BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

CITY OF WENATCHEE, Petitioner, vs. BURLINGTON NORTHERN SANTE FE RAILWAY, Respondent.	)	DOCKET TR-220540 PREFILED TESTIMONY OF RYAN HARMON

Please state you name and job title.

My name is Ryan Harmon. I am a Project Engineer for the City of Wenatchee Department of Public Works.

Are you familiar with the 9th Street Crossing Project?

Yes, I am familiar with the project. In my role as Project Engineer, I am the project manager for and oversaw the design of the 9th Street Crossing project.

Is the 9th Street Crossing Project funded by federal funds?

Yes, the City is utilizing federal funds for this project. The City was awarded funding through the Railway-Highway Crossings (Section 130) Program from the Federal Highway Administration (FHWA). The city, in partnership with BNSF Railway, was awarded $1,321,165 from this program (**Exhibit A**).

Can you explain the current roadway conditions at the rail crossing?

The roadway section varies in width from 34-ft to 47-ft wide. Lane widths are not delineated beyond a double yellow centerline (DYCL) on the western leg and the intersection of 9th Street and Piere Street is located parallel to the railroad tracks approximately 100-feet to the East from center of the nearest tracks to the DYCL of Piere Street. Currently there are no pedestrian facilities for pedestrians to cross the railroad and they are forced to enter into the travel lanes or navigate over the rock ballast on the side of the road. There are two main tracks servicing 14 trains per day (including 2 passenger trains per day) based on the most current U.S. DOT Crossing Inventory Form (**Exhibit B**) for this crossing. Additionally, this Inventory Form specifies that there are 4,358 daily vehicle trips containing 10% trucks and 8 daily school buses. Photos of the existing configuration are attached as **Exhibit C**.

Can you explain the current warning devices at the rail crossing?

Currently, there is one cantilever mounted signal system and one automatic entrance gate for each direction of travel. There is one driving lane eastbound and one driving lane westbound with a total of 10 flasher sets of lights. There are two stop bars, two RR Xing pavement markings, two W10-1 approach signs with two W10-9 signs, two R15-1 regulatory signs with two R15-2 signs, and a double yellow centerline (DYCL) on the eastern approach.

Can you explain the proposed modifications at the rail crossing?

The 9th Street Crossing Project will construct important improvements to this corridor that sees large volumes of passenger vehicles, buses, freight, bicycles and pedestrians.
The active warning devices proposed for this location includes one cantilever, one automatic entry gate and one automatic exit gate for each direction of travel as well as one automatic entry

gate and one automatic exit gate for each sidewalk. This work, along with new concrete crossing panels, and an updated instrument house will be constructed by BNSF, who will be reimbursed by the City.

The other improvements at the crossing include a 6-inch high concrete median on the western leg of 9th Street to block traffic from trying to go around the railroad crossing arms while they are down. The City will also increase the roadway width of the crossing and construct curb, gutter, sidewalk and associated drainage improvements. This project will complete sidewalk gaps currently existing in the corridor. At the railroad crossing the sidewalk will be separated from the concrete curb and run behind the mast arms of the cantilever signals as requested by BNSF. Additionally, the City will be overlaying the existing pavement up to the concrete crossing panels improving pavement condition and providing a smoother transition to the crossing.

The City will also install two stop bars, two RR Xing pavement markings, two W10-1 approach signs with two W10-9 signs, two R15-1 regulatory signs with two R15-2 signs, DYCL on both approaches and white edge lines in accordance with the Manual on Uniform Traffic Control Devices (MUTCD). The proposed layout is attached as **Exhibit D**.

Why did the City design those specific improvements?

The City originally completed a grant application in 2017 (**Exhibit E**) with the plan to fill in the existing sidewalk gap, improve pavement markings and signage, install Z gates for pedestrians and install new illumination. The next stage in the grant application included a Highway-Rail Grade Crossing Diagnostic Evaluation Report held on November 6, 2017 (**Exhibit F**). This meeting was attended by representatives from WSDOT, UTC, BNSF, and the

City of Wenatchee. The report stated that accommodations for pedestrians and bicycles are needed and it was also stated that the crossing signals need to be updated to current standards. Following this meeting, the non-traversable median was added to project scope on the western leg of the crossing. Due to turning movement restrictions from nearby Piere Street a median was not feasible on the eastern leg. The recommended improvement in lieu of the median was a quad gate system. The City was awarded grant funding on January 12, 2018 for "Pedestrian/Bicycle ADA improvements, installation of four-quadrant gate signal system with pedestrian gates. Update signs and markings per MUTCD." These elements were added to the original scope as a result of the Diagnostic Evaluation meeting.

In design of this project these proposed improvements have been further reviewed. At the 30% design level the City proposed installing the sidewalk adjacent to the roadway section and thus utilizing the vehicle automatic gates to prevent pedestrian movement across the railroad tracks. This proposal would match the improvements at our Orondo Street crossing. The City was directed at this time that it was BNSF's preference that the sidewalk be placed behind the signal mast and roadway gate arm and that separate pedestrian gates be installed for the sidewalk.

