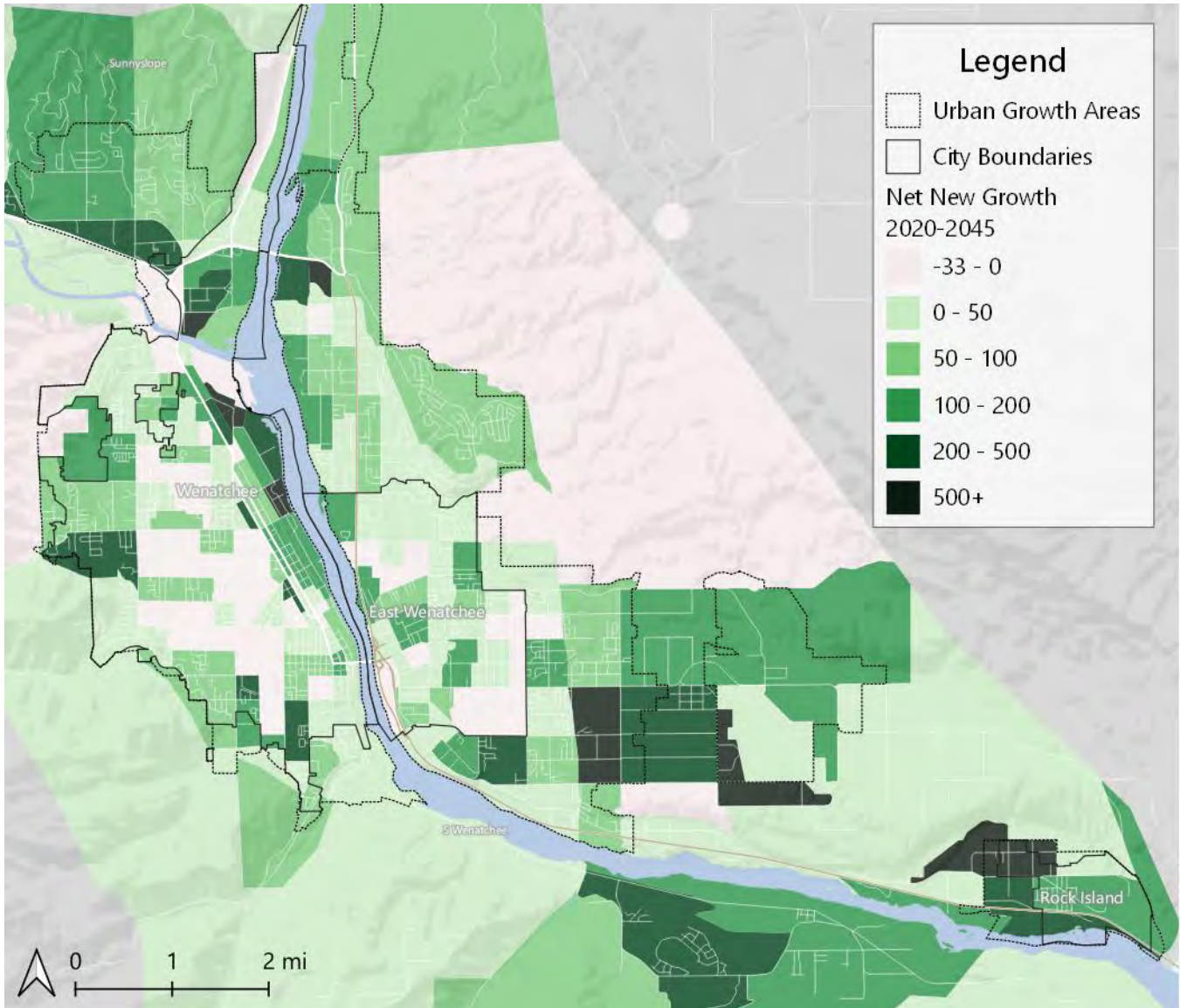


Source: CDTC TAZ Data

The following chart shows absolute growth in each TAZ in the Wenatchee Urbanized Area.

Growth is expected to concentrate in the peripheral areas of Wenatchee, downtown Wenatchee, the unincorporated areas of Douglas County, and west Rock Island. Growth is also expected in the Malaga area of Chelan County (where Microsoft has just announced plans for a new data center).

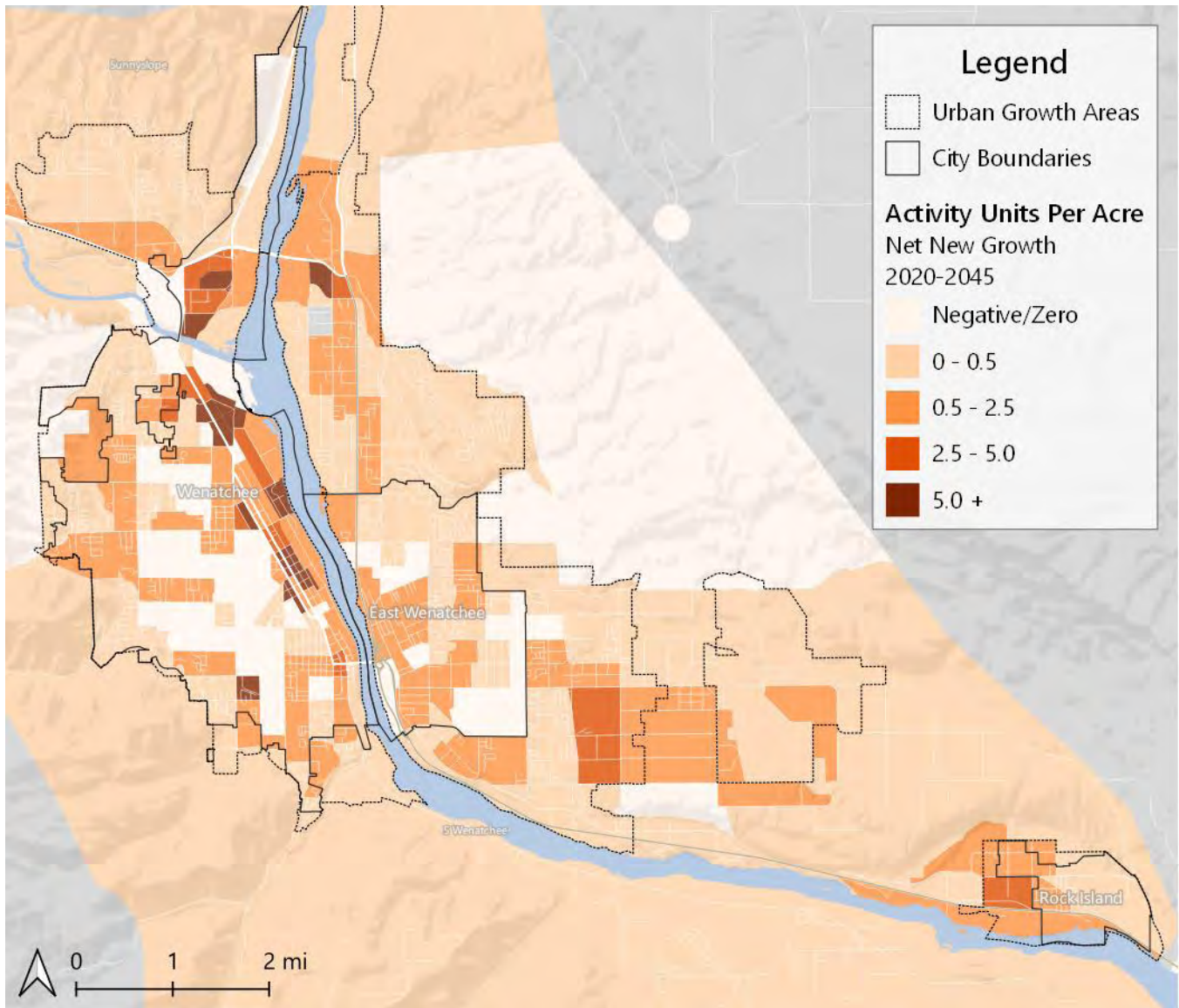
Figure 15. Activity Units Net New Growth, Wenatchee Urbanized Area



Source: CDTC TAZ Data

Similarly, the following chart shows this same information but by density (activity units per acre) to further demonstrate where most new development is expected to occur. Further densification is expected in downtown Wenatchee, while larger single-family residential subdivisions will likely make up the bulk of the growth in Douglas County.

Figure 16. Activity Units (Jobs and Households), Net New Growth Per Acre, 2045



Source: CDTC TAZ Data

SWOT Analysis

A SWOT analysis identifies the Strengths, Weaknesses, Opportunities, and Threats of any given area. LCG conducted a high-level SWOT analysis that is summarized in the table below and provides a general assessment of the strengths and weaknesses of the study area, considering its location within the region, access, physical conditions, and other factors. The information is based on both the quantitative analysis described in this memorandum and a series of stakeholder interviews conducted by LCG in the Spring of 2022.

LCG conducted these interviews with key stakeholders to help identify major growth areas, industry trends, barriers to development, commute patterns, and specific development projects. Stakeholders included major landowners, the Ports of Quincy and Chelan/Douglas, developers, real estate brokers, major employers (e.g., fruit packing facilities, local

chambers of commerce, higher education representatives, and economic development agency staff in the region. The information from these interviews, including key themes and major takeaways, is embedded in the table below.

Table 6. SWOT Summary

Strengths	Opportunities
<ul style="list-style-type: none"> • Cheap and plentiful power • Agricultural hub with favorable growing conditions • Land availability • Low cost of living • Outdoor recreation • High-quality water availability • Protection from extreme weather • Not prone to natural disaster • Significant hotel growth in Wenatchee • Dark fiber providers • Inexpensive land (\$70k-\$125k per acre) 	<ul style="list-style-type: none"> • Residential development • Waterfront development • Automation • Ongoing data center growth • Agricultural production/value add manufacturing • Outdoor recreation • Growing numbers of in-migrants • Telework • Developable county land
Weaknesses	Threats
<ul style="list-style-type: none"> • Topography (landlocked) • Zoning • Constrained land within existing city limits • Lack of public transit • Lack of sewer and water in places • No hotels in Quincy • Utility infrastructure • Isolation from interstate (for distribution) 	<ul style="list-style-type: none"> • Housing affordability and availability • Climate change • Local community opposition • Uncertain commercial (retail, office) future • The willingness of PUDs to add power capacity • Labor availability • Access to tradespeople

Source: LCG

Market Assessment

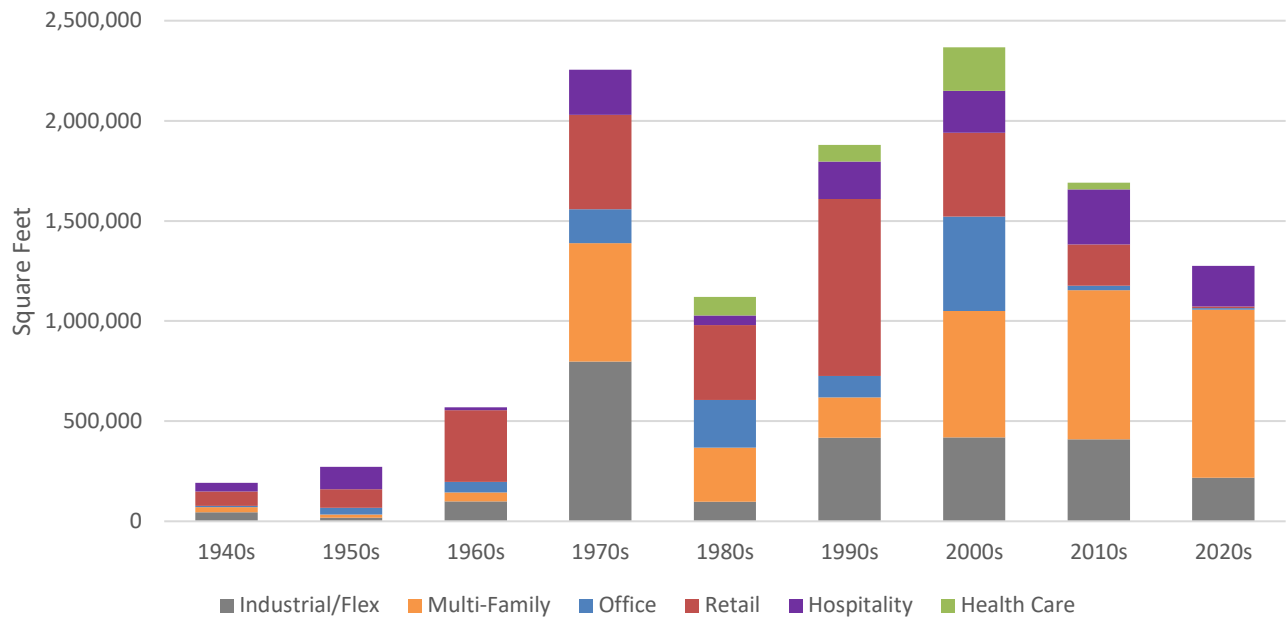
This section describes real estate trends and conditions in the Greater Wenatchee Area, including identification of growth areas and future potential.