Further discussions were held with BNSF about the requirements for the cantilever signals and the exit gate on the westbound lane. The City prefers to incorporate the use of cantilever signals for this project in order to maintain uniformity with the other mainline grade crossings within the City's Quiet Zone. The City also maintains that the exit gate on the westbound lane will provide safety benefit, specifically due to the location of a large commercial driveway adjacent to the center median.

Will the 9th Street Crossing Project improve public safety?

Yes. The 9th Street Crossing Project will improve public safety.

How will the 9th Street Crossing Project improve public safety?

9th Street is an urban minor arterial in the City of Wenatchee with a 2-track railroad crossing. It is listed as a "supporting freight system" roadway in the Wenatchee Valley Urbanized Area Freight Study (**Exhibit G**). The roadway connects the North Wenatchee Business District (NWBD) to the rapidly growing Waterfront Mixed Use area east of the BNSF Railway Tracks. The railroad crossing is located directly adjacent to the Waterfront Pedestrian Overlay. The City of Wenatchee Zoning Map is attached as **Exhibit H**. Located in the NWBD in the vicinity of 9th street are grocery stores, a local hospital, banks and restaurants that are destinations for drivers, pedestrians and cyclists in the Waterfront area. Directly east of the railroad tracks are two large apartment complexes, a new extended stay hotel, several businesses, and a riverfront park. These facilities lead to a multitude of users crossing the railroad tracks. With this crossing project already funded, the 9th Street corridor from the extents of this project to Miller Street is identified as Priority Project No. 1 based on the City of Wenatchee Local Road Safety Plan. The Local Road Safety Plan was established in 2018, and provides a systemic approach to addressing safety issues in the City of Wenatchee. This corridor was first identified due to the high presence of pedestrian and shoulder related accidents. Following a corridor study completed in 2020, the City's preferred alternative for the corridor reduces the 4 existing lanes to 3 lanes with bike lanes, update signing and pavement markings, and also modify the traffic signals in order to improve safety for vehicles, bicycles and pedestrians. The current version of the City's Local Road Safety Plan is attached as **Exhibit I**. Additionally, next year the City will

be overlaying 9th street from Walla Walla Ave to the east to the extents of our project at 9th Street. With that project, the City will be updating non-ADA compliant curb ramps at the intersection of Walla Walla Ave and 9th Street.

The City is committed to improving this corridor and the improvements included in the 9th Street Crossing project will improve public safety for vehicles, bicyclists, pedestrians and trains. The active warning devices and median being installed in this project will protect vehicles and trains from potential collisions by preventing vehicles from maneuvering around an entry gate. The widened roadway, channelized shoulder, along with the curb and gutter will reduce the risk of shoulder type accidents and will also create separation to a pedestrian sidewalk. The sidewalk, even if just installed behind the curb and gutter, will greatly increase safety for pedestrians. Pedestrians will no longer be required to enter into the traveled way to cross the railroad. By providing this surface for pedestrians to cross, the project will also greatly reduce tripping hazards that could lead to injury on the railroad tracks.

What will happen if the City cannot complete the proposed project?

This road is a major connector to the Waterfront from the NWBD and Residential zones to the west of the railroad crossing. Improvements to this full corridor will continue to draw more traffic, and the need for these improvements will be even more glaring.

If the City cannot complete the improvements included in this project, the railroad crossing will continue to function as a narrow vehicle crossing with no facilities for bicycles or pedestrians. Pedestrians will continue to utilize the paved travel lanes or rock ballast shoulder to cross the tracks. There will be no median or automatic gates available to prevent vehicles from

bypassing the entry warning devices. This will prevent the City from improving safety at this location to vehicles, bicycles, pedestrians as well as for trains and their cargo.

As uses of the corridor increase, the risk increases if it is not mitigated with projects such as this. We suspect the project was funded as it represents a high level of benefit for the cost. The benefit is safety enhancement to the road users and risk reduction for the City and BNSF.

Attached exhibits

Attached hereto and incorporated herein are the following exhibits:

Exhibit	**Description**	**# of Pages**
A	Federal Funding Notification	2
B	U.S. DOT Crossing Inventory Form	2
C	Photos of Existing Configuration	2
D	Proposed Crossing Layout	3
E	Section 130 Grant Application	4
F	Highway – Rail Grade Crossing Diagnostic Evaluation Report	10
G	Wenatchee Valley Urbanized Area Freight Study	54
H	City of Wenatchee Zoning Map	1
I	2022 Local Road Safety Plan	73

DECLARATION

I, Ryan Harmon, declare under penalty of perjury under the laws of the state of Washington that the foregoing Pre-filed Testimony of Ryan Harmon is true and correct to the best of my knowledge and belief.

DATED this 17TH day of JANUARY, 2023, at Wenatchee, Washington.

RYAN HARMON

Docket TR-220540
CERTIFICATE OF SERVICE

I hereby certify that I have this day served the attached Declaration of Ryan Harmon upon the persons and entities by electronic service as listed below.

DATED at Wenatchee, Washington, this 19th day of January, 2023.

Toni J Martin

TONI J. MARTIN, Legal Assistant
Davis, Arneil Law Firm, LLP
617 Washington Street
Wenatchee, WA 98801
toni@dadkp.com

For BNSF Railway Co.