Historic Market and Development Trends

This section documents development trends for the region to highlight prominent locations of employment, residential, and commercial uses.

The following figure shows square feet of development (excluding single-family residential) by the decade it was built. Much of the region’s development has been built since the 1970s, with particularly big decades in the 1970s and 2000s. Despite only being two years into the 2020s, this decade is on track to eclipse all previous decades for total development built. This is largely due to a substantial amount of multifamily, industrial, and, to a lesser extent, hotel development. The project pipeline, i.e., projects under construction, planned, or proposed, is heavily industrial-oriented and primarily related to data center growth.

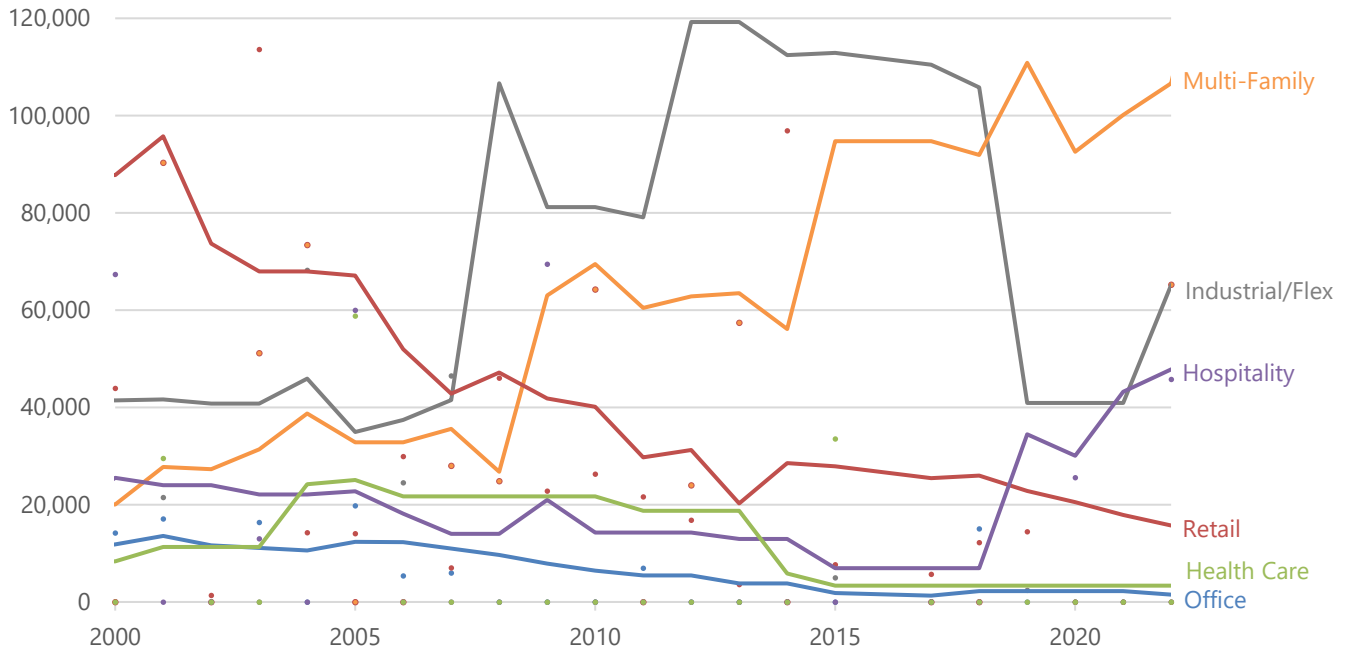
Figure 17. Development by Decade in the Greater Wenatchee Area (Total Square Feet)



Source: CoStar

Looking at a 10-year average of annual development over the past 30 years shows a major upward trend in multifamily development, with multifamily now averaging well over 100,000 square feet of development per year. The industrial sector has generally averaged around 60,000 square feet of development per year and is expected to now increase as several planned projects come online in the next few years. Retail and office, on the other hand, are seeing downward trends, with very little development. For reasons described in later pages, LCG does not believe there will be a significant uptick in retail or office development for many years.

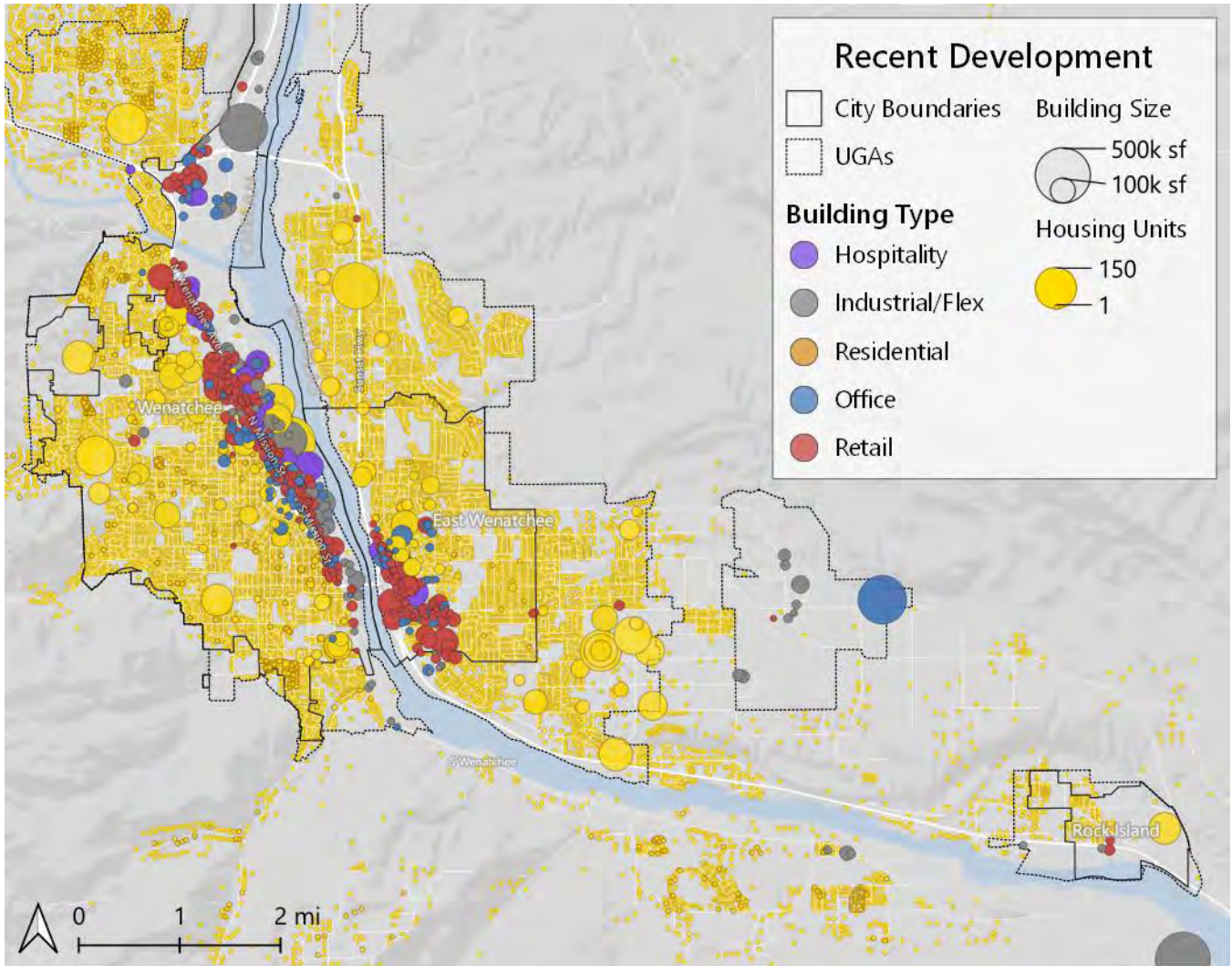
Figure 18. Annual Development Trends by Land Use Type (10-Year Moving Average)



Source: CoStar

Non-residential development is largely clustered in Wenatchee along primary arterial corridors and in southwest East Wenatchee. Industrial developments are also in the Pangborn UGA (Douglas County) and in north Wenatchee. In the future, major new development will likely be contingent on available land and zoning, which LCG describes in later pages.