Christopher G. Emch
Thomas F. Ahearne
Foster Garvey PC
chris.emch@foster.com
ahearne@foster.com
Adrian.winder@foster.com

Trey Sargent
General Attorney
BNSF Railway Company
trey.sargent@bnsf.com

For Attorney General

Jeff Roberson
Assistant Attorney General
Jeff.Roberson@utc.wa.gov

Administrative Law Judge

Rayne Pearson
rayne.pearson@utc.wa.gov

EXHIBIT “A”

FEDERAL FUNDING NOTIFICATION

Washington State Department of Transportation

Transportation Building
310 Maple Park Avenue S.E.
P.O. Box 47300
Olympia, WA 98504-7300
360-705-7000
TTY: 1-800-833-6388
www.wsdot.wa.gov

January 12, 2018

Mr. Matt Leonard
Public Works Director
City of Wenatchee
PO Box 519
Wenatchee, Washington 98807

9th Street
FFY 2017 Railway/Highway Crossing Selections
Federal Funding

Dear Mr. Leonard:

WSDOT is pleased to advise you that the above mentioned railroad crossing project was recently selected. The federal funding is limited to the amount shown below:

9th Street **$1,321,165**
Scope: See attached Project Summary
NOTE: This project requires a 10 percent local match. The local match requirement for construction is waived, if construction is authorized by April 30, 2019.

In order to meet state and federal requirements, the following are required:

- Project expenditures incurred before receiving notice from Local Programs of federal fund authorization are not eligible for reimbursement.
- Please refer to the Local Programs web page for detailed information, including: (http://www.wsdot.wa.gov/localprograms/)
  - ✓ Local Agency Guidelines (LAG) manual for the requirements regarding programming, authorization, reimbursement, etc.;
  - ✓ Projects utilizing federal funds must be included in your current Transportation Improvement Program (TIP) as a complete programmed project. Once your TIP amendment is approved, WSDOT will amend the Statewide Transportation Improvement Program (STIP);
  - ✓ Funding and billing forms;
  - ✓ Quarterly Project Reporting is required to be completed by the end of March, June, September, and December each year. To access the database you will need an account name and password. Your account name is **Wenatchee** and your password is **Wenat102**. The password is case sensitive.

As a reminder, Local Programs requires all agencies to submit monthly progress billings to ensure timely reimbursement of eligible federal expenditures.

For assistance please contact Paul Mahre, your Region Local Programs Engineer, at 509.667.3090.

Sincerely,

Kathleen B. Davis
Director
Local Programs

KBD:st:sas
cc: Jeff Wilkens, Executive Director, CDTC
Paul Mahre, North Central Region Local Programs Engineer

Program: 2017 Railway – Highway Crossings Program (Section 130)
Agency: City of Wenatchee
Date:
Project Title: 9th Street Crossing
Project Number: To be assigned
USDOT Crossing Number: 065838N

Project Description: Pedestrian/Bicycle ADA improvements, installation of four-quadrant gate signal system with pedestrian gates. Update signs and markings per the MUTCD.

Detailed Project Description:
Construct ADA compliant railroad pedestrian/bike crossings surfaces on both sides of 9th St through the railroad RW. Installation of four-quadrant gate signal system with pedestrian gates. Update signs and markings per the MUTCD.

Project Schedule (Estimated):

Project added to the Statewide Transportation Improvement Program (STIP)	01/2018
Begin PE (PE authorized by WSDOT/FHWA)	06/2018
Environmental documents approved (required for every project)	10/2019
Right of way completed (certification, if required)	03/2019
Railroad contract	02/2019
Contract advertised for roadway work (if required)	04/2019
Contract awarded (must occur within two years of selection)	05/2019
Open to traffic	08/2019

Project Cost and Award Amount:

Phase	Application Amount requested	10% local match if required	Local Match Source	Total Cost	Revised Amount from Diagnostic	Amount awarded
Preliminary Engineering	$58,145	$6,461	Arterial Street Fund	$64,605	$55,000	
Right-of-Way	$13,500	$1,500	Arterial Street Fund	$15,000	$0	
Construction	$318,412	$35,379	Arterial Street Fund	$353,791	$1,266,165	
Total	$390,057	$43,340		$433,379	**$1,321,165**	

Acknowledgement of Revised Estimate Amounts and Scope:

Signature: _____ **Date:** 1/8/2018

EXHIBIT “B”

U.S. DOT CROSSING INVENTORY FORM

U. S. DOT CROSSING INVENTORY FORM

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION

OMB No. 2130-0017

Instructions for the initial reporting of the following types of new or previously unreported crossings: For public highway-rail grade crossings, complete the entire inventory Form. For private highway-rail grade crossings, complete the Header, Parts I and II, and the Submission Information section. For public pathway grade crossings (including pedestrian station grade crossings), complete the Header, Parts I and II, and the Submission Information section. For Private pathway grade crossings, complete the Header, Parts I and II, and the Submission Information section. For grade-separated highway-rail or pathway crossings (including pedestrian station crossings), complete the Header, Part I, and the Submission Information section. For changes to existing data, complete the Header, Part I Items 1-3, and the Submission Information section, in addition to the updated data fields. Note: For private crossings only, Part I Item 20 and Part III Item 2.K. are required unless otherwise noted. An asterisk * denotes an optional field.