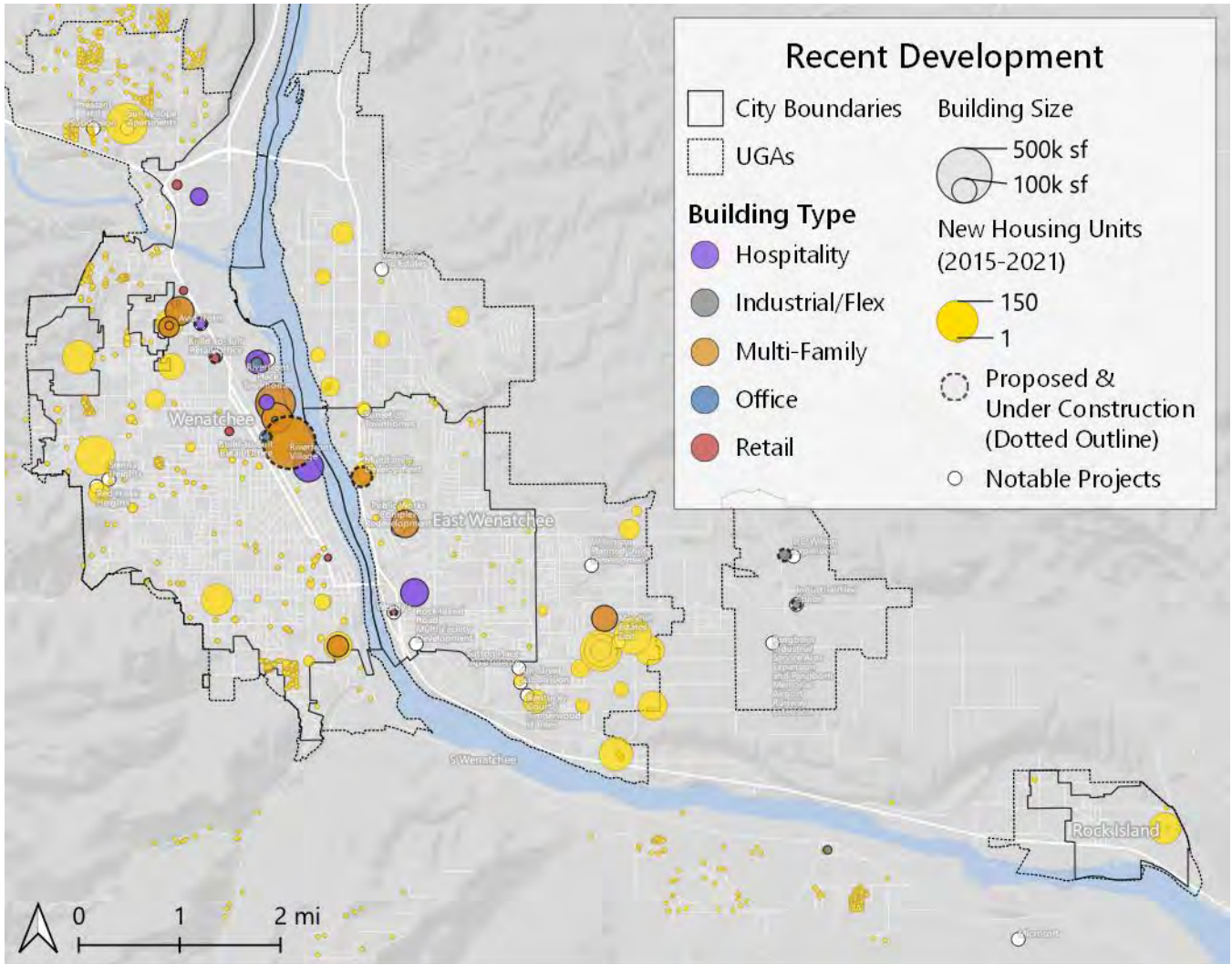
Figure 19. Wenatchee Valley Development



Sources: CoStar, County Assessor, CDTC, SEPA, Leland Consulting Group

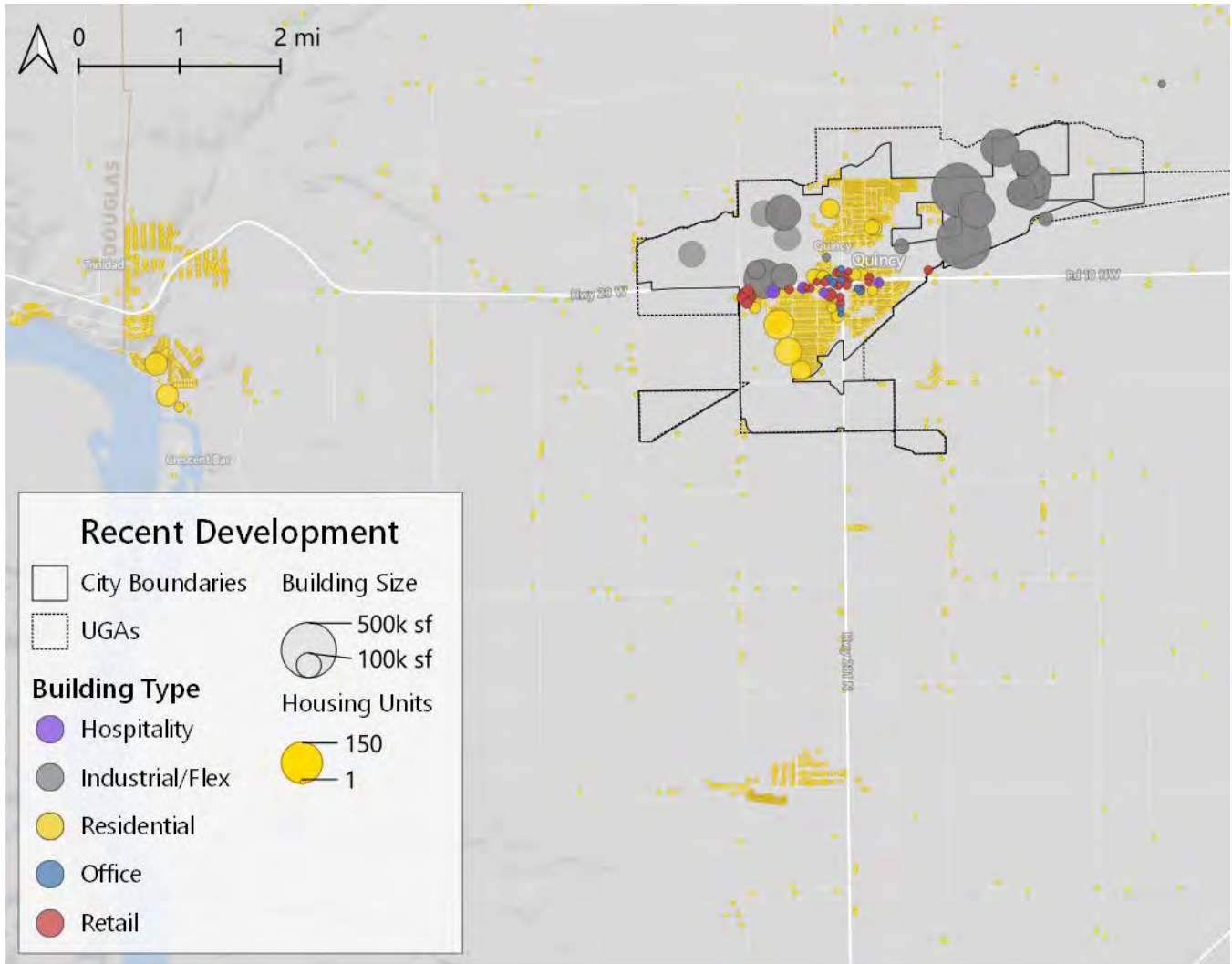
New projects in the Wenatchee Valley are widely distributed. New industrial development has generally been limited to the Pangborn Industrial Service Area, although some expansions of existing facilities have also occurred (that are not shown on the map below). Most apartments have continued to be built in and near downtown and the urban core, although there is growing interest on the urban periphery for multifamily development.

Figure 20. Wenatchee Valley Development (Built Since 2015 and Upcoming)



Sources: CoStar, County Assessor, CDTC, SEPA, Leland Consulting Group

Figure 21. Quincy Area Development



Sources: CoStar, County Assessor, CDTC, SEPA, Leland Consulting Group

Residential Market Dynamics

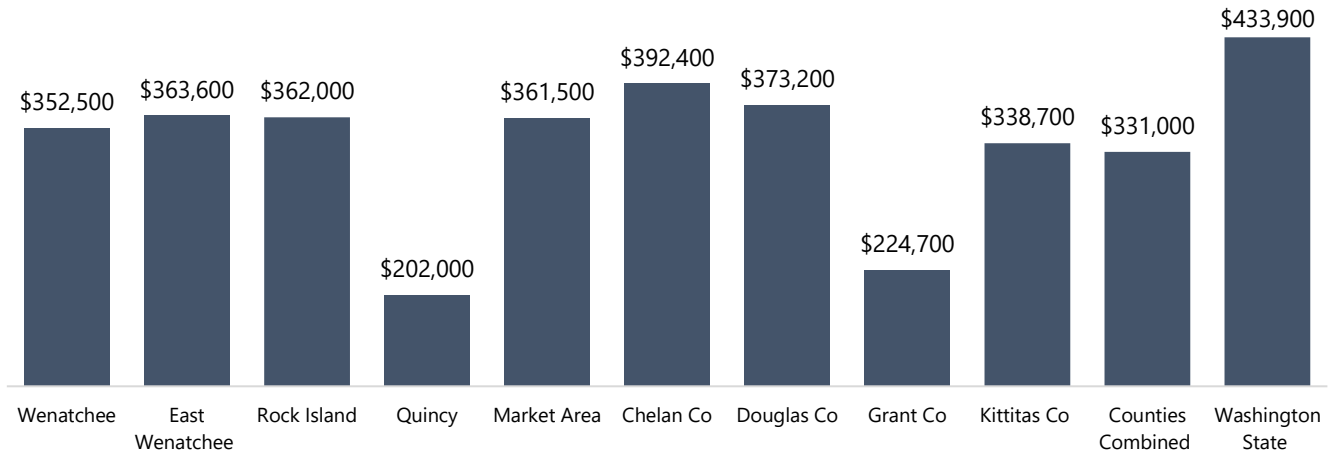
This section covers the multifamily and single-family markets in the region. The regional market is strong, with solid construction activity in the single-family market while the multifamily market has started to see denser developments in select locations.

Approximately 4,000 residential units have been built since 2015 (a seven-year timeline), with roughly a 50/50 split between multifamily and single-family units. Development activity has increased substantially and will likely drive significant population growth in the future.

Household Characteristics

The region is said to be attracting significant numbers of people from outside the area, primarily because of its quality of life and affordability (relative to other larger metropolitan areas). Quincy is considered the most affordable market amongst the four cities in the market area and is seeing new housing construction that easily exceeds the current averages.

Figure 22. Median Home Value

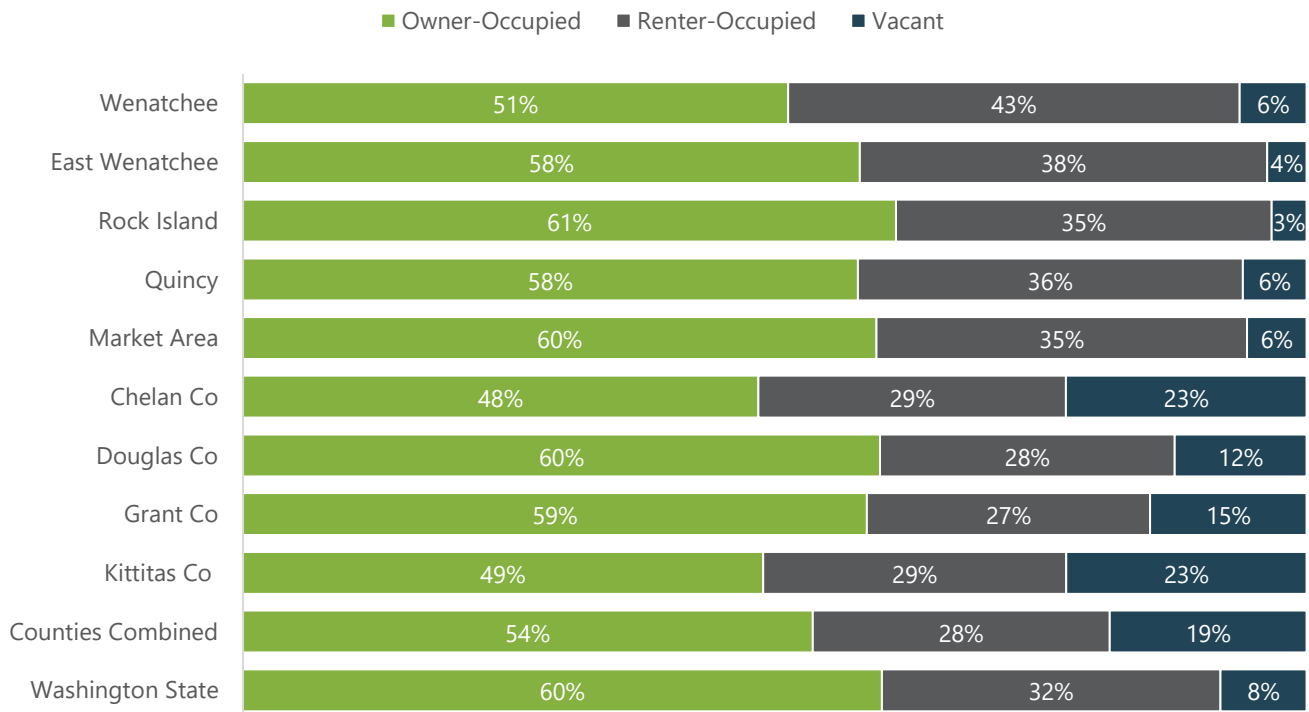


The following chart shows housing tenure. Tenure is important to consider for market trends and opportunities; higher proportions of renter housing indicate a potential for apartments and other higher-density development types.

The market area is approximately 60% owner-occupied, in keeping with the Statewide trends. Three of the four incorporated cities (except Rock Island) have slightly higher proportions of renter-occupied housing. Wenatchee is the regional hub for rental housing, with renter-occupied housing units representing 43% of its household inventory.

As noted above, about half of the newly constructed housing units in the region have been rentals, which is higher than the regional average. This trend is expected to continue as the area continues to add jobs and younger households.

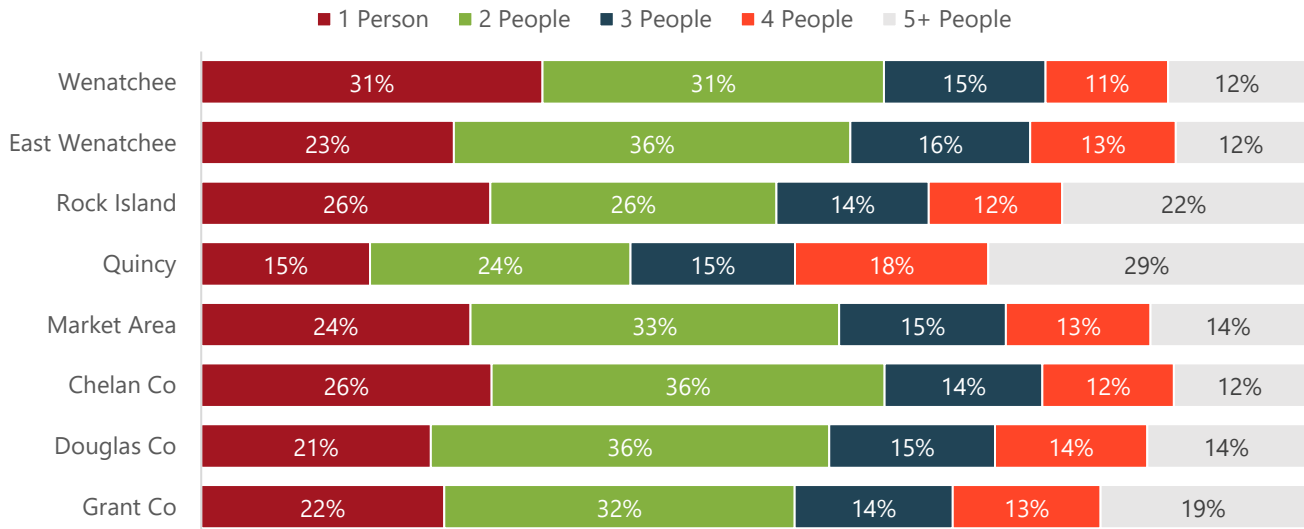
Figure 23. Tenure by Area



Source: ESRI

The following chart shows average household sizes throughout the region. Wenatchee has the highest proportion of one and two-person households (in keeping with the higher proportion of renters), closely followed by East Wenatchee, and households in Quincy tend to be significantly larger (averaging 3.5 people per household).