A. Revision Date (MM/DD/YYYY)	B. Reporting Agency	C. Reason for Update (Select only one)	D. DOT Crossing Inventory Number
09 / 01 / 2021	☐ Railroad ☐ Transit ☒ State ☐ Other	☒ Change in Data ☐ New Crossing ☐ Closed ☐ No Train Traffic ☐ Quiet Zone Update ☐ Re-Open ☐ Date Change Only ☐ Change in Primary Operating RR ☐ Admin. Correction	065838N

Part I: Location and Classification Information

1. Primary Operating Railroad	2. State	3. County
BNSF Railway Company [BNSF]	WASHINGTON	CHELAN

4. City / Municipality	5. Street/Road Name & Block Number	6. Highway Type & No.
☒ In ☐ Near WENATCHEE	9TH ST (Street/Road Name) | * (Block Number)	L5838

7. Do Other Railroads Operate a Separate Track at Crossing?	8. Do Other Railroads Operate Over Your Track at Crossing?
☐ Yes ☒ No If Yes, Specify RR	☒ Yes ☐ No If Yes, Specify RR ATK

9. Railroad Division or Region	10. Railroad Subdivision or District	11. Branch or Line Name	12. RR Milepost
☐ None NORTHWEST	☐ None COLUMBIA RIVER	☐ None WENACHE-SEATTLE	(prefix) | 1651.294 (nnnn.nnn) | (suffix)

13. Line Segment *	14. Nearest RR Timetable Station *	15. Parent RR (if applicable)	16. Crossing Owner (if applicable)
37	WENATCHEE	☒ N/A	☐ N/A BNSF

17. Crossing Type	18. Crossing Purpose	19. Crossing Position	20. Public Access (if Private Crossing)	21. Type of Train	22. Average Passenger Train Count Per Day
☒ Public ☐ Private	☒ Highway ☐ Pathway, Ped. ☐ Station, Ped.	☒ At Grade ☐ RR Under ☐ RR Over	☐ Yes ☐ No	☒ Freight ☐ Transit ☒ Intercity Passenger ☐ Shared Use Transit ☐ Commuter ☐ Tourist/Other	☐ Less Than One Per Day ☒ Number Per Day 2

23. Type of Land Use
☐ Open Space ☐ Farm ☐ Residential ☐ Commercial ☒ Industrial ☐ Institutional ☐ Recreational ☐ RR Yard

24. Is there an Adjacent Crossing with a Separate Number?	25. Quiet Zone (FRA provided)
☐ Yes ☒ No If Yes, Provide Crossing Number	☐ No ☒ 24 Hr ☐ Partial ☐ Chicago Excused Date Established 6/25/2005 12:00:0

26. HSR Corridor ID	27. Latitude in decimal degrees (WGS84 std: nn.nnnnnnn)	28. Longitude in decimal degrees (WGS84 std: -nnn.nnnnnnn)	29. Lat/Long Source
☒ N/A	47.4359564	-120.3180630	☒ Actual ☐ Estimated

30.A. Railroad Use *	31.A. State Use * 2A1651.30
30.B. Railroad Use *	31.B. State Use *
30.C. Railroad Use *	31.C. State Use *
30.D. Railroad Use *	31.D. State Use *
32.A. Narrative (Railroad Use) * (I.27 I.28 I.29)Value Provided by Railroad, Not Ye	32.B. Narrative (State Use) *

33. Emergency Notification Telephone No. (posted)	34. Railroad Contact (Telephone No.)	35. State Contact (Telephone No.)
800-832-5452	817-352-1549	360-664-1262

Part II: Railroad Information

1. Estimated Number of Daily Train Movements

1.A. Total Day Thru Trains (6 AM to 6 PM)	1.B. Total Night Thru Trains (6 PM to 6 AM)	1.C. Total Switching Trains	1.D. Total Transit Trains	1.E. Check if Less Than One Movement Per Day ☐ How many trains per week?
7	7	0	0	

2. Year of Train Count Data (YYYY)	3. Speed of Train at Crossing
2019	3.A. Maximum Timetable Speed (mph) 50 3.B. Typical Speed Range Over Crossing (mph) From 1 to 50

4. Type and Count of Tracks
Main 2 Siding 0 Yard 0 Transit 0 Industry 0

5. Train Detection (Main Track only)
☒ Constant Warning Time ☐ Motion Detection ☐AFO ☐ PTC ☐ DC ☐ Other ☐ None

6. Is Track Signaled?	7.A. Event Recorder	7.B. Remote Health Monitoring
☒ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No