Figure 24. Household Size by Area

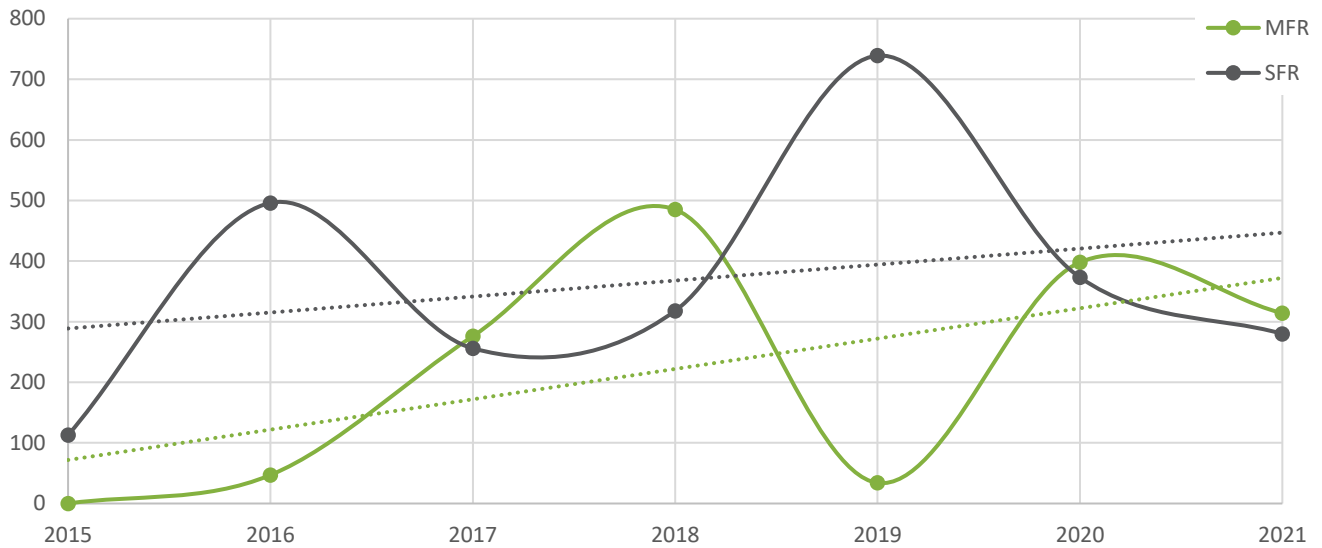


Source: ESRI

Development Trends and Growth Areas

The following chart shows construction trends for multifamily and single-family housing by year. Both sectors continue to see upticks in construction each year, with the multifamily housing sector experiencing more dramatic increases, even with the impacts of the COVID pandemic. Based on these trends, LCG expects the market to see at least 300 units of both multifamily and single-family housing to be constructed on an annual basis going forwards.

Figure 25. Multifamily and Single-Family Development Trends, 2015-2021



Source: SEPA, CoStar, CDTC

The following table shows housing development over time in the city limits and unincorporated UGA areas of each of the four cities. This data highlights a notable difference between East Wenatchee and Wenatchee. East Wenatchee has attracted significant residential construction in its unincorporated UGA area, while Wenatchee has largely seen new development occur within its city limits. Development in Rock Island and Quincy is exclusively within city limits.

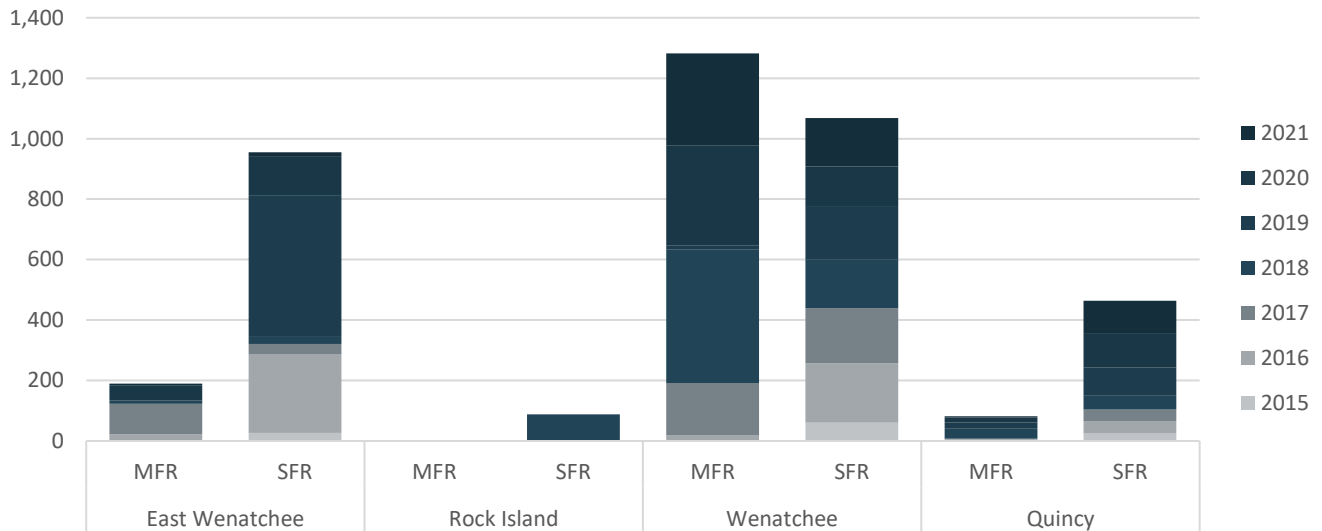
Table 7. Residential Development Overview, 2015-2021

Location	2015	2016	2017	2018	2019	2020	2021	Total	Annual Avg.
East Wenatchee									
City	0	25	7	20	13	54	1	120	17
Unincorporated UGA	27	257	128	14	456	125	18	1,025	146
Rock Island									
City	0	0	0	88	0	0	0	88	13
Wenatchee									
City	0	162	308	524	128	410	290	1,822	260
Unincorporated UGA	61	52	49	80	59	53	174	528	75
Quincy									
City	25	47	40	77	117	129	111	546	78
Total	113	543	532	803	773	771	594	4,129	590

Source: SEPA, CoStar, CDTC

Similarly, and in keeping with the data above, East Wenatchee has largely attracted single-family residential developments (in the lower density zones of the unincorporated UGA). Most of the region’s multifamily development has concentrated in Wenatchee.

Figure 26. Residential Development by Location and Type



Source: SEPA, CoStar, CDTC

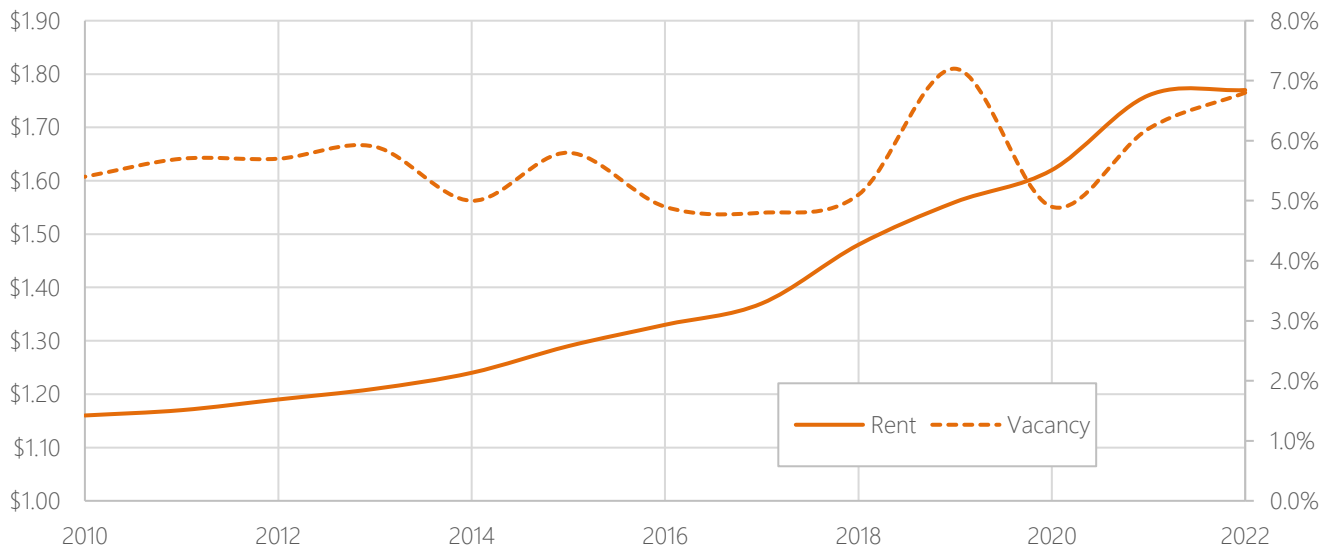
Apartment Market Overview

The region is a relatively small market for apartment units, with roughly 3,481 units (buildings with five or more units only; not including those in duplexes or other smaller residences). Of these almost one-third were completed in the past decade years—reflecting improving market fundamentals and strong demand for multifamily housing. Significant development has occurred in downtown Wenatchee, where redevelopment continues of a former industrial area near the waterfront.

Vacancy rates have remained stable despite significant development activity in recent years. In recent years, the vacancy rate was volatile, rising with new construction but quickly recovering when those properties were leased up. Five percent is typically considered equilibrium, with an overall market vacancy rate of less than five percent reflecting demand for additional units and above five percent reflecting a market in need of positive absorption or replacement (of older units). At approximately 6.5% overall vacancy, the Wenatchee market may be in an absorption stage. Alternatively, the rapid leasing of new units may simply reflect strong demand for newer, higher-quality multifamily housing while older, subpar properties exhibit higher vacancies.

Rents have dramatically risen over the past decade following the Great Recession. The average market rent for the area is \$1,630/month and has risen 8.2% over the past 12 months. Rent growth accelerated in 2021 and remains above historical averages at the start of 2022. An influx of people from larger cities has increased demand for both short and long-term rentals, driving up rents. This trend is likely to continue to attract investors to the market and may begin to support higher-cost developments, such as midrise apartments with structured parking or the redevelopment of existing properties.

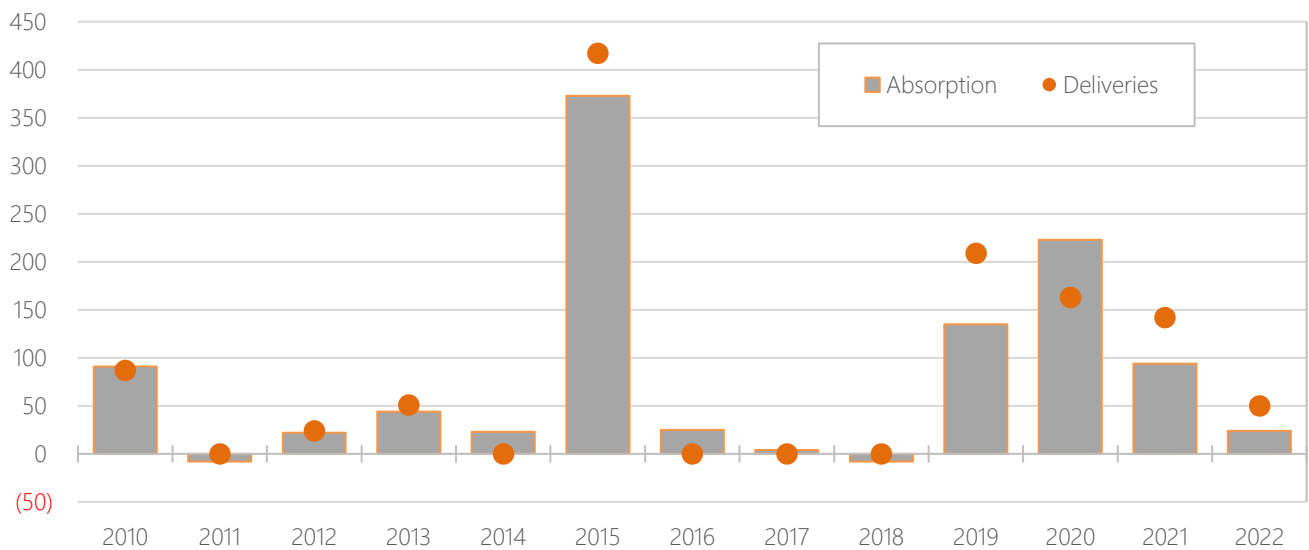
Figure 27. Multifamily Rent and Vacancy Trends



Source: CoStar

As noted above, there have been several years of prominent construction activity. Absorption also continues to be positive—a sign of continuing demand.

Figure 28. Multifamily Construction and Absorption Trends



Source: CoStar

Development Pipeline

The following table shows the pipeline of proposed residential development projects in the region, totaling around 2,500 housing units. Apartment projects are relatively limited in terms of the total number of projects, but the three projects in the pipeline are all substantial in size. Building types have largely remained at suburban densities (<30 units per acre), although the downtown Wenatchee Riverfront Village will be the first midrise apartment project in the market.