U. S. DOT CROSSING INVENTORY FORM

A. Revision Date *(MM/DD/YYYY)*	PAGE 2	D. Crossing Inventory Number *(7 char.)*
09/01/2021		065838N

Part III: Highway or Pathway Traffic Control Device Information

1. Are there Signs or Signals? ☒ Yes ☐ No

2. Types of Passive Traffic Control Devices associated with the Crossing

2.A. Crossbuck Assemblies *(count)*	2.B. STOP Signs *(R1-1) (count)*	2.C. YIELD Signs *(R1-2) (count)*	2.D. Advance Warning Signs *(Check all that apply; include count)* ☐ None
2	0	0	☒ W10-1 2 ☐ W10-3 0 ☐ W10-11 0 ☐ W10-2 0 ☐ W10-4 0 ☐ W10-12 0

2.E. Low Ground Clearance Sign *(W10-5)*	2.F. Pavement Markings	2.G. Channelization Devices/Medians	2.H. EXEMPT Sign *(R15-3)*	2.I. ENS Sign *(I-13)* Displayed
☐ Yes *(count* 0 *)* ☒ No	☒ Stop Lines ☐ Dynamic Envelope ☒ RR Xing Symbols ☐ None	☐ All Approaches ☐ Median ☐ One Approach ☒ None	☐ Yes ☒ No	☒ Yes ☐ No

2.J. Other MUTCD Signs	2.K. Private Crossing Signs *(if private)*	2.L. LED Enhanced Signs *(List types)*
☐ Yes ☒ No Specify Type _____ Count _____ Specify Type _____ Count _____ Specify Type _____ Count _____	☐ Yes ☐ No	

3. Types of Train Activated Warning Devices at the Grade Crossing *(specify count of each device for all that apply)*

3.A. Gate Arms *(count)*	3.B. Gate Configuration	3.C. Cantilevered *(or Bridged)* Flashing Light Structures *(count)*	3.D. Mast Mounted Flashing Lights *(count of masts)* 2	3.E. Total Count of Flashing Light Pairs
Roadway 2 Pedestrian 0	☒ 2 Quad ☐ Full *(Barrier)* Resistance ☐ 3 Quad ☐ 4 Quad ☐ Median Gates	Over Traffic Lane 0 ☒ Incandescent Not Over Traffic Lane 2 ☐ LED	☐ Incandescent ☐ LED ☐ Back Lights Included ☐ Side Lights Included	10

3.F. Installation Date of Current Active Warning Devices: *(MM/YYYY)*	3.G. Wayside Horn	3.H. Highway Traffic Signals Controlling Crossing	3.I. Bells *(count)*
_____/_____ ☐ Not Required	☐ Yes Installed on *(MM/YYYY)* _____/_____ ☒ No	☐ Yes ☒ No	1

3.J. Non-Train Active Warning	3.K. Other Flashing Lights or Warning Devices
☐ Flagging/Flagman ☐ Manually Operated Signals ☐ Watchman ☐ Floodlighting ☐ None	Count 0 Specify type _____

4.A. Does nearby Hwy Intersection have Traffic Signals?	4.B. Hwy Traffic Signal Interconnection	4.C. Hwy Traffic Signal Preemption	5. Highway Traffic Pre-Signals	6. Highway Monitoring Devices *(Check all that apply)*
☐ Yes ☐ No	☐ Not Interconnected ☐ For Traffic Signals ☐ For Warning Signs	☐ Simultaneous ☐ Advance	☐ Yes ☐ No Storage Distance * _____ Stop Line Distance * _____	☐ Yes - Photo/Video Recording ☐ Yes – Vehicle Presence Detection ☐ None

Part IV: Physical Characteristics

1. Traffic Lanes Crossing Railroad	2. Is Roadway/Pathway Paved?	3. Does Track Run Down a Street?	4. Is Crossing Illuminated? *(Street lights within approx. 50 feet from nearest rail)*
☐ One-way Traffic ☒ Two-way Traffic ☐ Divided Traffic Number of Lanes 2	☒ Yes ☐ No	☐ Yes ☒ No	☒ Yes ☐ No

5. Crossing Surface *(on Main Track, multiple types allowed)* Installation Date * *(MM/YYYY)* _____/_____ Width * 22 Length * 48

☐ 1 Timber ☐ 2 Asphalt ☐ 3 Asphalt and Timber ☐ 4 Concrete ☐ 5 Concrete and Rubber ☒ 6 Rubber ☐ 7 Metal
☐ 8 Unconsolidated ☐ 9 Composite ☐ 10 Other *(specify)* _____

6. Intersecting Roadway within 500 feet?	7. Smallest Crossing Angle	8. Is Commercial Power Available? *
☐ Yes ☒ No If Yes, Approximate Distance *(feet)* _____	☐ 0° – 29° ☐ 30° – 59° ☒ 60° - 90°	☒ Yes ☐ No

Part V: Public Highway Information

1. Highway System	2. Functional Classification of Road at Crossing	3. Is Crossing on State Highway System?	4. Highway Speed Limit
☐ (01) Interstate Highway System ☐ (02) Other Nat Hwy System (NHS) ☐ (03) Federal AID, Not NHS ☒ (08) Non-Federal Aid	☐ (0) Rural ☒ (1) Urban ☐ (1) Interstate ☐ (5) Major Collector ☐ (2) Other Freeways and Expressways ☐ (3) Other Principal Arterial ☐ (6) Minor Collector ☐ (4) Minor Arterial ☒ (7) Local	☐ Yes ☒ No	25 MPH ☐ Posted ☐ Statutory