There are about 1,650 single-family homes currently in the residential pipeline (that are known to LCG). These have been generally proposed at around five units per acre but per-project densities are much more varied. Projects in unincorporated UGA and County areas are typically much lower density than those within City limits.

Table 8. Proposed Residential Projects

County	Project Name	Units	Acres	Density
Apartments		906	41	29.1
Chelan	Riverfront Village	454	7.8	58.2
	Sagecrest Apartments	60	1.9	31.6
Douglas	Wilkinson Planned Unit Development	290	24.3	12.0
	Sutton Place Apts	102	6.9	14.7
Single Family		1,646	355+	5.2
Chelan	Riverfront Place Townhomes	31		
	Red Hawk Heights Subdivision	137	17.2	8.0
	Sienna Heights Subdivision	40	9.0	4.4
	Pheasant Hill Subdivision	93	18.9	4.9
Douglas	Chapacka East	53	35.3	1.5
	Sunset 19 Townhomes	12	1.8	6.6
	N/A	70	33.8	2.1
	Kentucky Court	51	10.8	4.7
	Maryhill Estates East	123	28.8	4.3
	Sutton Place Apts	102	6.9	14.7
	N/A	50	3.7	13.6
	Sage Brooke Subdivision	49	18.0	2.7
	Fourth Street Subdivision	66	8.2	8.0
	George's Shallows Subdivision	87	16.1	5.4
	Vista del Rio Estates	24	8.9	2.7
Grant	Willow Springs Gated Neighborhood	40		
	Palos Verdes Estates	65	20.0	3.3
	Palos Verdes (other)	400	56.8	7.0
	Paradise Park	255	68.0	3.8
		2,492		

Source: SEPA, CoStar, CDTC

Other / Short-term Rentals

In three years, the number of short-term renters in the market area has increased by 80% (22% annually), rising from 197 to 354 rental units despite the tourism-related challenges of the COVID pandemic. About 90% of these units are for entire homes (versus rooms or accessory dwellings). However, the average occupancy is only 53%, with the Wenatchee area reflecting the highest occupancy rates and the Quincy area the lowest, which potentially indicates an oversaturated market that may need to stabilize before additional units come online.

While LCG does not expect this growth to continue indefinitely, the popularity of short-term rentals in the region reflects the rise of domestic tourism, recent employment growth, and the development of several data centers. Combined, these factors create a strong market for long-term rentals.

Table 9. Short Term Rental Inventory

Location/Market	Total Units (Q1 '22)	Total "Whole Home"	Avg. Occupancy	Total Units (Q1 '19)
Wenatchee	127	99 (78%)	67%	90
East Wenatchee	60	51 (85%)	61%	49
Quincy	167*	167 (100%)	39%	58
Total	354	317 (90%)	53%	197

Source: AirDNA

*Primarily along the river; only six short-term rentals are within Quincy proper

Commercial Market Dynamics

Retail. The retail sector is suffering in the face of ecommerce and consumer behavioral shifts that now favor experience and convenience versus the traditional retail market. This has caused retailers to downsize, redistribute their assets, become a hybrid operation with an online presence, and focus on place versus space. The result is a shift back to neighborhoods and smaller commercial centers that boast food services, interesting places, and experiences.

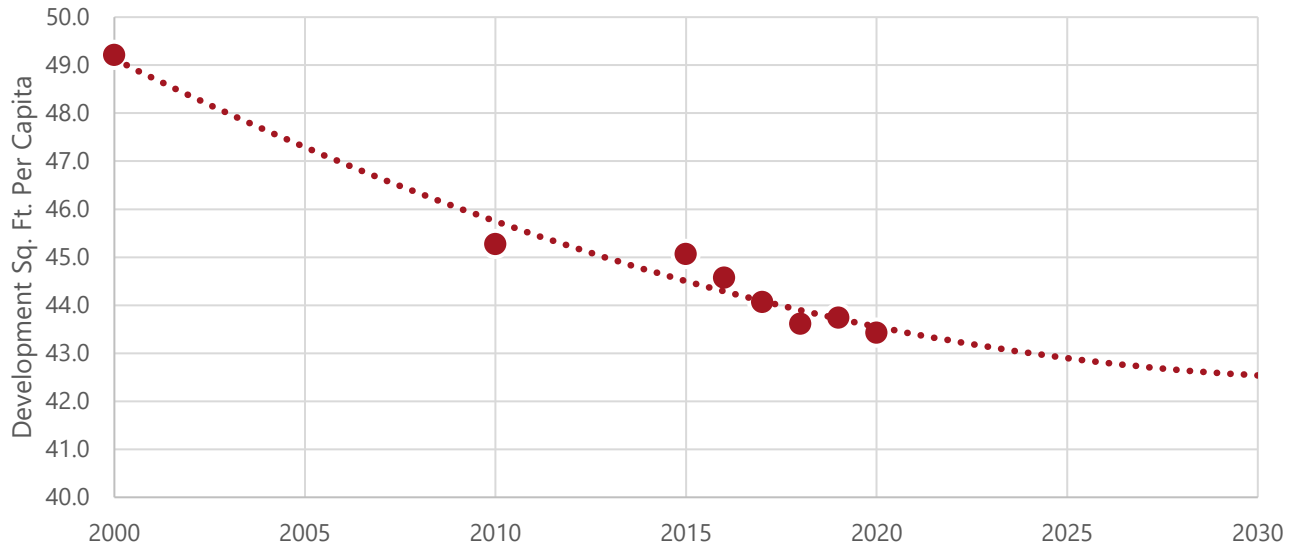
As is the case in the rest of the country, there has been a gradual decline in the amount of retail space developed per capita in the Wenatchee Valley, as shown in the following chart. Before 2000, there was upwards of 50 square feet of retail space per person living in the area. Today, due to recent population growth and a lack of retail development, that figure is approaching 43 square feet. This is largely because between 2000 and 2010, approximately 35 square feet of retail space was developed for every new person living in the area. Since 2010, that figure has dropped to just 22 square feet per person.

While smaller pockets of larger format retailers will likely pop up in the future in response to the region's housing growth, it is unlikely to resemble the trends of the 1980s and 1990s that saw large format retails spring up throughout the Valley. Instead, traditional retailers will likely concentrate in strategic locations along major arterials where access and visibility remain good, such as in South Quincy. Neighborhood-scale retailers will be more broadly distributed.

Office. There is a very limited office market in the Wenatchee region. Office-using industries account for only six percent of all employment in the market area. Much like the retail sector, the office sector has seen diminishing growth, with less than 15 square feet of space per capita overall, and only five square feet of office space added per person over the past 20 years. The office sector has been consolidating for many years, with typical office employees accounting for an

average of just 180 square feet of office space in 2021. The increasing popularity of remote work and work-from-home lifestyles may generate more demand for smaller office spaces in Wenatchee, but larger speculative office developments remain unlikely in the future. Expansions of existing facilities, build-to-suit corporate offices, and office spaces that are secondary uses as part of larger developments may occur and will likely align with past employment trends.

Figure 29. Market Area Retail Square Feet Per Capita

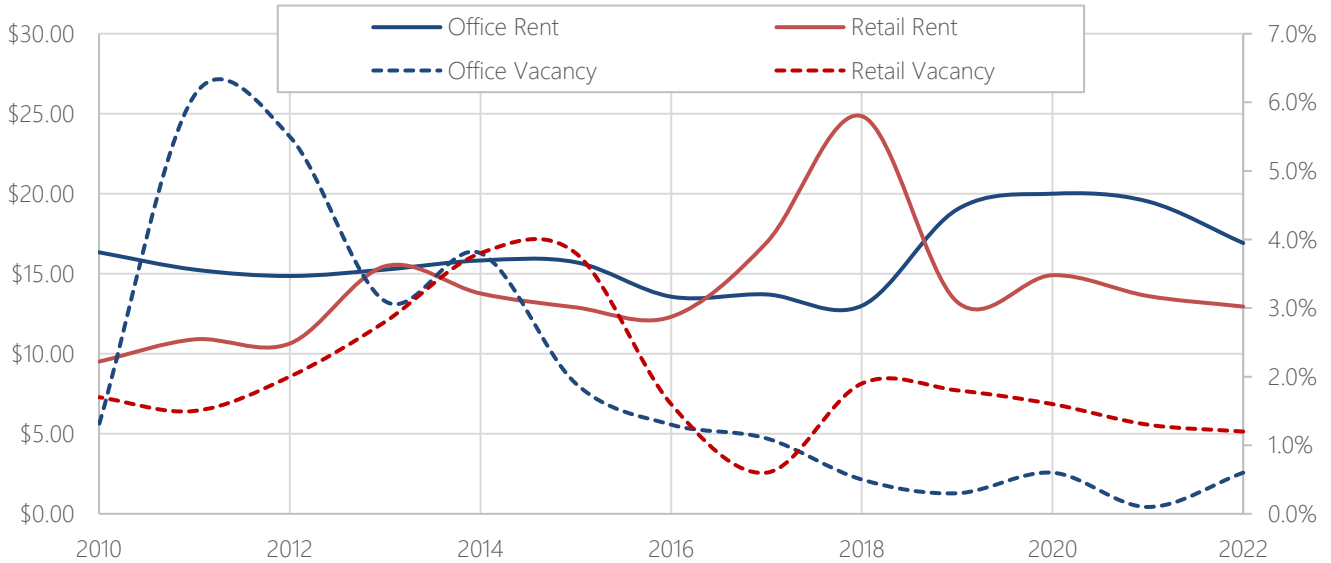


Source: CoStar, WA OFM

Vacancies in the market have dropped significantly for both retail and office uses since the last major commercial construction was absorbed in 2014.

Retail rents in the Wenatchee market have stagnated after seeing positive gains in 2017-2018, despite low vacancy rates. Office rents were in the midst of a modest increase leading into 2020, but the COVID pandemic provided many challenges for office users and rents have likely suffered as a result. This shows little evidence of market support for additional commercial space, except in select locations.

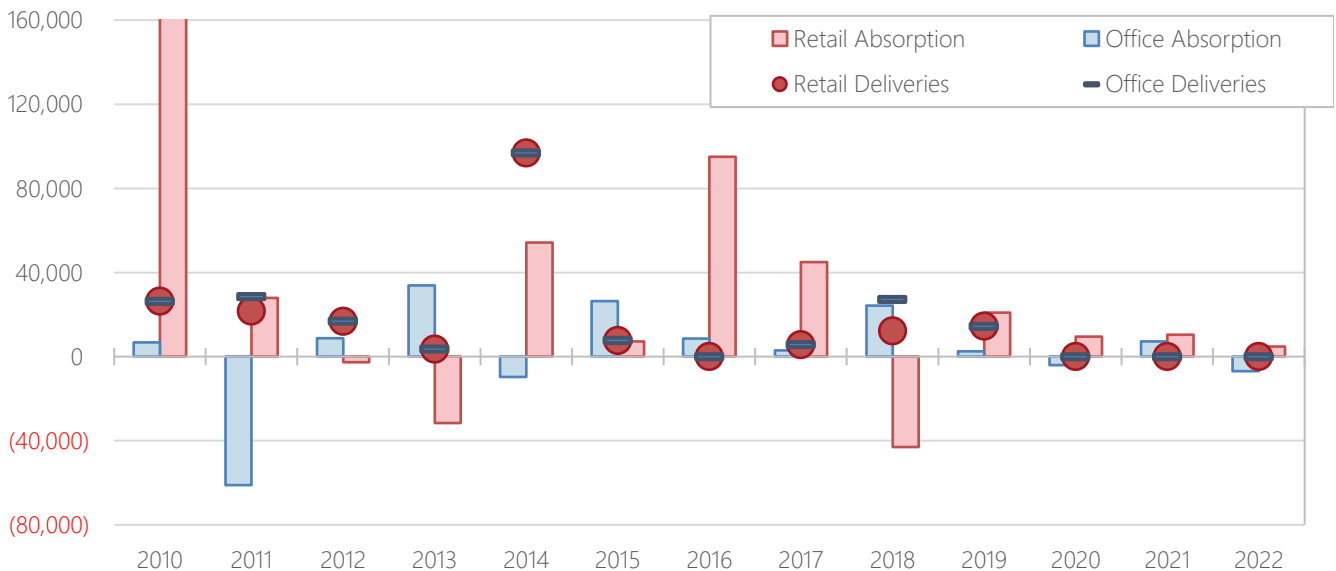
Figure 30. Market Area Commercial Rent and Vacancy Trends



Source: CoStar

As noted above, very little commercial development has been built recently, and there is nothing of significance in the development pipeline, although population and employment growth over the past several years may spur new investment. There have been multiple instances of negative absorption (caused by retailers vacating stores) that reflect a challenging retail market. Absorption has largely been zero for several years due to the lack of leasable space on the market. While some office brokers suggest that 7,000 square feet of office space are being absorbed to market annually in the Wenatchee Valley, this still reflects relatively low market demand for new space in the future.