5. Linear Referencing System *(LRS Route ID)* *

6. LRS Milepost *

7. Annual Average Daily Traffic *(AADT)*	8. Estimated Percent Trucks	9. Regularly Used by School Buses?	10. Emergency Services Route
Year 2021 AADT 004358	10 %	☒ Yes ☐ No Average Number per Day 8	☐ Yes ☒ No

Submission Information - *This information is used for administrative purposes and is not available on the public website.*

Submitted by _____ Organization _____ Phone _____ Date _____

EXHIBIT “C”

PHOTOS OF EXISTING CONFIGURATION

Google Maps

84 Walla Walla Ave

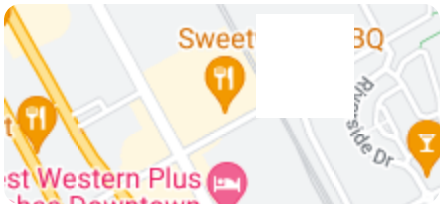
Eastern Approach

Wenatchee, Washington

Google

Street View - Sep 2022

Image capture: Sep 2022 © 2023 Google



Google Maps

26 E 9th St

Western Approach

Wenatchee, Washington

Google

Street View - Sep 2022

Image capture: Sep 2022 © 2023 Google

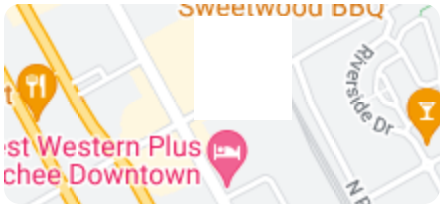


EXHIBIT “D”

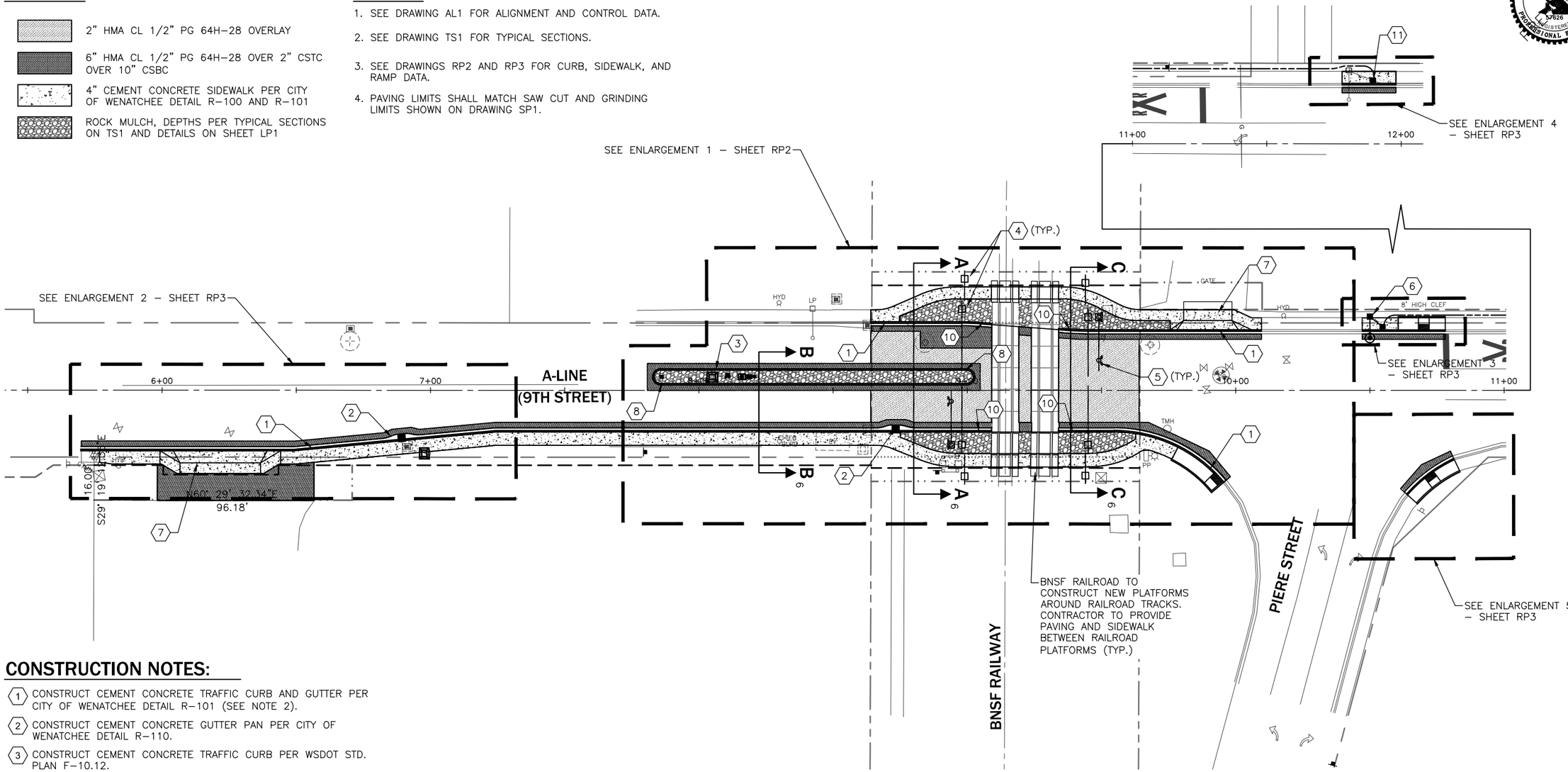
PROPOSED CROSSING LAYOUT

LEGEND:

- 2" HMA CL 1/2" PG 64H-28 OVERLAY
- 6" HMA CL 1/2" PG 64H-28 OVER 2" CSTC OVER 10" CSBC
- 4" CEMENT CONCRETE SIDEWALK PER CITY OF WENATCHEE DETAIL R-100 AND R-101
- ROCK MULCH, DEPTHS PER TYPICAL SECTIONS ON TS1 AND DETAILS ON SHEET LP1

NOTES:

1. SEE DRAWING AL1 FOR ALIGNMENT AND CONTROL DATA.
2. SEE DRAWING TS1 FOR TYPICAL SECTIONS.
3. SEE DRAWINGS RP2 AND RP3 FOR CURB, SIDEWALK, AND RAMP DATA.
4. PAVING LIMITS SHALL MATCH SAW CUT AND GRINDING LIMITS SHOWN ON DRAWING SP1.



CONSTRUCTION NOTES:

1. CONSTRUCT CEMENT CONCRETE TRAFFIC CURB AND GUTTER PER CITY OF WENATCHEE DETAIL R-101 (SEE NOTE 2).
2. CONSTRUCT CEMENT CONCRETE GUTTER PAN PER CITY OF WENATCHEE DETAIL R-110.
3. CONSTRUCT CEMENT CONCRETE TRAFFIC CURB PER WSDOT STD. PLAN F-10.12.
4. AUTOMATIC GATE INSTALLED BY BNSF. CONTRACTOR TO COORDINATE CONSTRUCTION SCHEDULE W/ BNSF REPRESENTATIVE.
5. CANTILEVER FLASHING LIGHT SIGNAL INSTALLED BY BNSF. CONTRACTOR TO COORDINATE CONSTRUCTION SCHEDULE W/ BNSF REPRESENTATIVE.
6. NEW LUMINAIRE PER DETAILS ON SHEET IL1.
7. CEMENT CONCRETE DRIVEWAY TYPE 2 PER WSDOT STD. PLAN F-80.10. DRIVEWAY AND SIDEWALK THICKNESS SHALL BE 8" AND SIDEWALK WIDTH SHALL BE 4' MINIMUM.
8. YELLOW FLEXIBLE GUIDE POST.
9. CONSTRUCT CEMENT CONCRETE TRAFFIC CURB AND GUTTER END SECTION PER DETAIL ON SHEET MD1.
10. NEW TYPE 1 JUNCTION BOX PER DETAILS ON SHEET IL1.

90% PLAN SET

RYAN E HARMON STATE OF WASHINGTON 57626 REGISTERED PROFESSIONAL ENGINEER

PRELIMINARY

RAILWAY-HIGHWAY CROSSINGS PROGRAM
9TH STREET CROSSING
ROADWAY PLAN

City of Wenatchee

REVISIONS			

SCALE: AS SHOWN	DESIGNED REH	DRAWN REH	CHECKED JJH
DATE DRAWN 06-01-2020	DATE APPROVED XX-XX-2020	APPROVED BY RYAN E HARMON	DRAWING NAME 1801_p-road.dwg