Figure 31. Market Area Retail Construction and Absorption Trends



Source: CoStar

Industrial/Flex Market Dynamics

As the following table shows, industrial occupations comprised 30% of all jobs in the Wenatchee MSA in 2021, according to the Bureau for Labor Statistics (BLS). This percentage increased from 26% in 2011. Industrial jobs grew by 3.5% annually between 2011 and 2021 and accounted for more than half of total employment growth during this time. Given the previously described macro and local economic trends and the composition of the development pipeline, LCG expects this trend to continue for the foreseeable future.

Figure 32. Industrial Occupations as a Percentage of Total Growth, 2011-2021, Wenatchee MSA

	2011	2021	Total Growth	Annual Growth
Industrial Occupations	9,830	13,880	4,050	3.5%
All Occupations	37,940	45,790	7,850	1.9%
% Industrial	26%	30%	52%	

Source: BLS

The industrial market is dominated by agricultural facilities and data centers. Agricultural facilities include fruit packing, corporate campuses, light manufacturing, and other facilities. Many of these facilities have continued to expand their real estate footprint to respond to the demand drivers outlined in previous pages. However, due to technological advances in automation and productivity, these expansions generally result in limited job creation.

Data centers have been a relatively recent development in comparison, with most of the existing facilities built in the last 15 years. While data centers/server farms do not require many on-site jobs to operate, there is typically a constant stream of activity throughout the day and night as “tenants” or users, maintenance people, and other staff tend to various aspects of the facility. According to a report by the United States Chamber of Commerce, a 165,000 square foot data center will typically employ about 157 people during standard operations (and 1,700 people during construction), the equivalent of 1,050 square feet per employee.²

Growth Areas

Industrial growth areas are largely consistent with existing zoning and development patterns with one exception: the proposed Malaga industrial area. Malaga contains hundreds of acres of developable land and the shuttered Alcoa plant. The lack of infrastructure is a significant issue, although LCG understands that large users like Microsoft will partner with both the local PUD and the City to build the necessary infrastructure.

² https://www.uschamber.com/assets/archived/images/ctec_datacenterrpt_lowres.pdf

County	Growth Areas	Type
Chelan	Malaga	Data centers, agricultural facilities, cold storage
Douglas	Pangborn, Baker Flats	Data centers, manufacturing, agricultural facilities, cold storage
Grant	Quincy (north), George	Data centers, manufacturing, distribution, agricultural facilities, cold storage, rail-oriented users

Source: Leland Consulting Group

Recent Industrial Developments

The vast majority of new and planned industrial development is related to the data center industry. The figure and table below show recently built industrial developments. These projects have totaled approximately 2.7 million square feet between 2006 and 2022, averaging 142,000 square feet of development per year. Data centers have accounted for about 2.2 million square feet of this total.

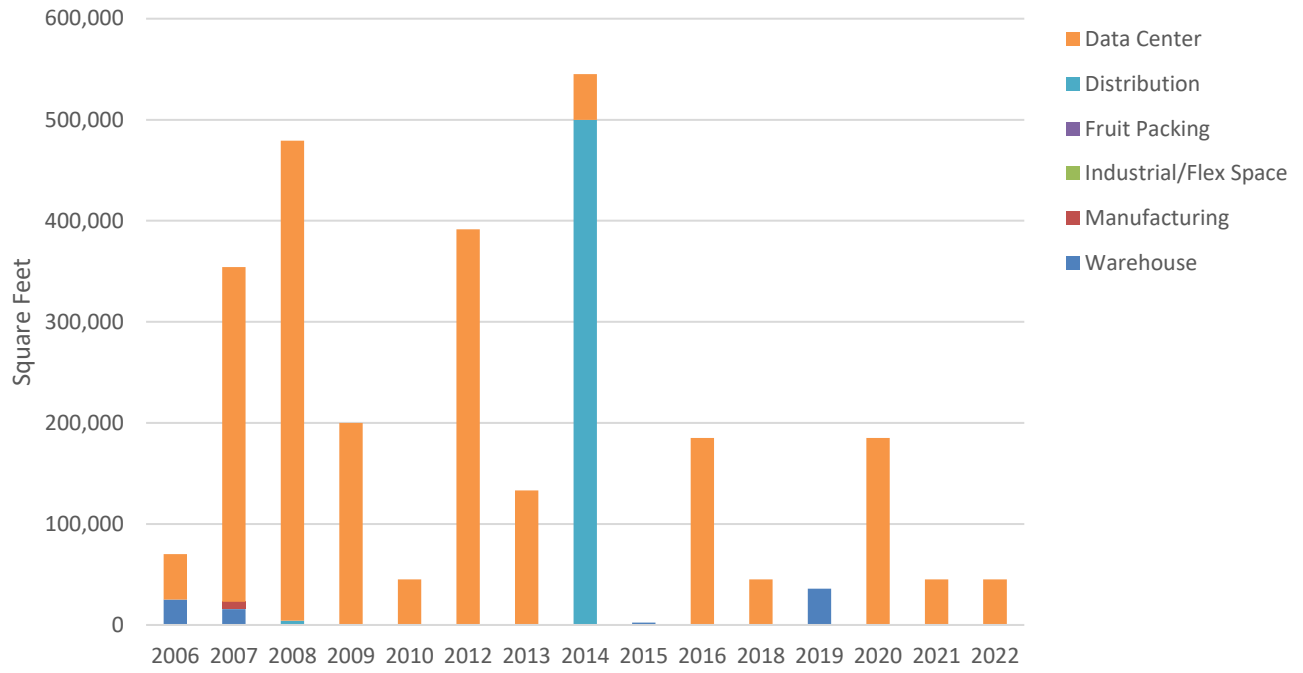
The chart below shows construction trends for these projects. Several of the largest data center projects include multiple buildings over many years; as such, these projects have been shown as multiple-year developments.

In terms of location, Quincy has attracted the most investment over the past 16 years, followed by East Wenatchee (driven largely by Pangborn), then Wenatchee.

Notable trends include:

- Quincy has been responsible for 1.8 million square feet of development, which has been almost exclusively data centers,
- East Wenatchee, with 0.5 million square feet, has seen a much more diverse industrial portfolio, with manufacturing, warehousing, and general industrial uses, as well as two large data centers, and
- Wenatchee has also seen 0.5 million square feet of development over this time. However, this is largely comprised of the 500,000-square-foot McDougal Fruit facility.

Figure 33. Industrial Construction Activity, 2006-2022



Source: CoStar

Table 10. Recent Development Projects, 2006-2022

Type	Project Name	City	Location	Project Sq. Ft.	Year Commenced
Warehouse	N/A	Wenatchee	South (Waterfront)	3,000	2006
Distribution	N/A	Wenatchee	South (Waterfront)	4,320	2008
Warehouse	N/A	Wenatchee	Malaga	5,000	2015
Warehouse	N/A	Wenatchee	Central Waterfront	2,420	2019
Data Center	Microsoft	Quincy	NW Quincy	450,000	2006
Data Center	Yahoo	Quincy	NE Quincy	331,000	2007
Data Center	H5 Data Centers	Quincy	NE Quincy	240,000	2008
Data Center	NTTDATA	Quincy	NE Quincy	206,688	2012
Data Center	Sabey Corp.	Quincy	NE Quincy	420,000	2012
Data Center	Vantage DC	Quincy	NE Quincy	133,000	2013
Warehouse	N/A	East Wenatchee	Pangporn	7,200	2006
Warehouse	N/A	East Wenatchee	Pangporn	10,032	2006
Warehouse	N/A	East Wenatchee	Central Westside	4,300	2006
Manufacturing	N/A	East Wenatchee	Pangporn	46,493	2007
Warehouse	N/A	East Wenatchee	Central Westside	3,483	2007
Warehouse	N/A	East Wenatchee	N. East Wenatchee	10,560	2007
Data Center	Sabey Corp.	East Wenatchee	Pangborn	393,000	2008

Source: CoStar, SEPA, CDTC, LCG

Development Pipeline

The following information documents planned and proposed projects (to the best of LCG’s knowledge).

Similar to recent development trends, the vast majority of the development pipeline over the next 10+ years is comprised of data center developments.

Figure 34. Proposed Industrial Development by Type

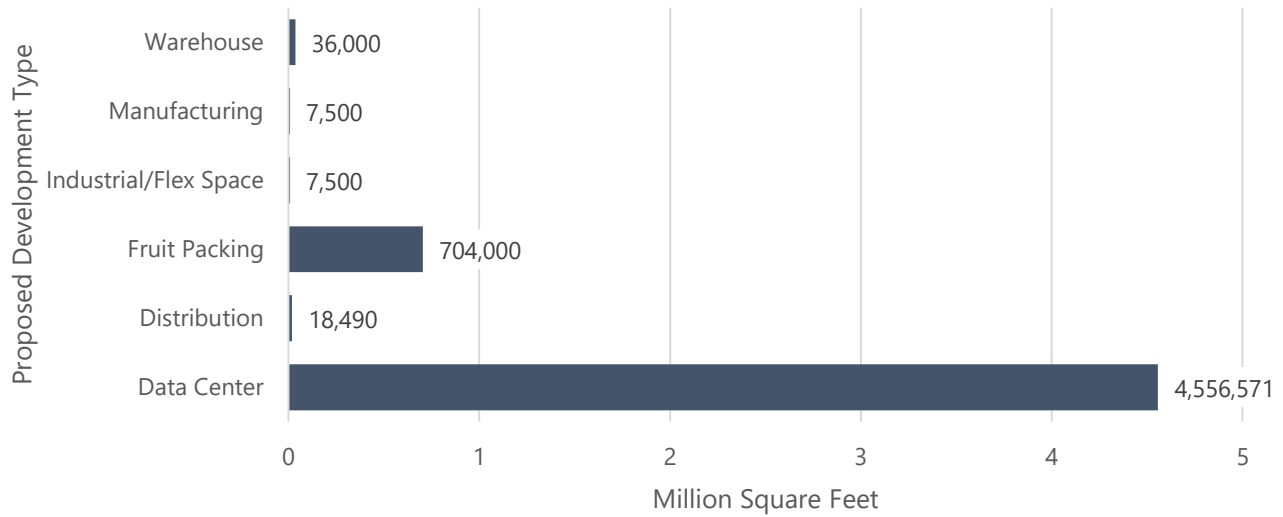


Table 11. Proposed Industrial Development Projects

Type	Project Name	City	Location	Sq. Ft.	Proposed Start
Data Center	Microsoft Corporation	Wenatchee	Malaga	250,000	2025
Data Center	CyrusOne	Quincy	NW Quincy	920,000	2023
Data Center	Environmental Systems Design	Quincy	NW Quincy	950,000	2023
Data Center	Microsoft Corporation	Quincy	NW Quincy	15,600	2023
Data Center	Sabey Corporation	Quincy	NE Quincy	190,971	2023
Data Center	Sabey Corporation	Quincy	NE Quincy	250,000	2023
Data Center	Vantage DC	Quincy	NE Quincy	396,000	2023
Data Center	H5 Data Centers	Quincy	NE Quincy	240,000	2023
Data Center	Sabey Corporation	Quincy	NE Quincy	450,000	2025
Data Center	Sabey Corporation	East Wenatchee	Pangborn	560,000	2023
Data Center	Microsoft Corporation	East Wenatchee	Pangborn	90,000	2023
Data Center	Microsoft Corporation	East Wenatchee	Pangborn	244,000	2023
Distribution	Unknown	East Wenatchee	Pangporn	18,490	2023
Flex Space	Unknown	East Wenatchee	Pangborn	7,500	2023
Manufacturing	Unknown	East Wenatchee	Pangporn	7,500	2023
Warehouse	L.E. Wilson Expansion	East Wenatchee	Pangborn	36,000	2023
Fruit Packing	Northern Fruit	East Wenatchee	N. of City	704,000	2023

Source: CoStar, SEPA, CDTC, Leland Consulting Group

Notable takeaways from the table and chart above are listed below.

- Of the 4.6 million square feet of proposed data centers in the region, 3.4 million square are in Quincy, continuing the regional concentration.

- The Microsoft data center proposal in the Malaga area, as well as other as yet unknown development in the area, will increase industrial development in the Wenatchee area.
- The Pangborn Industrial Service Area is likely to see a major uptick in development activity based on the active development proposals in the area. Almost 1.0 million square feet are proposed. At a floor area ratio of 0.20 (in keeping with other developments), this would account for about 115 acres of land or more and generate about 1,000 permanent jobs.
- Elsewhere in East Wenatchee, the only significant known industrial proposal is the Northern Fruit packing facility in Baker Flats. Stakeholders interviewed for this project indicate about 1,500 jobs would be created.

Land Capacity Analysis

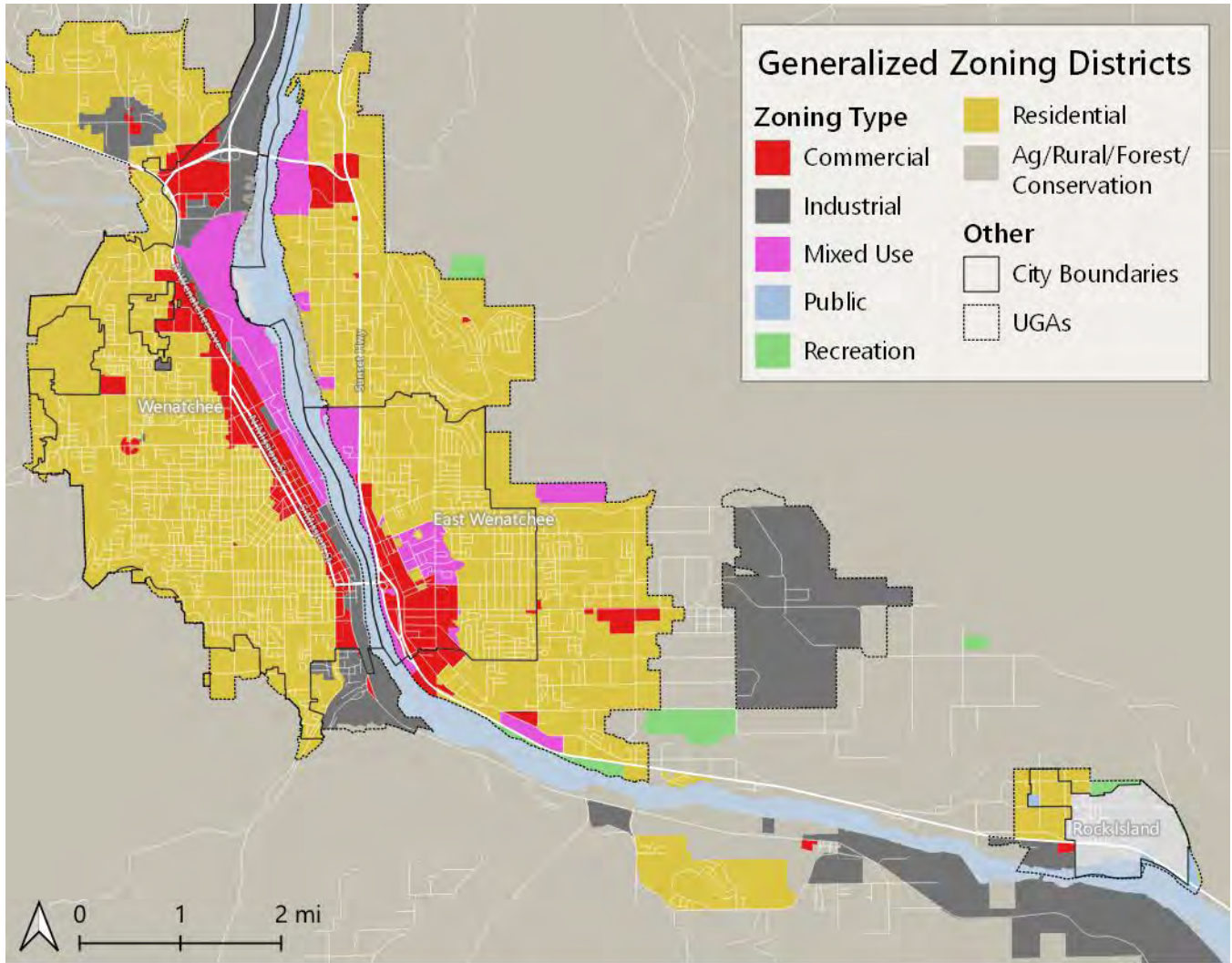
While there is a strong market for residential and industrial uses that will likely drive development activity in the region for the foreseeable future, land in the Wenatchee Valley is highly constrained, primarily due to topography. Significantly more land is available near Quincy (accessed via the SR 28 corridor), which is largely getting developed as housing and industrial (primarily data centers) development.

An important element of a development forecast is land carrying capacity. Single-family homes and industrial development are generally built on vacant land, while the economics of some commercial and multifamily developments may support infill or redevelopment. Construction trends will typically slow as an area nears its land carrying capacity until market dynamics support densification and redevelopment. LCG expects there to be limited future examples of the redevelopment of existing properties in the market area outside of downtown Wenatchee. With adequate residential land capacity in the region, as discussed below, any redevelopment and infill in downtown Wenatchee would have the effect of increasing capacity overall.

Land capacity and availability depend on several factors, including regulatory conditions (e.g., zoning, UGAs, etc.) and environmental conditions (e.g., the presence of wetlands, steep slopes, etc.). This land capacity analysis considers land within existing urban growth areas for development and also includes areas outside existing UGAs if development activity is already occurring.

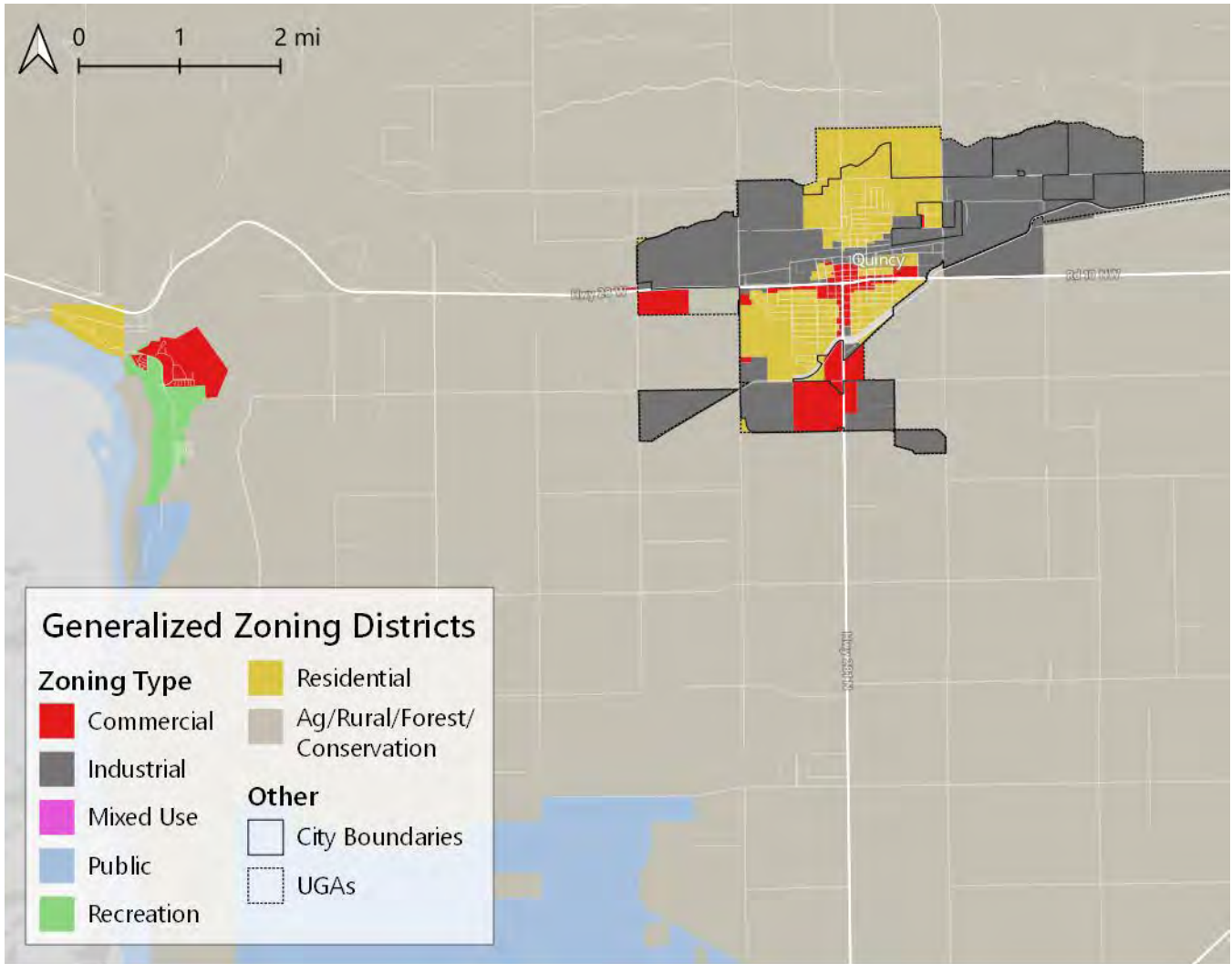
The following information provides an overview of the "carrying capacity" of the market area for new development.

Figure 35. Zoning (Wenatchee)



Source: County Assessor, Leland Consulting Group

Figure 36. Zoning (Quincy Area)



Source: County Assessor, Leland Consulting Group

LCG's land capacity analysis is generally focused on areas within existing urban growth areas, except for unique situations like the Microsoft expansion in the Malaga area of Chelan County and the unincorporated area between the East Wenatchee UGA and the Pangborn UGA. LCG expects significantly lower density development patterns to occur in land outside of the UGAs.

The following table shows the amount of vacant land (in total acres) by zoning (standardized for an apples-to-apples comparison) and location. LCG expects land within existing city limits to develop more quickly than land within the urban growth areas of each county. Land outside of these UGAs is not expected to develop at any density of significance and was excluded from this analysis except where noted in the table.

It is important to note that this analysis was done at a high level and did not account for major development impediments like wetlands, challenging topography, or infrastructure constraints. Wherever possible, LCG filtered out parcels occupied by transportation, recreational uses, and other natural features that are unlikely to be privately developed in the future.

Table 12. Vacant Land Acreage by Zoning and Location

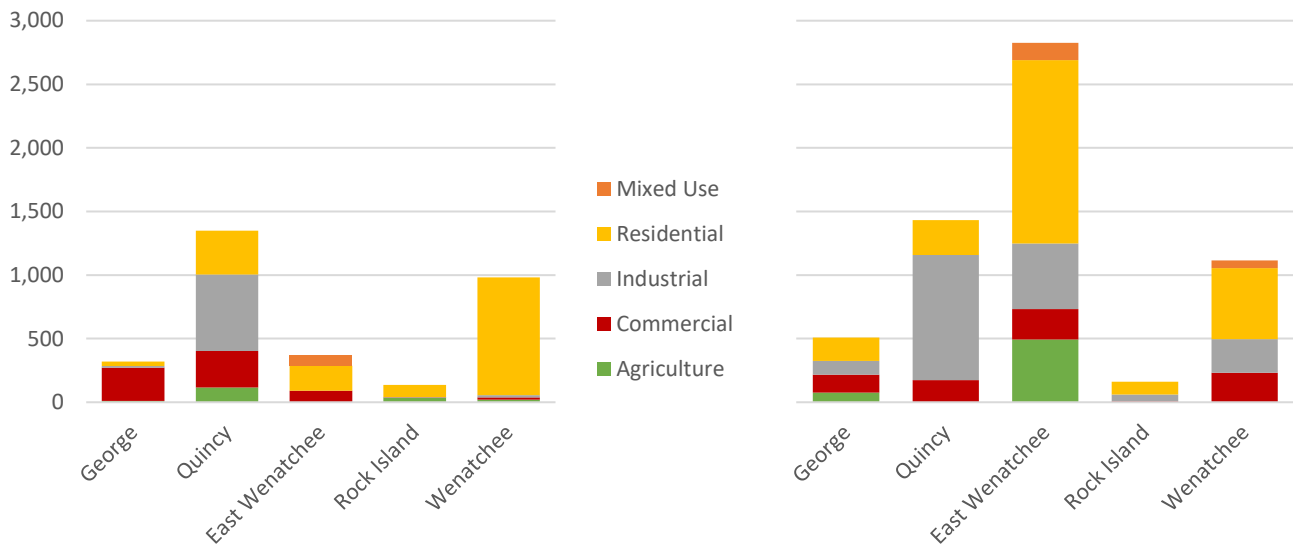
Location	Agriculture	Commercial	Industrial	Residential	Mixed-Use	Total
George						
City Limits	10	264	11	36		285
Unincorporated UGA	75	141	110	184		546
Quincy						
City Limits	116	289	600	345		1,349
Unincorporated UGA		174	982	275		1,432
East Wenatchee						
City		90		198	85	372
Pangborn UGA	84		515			599
Unincorporated UGA	410	238		1,444	136	2,228
Other Unincorp.	3,769			16		3,785
Rock Island						
	36	8	58	196		298
City	36	1	5	95		137
Unincorporated UGA		7	53	101		161
Wenatchee						
City	20	19	17	901		981
Unincorporated UGA		232	264	517	58	1,114
Total	4,519	1,454	2,558	4,110	279	12,988
City	181	662	633	1,574	85	3,124
Unincorporated UGA	569	792	1,924	2,520	194	6,079
Other	3,769	0	0	16	0	3,785

Source: County Assessor Zoning and Parcel Datasets, LCG

The following chart shows this same data but focuses on city versus unincorporated UGA land for each city. Despite being one of the smallest cities, Quincy has the most vacant acreage, particularly for industrially-zoned land. Wenatchee also has a significant amount of vacant land, primarily for residential.

Each unincorporated UGA has significant opportunities for new development. These areas are more likely to lack the major infrastructure to support new development and will be annexed in phases throughout the next two decades and beyond.

Figure 37. Vacant Land by Zoning and Location, Existing City Limits (left), Unincorporated UGA (right)



To calculate estimates of net acreage, LCG assumes about 50 percent of gross acreage will be used for transportation (streets, circulation, parking) and open space and densities and FARs consistent with recent development patterns.

Table 13. Vacant Land Capacity to Support Housing Units and Development Square Feet, Incorporated Cities

City	Agriculture (Hsg. Units)	Commercial Square Feet	Industrial Square Feet	Residential (Hsg. Units)	Mixed Use (Hsg. Units)
George	5	1,148,067	49,179	126	0
Quincy	58	1,256,967	2,614,428	1,207	0
East Wenatchee	0	391,125	0	692	850
Rock Island	18	4,966	20,473	334	0
Wenatchee	10	82,198	74,793	3,154	0
Total	91	2,883,324	2,758,873	5,512	850

Table 14. Vacant Land Capacity to Support Housing Units and Development Square Feet, Urban Growth Areas

Unincorporated UGA	Agriculture (Hsg. Units)	Commercial Square Feet	Industrial Square Feet	Residential (Hsg. Units)	Mixed Use (Hsg. Units)
George	38	612,628	479,639	367	0
Quincy	0	758,902	4,278,812	551	0
East Wenatchee	247	1,038,122	2,243,340	2,887	1,359
Rock Island	0	30,928	232,175	202	0
Wenatchee	0	1,008,741	1,148,242	1,034	583
Total	285	3,449,321	8,382,207	5,041	1,942

Source: Leland Consulting Group

Based on the vacant land within existing city limits, there is enough land to support about 6,360 new housing units, which is enough to accommodate the market-based growth projections. Additionally, there is enough land to support 2.9 million square feet of commercial space and 2.8 million square feet of industrial space. While there is technically enough land to accommodate the residential growth, some sites may have environmental, policy, and code constraints that make it infeasible for developers to build on all sites, which would drive some growth to unincorporated UGAs. The unincorporated UGA areas have significant growth potential for all land uses, and could potentially support an additional approximately 7,000 new housing units, 3.5 million square feet of commercial development, and 8.4 million square feet of industrial.

There are 5.3 million square feet of industrial proposed in the market area (both city and unincorporated UGA land). This exceeds LCG's estimate of available vacant industrial land within city limits. As unincorporated UGA land continues to develop with industrial uses, the region's public decision-makers will need to identify expansion areas or rezone existing land for industrial uses. There is likely a significant excess of commercially zoned land currently.

Appendix: Market Based Projections by TAZ

TAZ	2020 Jobs	2045 Jobs	2020 Housing Units	2045 Housing Units	Projected New Jobs	Projected Housing Unit Growth
100	234	307	0	0	73	0
101	1	1	5	5	0	0
102	131	354	31	314	223	283
103	397	646	31	314	249	283
104	174	377	0	0	203	0
105	395	642	0	0	247	0
106	126	228	0	0	102	0
107	92	177	5	5	85	0
108	203	274	11	11	71	0
109	345	345	6	6	0	0
110	117	117	47	50	0	3
111	2	2	81	82	0	1
112	6	6	107	107	0	0
113	118	118	4	5	0	1
114	13	13	122	136	0	14
115	11	11	51	141	0	90
116	194	194	23	303	0	280
117	0	0	118	118	0	0
118	0	0	144	145	0	1
119	0	0	15	104	0	89
120	0	0	106	243	0	137
130	167	167	13	13	0	0
131	319	417	0	0	98	0
132	834	972	31	91	138	60
133	186	343	62	314	157	252
134	673	745	32	35	72	3
135	1181	1421	632	634	240	2
136	323	349	4	4	26	0
137	611	646	15	23	35	8
138	536	575	0	0	39	0
140	2	2	127	127	0	0
141	9	42	278	338	33	60
142	631	656	25	25	25	0
143	133	158	140	142	25	2
144	156	171	174	175	15	1
145	43	43	376	376	0	0
146	159	169	272	314	10	42
147	514	561	78	78	47	0
148	12	12	125	125	0	0

TAZ	2020 Jobs	2045 Jobs	2020 Housing Units	2045 Housing Units	Projected New Jobs	Projected Housing Unit Growth
149	109	87	277	280	-22	3
160	0	0	138	148	0	10
161	240	294	178	188	54	10
162	41	41	313	315	0	2
163	31	31	114	114	0	0
164	21	21	454	454	0	0
165	149	199	535	535	50	0
166	36	36	267	269	0	2
167	62	62	138	138	0	0
168	0	0	167	172	0	5
180	40	40	146	150	0	4
181	9	9	343	343	0	0
182	603	603	303	303	0	0
183	22	22	220	222	0	2
184	209	209	220	219	0	-1
200	323	363	54	54	40	0
201	1357	1418	23	86	61	63
202	203	222	63	125	19	62
203	1260	1337	127	192	77	65
204	351	415	5	494	64	489
205	327	360	16	80	33	64
206	369	378	95	97	9	2
207	179	325	124	125	146	1
208	135	163	36	36	28	0
220	43	43	304	308	0	4
221	143	143	73	74	0	1
222	336	402	0	0	66	0
223	119	138	6	6	19	0
224	72	166	21	27	94	6
225	8	8	105	115	0	10
226	24	24	184	231	0	47
227	75	75	165	212	0	47
228	0	0	155	155	0	0
229	90	90	230	230	0	0
230	280	280	284	285	0	1
231	45	45	168	182	0	14
232	57	57	235	235	0	0
233	90	90	129	159	0	30
234	164	164	16	16	0	0
235	3	3	130	170	0	40
236	34	34	157	157	0	0

TAZ	2020 Jobs	2045 Jobs	2020 Housing Units	2045 Housing Units	Projected New Jobs	Projected Housing Unit Growth
240	2276	2594	35	35	318	0
241	7	7	137	295	0	158
242	87	87	253	257	0	4
243	23	23	157	273	0	116
244	107	128	249	249	21	0
245	124	174	128	128	50	0
246	166	195	5	5	29	0
247	171	193	252	252	22	0
248	59	59	106	160	0	54
249	16	16	60	73	0	13
250	19	19	114	182	0	68
251	100	121	0	0	21	0
260	33	33	250	250	0	0
261	219	284	133	134	65	1
262	19	19	300	425	0	125
263	26	31	246	247	5	1
264	36	38	245	252	2	7
265	2	2	31	37	0	6
266	47	47	11	26	0	15
267	0	0	251	251	0	0
280	19	19	204	211	0	7
281	144	153	182	359	9	177
282	157	182	167	195	25	28
283	84	84	348	648	0	300
284	0	0	42	42	0	0
285	0	0	0	0	0	0
286	9	9	151	163	0	12
287	0	0	328	397	0	69
300	304	326	0	0	22	0
301	1219	1378	4	4	159	0
302	509	569	0	0	60	0
303	783	1338	2	2	555	0
304	401	642	0	0	241	0
305	51	151	0	0	100	0
306	34	34	0	0	0	0
307	44	44	155	156	0	1
308	167	243	110	331	76	221
309	4	39	105	361	35	256
310	25	25	62	75	0	13
311	288	369	0	0	81	0
312	475	679	0	0	204	0

TAZ	2020 Jobs	2045 Jobs	2020 Housing Units	2045 Housing Units	Projected New Jobs	Projected Housing Unit Growth
313	127	257	0	0	130	0
320	523	553	8	8	30	0
321	1403	1431	1	1	28	0
322	152	182	415	459	30	44
323	33	45	145	225	12	80
324	62	62	270	324	0	54
325	285	295	211	228	10	17
326	253	253	4	4	0	0
340	52	58	61	61	6	0
341	44	44	137	160	0	23
342	58	58	64	68	0	4
360	163	163	298	319	0	21
361	55	234	351	418	179	67
362	217	373	267	343	156	76
363	414	658	13	13	244	0
364	344	366	235	252	22	17
400	48	48	174	164	0	-10
401	11	11	270	271	0	1
402	105	190	377	377	85	0
403	273	391	73	73	118	0
404	1	1	162	212	0	50
405	61	61	106	112	0	6
420	540	563	0	0	23	0
421	28	51	44	44	23	0
422	163	338	437	437	175	0
423	53	53	99	99	0	0
424	414	430	0	0	16	0
425	249	249	0	0	0	0
426	272	314	0	0	42	0
427	138	161	31	31	23	0
440	132	161	0	0	29	0
441	249	309	60	62	60	2
442	611	647	50	51	36	1
443	275	342	88	88	67	0
444	171	171	4	5	0	1
445	94	94	26	29	0	3
446	58	58	217	324	0	107
447	181	217	20	20	36	0
460	34	34	330	330	0	0
461	130	130	110	110	0	0
462	111	149	336	336	38	0

TAZ	2020 Jobs	2045 Jobs	2020 Housing Units	2045 Housing Units	Projected New Jobs	Projected Housing Unit Growth
463	6	69	49	955	63	906
464	11	11	54	874	0	820
465	15	15	291	372	0	81
466	9	9	144	491	0	347
467	10	10	211	210	0	-1
480	418	575	65	89	157	24
481	264	306	53	54	42	1
482	44	44	146	150	0	4
483	35	35	149	152	0	3
484	11	11	84	86	0	2
485	15	15	233	235	0	2
486	50	50	161	278	0	117
487	7	7	4	51	0	47
488	24	24	76	92	0	16
489	15	15	241	241	0	0
490	1	1	97	97	0	0
491	8	8	86	91	0	5
492	143	176	50	68	33	18
493	120	120	65	78	0	13
494	70	70	79	79	0	0
495	18	18	305	307	0	2
496	5	5	162	162	0	0
497	77	77	251	319	0	68
500	181	248	98	127	67	29
501	5	5	66	96	0	30
502	42	52	127	218	10	91
503	23	23	95	151	0	56
504	74	74	124	195	0	71
505	6	6	162	196	0	34
506	1	1	76	96	0	20
507	73	138	122	143	65	21
508	13	13	171	212	0	41
509	35	35	114	184	0	70
510	11	11	214	226	0	12
511	19	19	178	229	0	51
512	0	0	0	0	0	0
513	11	11	238	243	0	5
514	74	74	69	70	0	1
515	25	25	203	217	0	14
520	13	16	22	53	3	31
521	18	238	20	20	220	0

TAZ	2020 Jobs	2045 Jobs	2020 Housing Units	2045 Housing Units	Projected New Jobs	Projected Housing Unit Growth
522	23	153	20	20	130	0
523	11	138	20	20	127	0
524	24	110	49	39	86	-10
525	17	17	129	218	0	89
526	7	101	11	11	94	0
527	19	93	8	17	74	9
528	0	0	24	348	0	324
529	2	0	75	82	-2	7
530	48	2	103	117	-46	14
531	2	48	34	36	46	2
532	2	2	34	36	0	2
540	347	965	82	82	618	0
541	276	328	20	20	52	0
560	31	31	469	549	0	80
561	15	15	255	348	0	93
562	83	83	1	1	0	0
563	0	0	7	7	0	0
580	3	3	127	203	0	76
581	22	22	326	435	0	109
582	76	76	132	259	0	127
583	124	239	10	10	115	0
584	35	646	0	0	611	0
585	13	13	25	35	0	10
586	66	251	7	7	185	0
587	180	183	14	23	3	9
588	99	1147	16	16	1048	0
590	27	27	45	78	0	33
591	2	2	9	32	0	23
592	22	22	198	233	0	35
593	202	244	182	205	42	23
594	137	161	96	113	24	17
595	45	45	18	18	0	0
596	194	194	55	314	0	259
597	34	34	181	345	0	164
600	312	312	88	121	0	33
601	44	103	102	112	59	10
602	0	0	16	39	0	23
603	79	173	161	428	94	267
604	48	79	150	196	31	46
605	5	20	60	203	15	143
606	8	8	34	73	0	39

TAZ	2020 Jobs	2045 Jobs	2020 Housing Units	2045 Housing Units	Projected New Jobs	Projected Housing Unit Growth
607	43	135	37	107	92	70
608	51	212	0	0	161	0