PROJECT NO. 1801

RP1

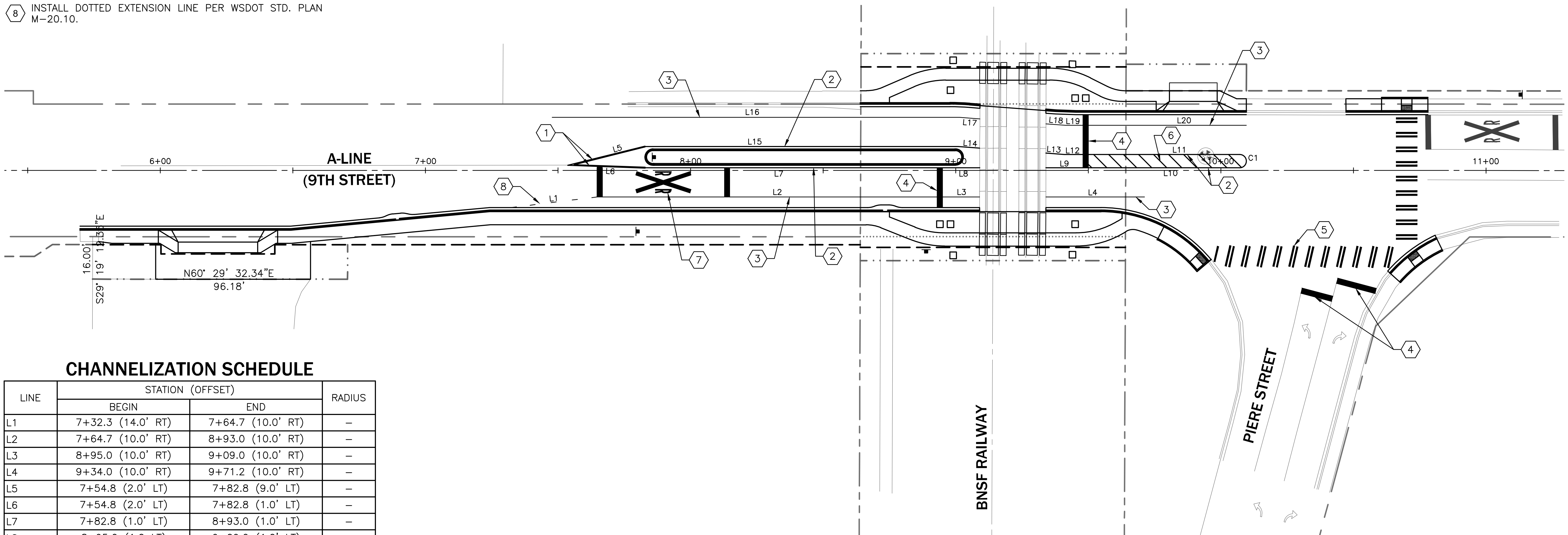
SHEET 8 OF 22

CONSTRUCTION NOTES:

1. INSTALL PLASTIC YELLOW DOUBLE CENTERLINE WITH 4" SPACING PER WSDOT STD PLAN M-20.10.
2. INSTALL PLASTIC YELLOW EDGE LINE PER WSDOT STD PLAN M-20.10.
3. INSTALL PLASTIC WHITE EDGE LINE PER WSDOT STD PLAN M-20.10.
4. INSTALL PLASTIC WHITE STOP BAR PER DETAIL ON MD1.
5. INSTALL PLASTIC WHITE CROSSWALK MARKING PER DETAIL ON DWG MD1.
6. INSTALL PLASTIC YELLOW GORE STRIPING PER DETAIL ON DWG MD1.
7. INSTALL PLASTIC WHITE RAILROAD CROSSING ALTERNATIVE LAYOUT PER WSDOT STD. PLAN M-11.10.
8. INSTALL DOTTED EXTENSION LINE PER WSDOT STD. PLAN M-20.10.

NOTES:

1. STATION/OFFSET INFORMATION IS PROVIDED TO THE CENTER OF LONGITUDINAL LINES AND TO SYMBOLS AS SHOWN IN THEIR RESPECTIVE DETAILS.
2. SEE DRAWING AL1 FOR ALIGNMENT AND CONTROL DATA.



CHANNELIZATION SCHEDULE

LINE	STATION (OFFSET) BEGIN	STATION (OFFSET) END	RADIUS
L1	7+32.3 (14.0' RT)	7+64.7 (10.0' RT)	–
L2	7+64.7 (10.0' RT)	8+93.0 (10.0' RT)	–
L3	8+95.0 (10.0' RT)	9+09.0 (10.0' RT)	–
L4	9+34.0 (10.0' RT)	9+71.2 (10.0' RT)	–
L5	7+54.8 (2.0' LT)	7+82.8 (9.0' LT)	–
L6	7+54.8 (2.0' LT)	7+82.8 (1.0' LT)	–
L7	7+82.8 (1.0' LT)	8+93.0 (1.0' LT)	–
L8	8+95.0 (1.0 LT)	9+09.0 (1.0' LT)	–
L9	9+34.0 (1.0' LT)	9+48.0 (1.0' LT)	–
L10	9+50.0 (1.0' LT)	10+07.1 (1.0' LT)	–
L11	10+07.1 (1.0' LT)	10+07.1 (6.0' LT)	2.5'
C1	10+07.1 (6.0' LT)	9+50.0 (6.0' LT)	–
L12	9+48.0 (6.0' LT)	9+40.9 (6.0' LT)	–
L13	9+40.9 (6.0' LT)	9+34.0 (6.5' LT)	–
L14	9+09.0 (8.4' LT)	9+00.9 (9.0' LT)	–
L15	9+00.94 (9.0' LT)	7+82.8 (9.0' LT)	–
L16	7+47.8 (20.0' LT)	9+01.4 (20.0' LT)	–
L17	9+01.4 (20.0' LT)	9+09.1 (19.4' LT)	–
L18	9+34.0 (17.6' LT)	9+41.4 (17.0' LT)	–
L19	9+41.4 (17.0' LT)	9+48.0 (17.0' LT)	–
L20	9+50.0 (17.0' LT)	10+09.6 (17.0' LT)	–

SYMBOL SCHEDULE

SYMBOL	STATION (OFFSET) POINT A	STATION (OFFSET) POINT B
RxR	7+99.7 (8.5' RT)	7+79.7 (8.5' RT)

SCALE IN FEET: 20 10 0 20 40

RAILWAY-HIGHWAY CROSSINGS PROGRAM
9TH STREET CROSSING
CHANNELIZATION PLAN

City of Wenatchee

PRELIMINARY

REVISIONS

SCALE: AS SHOWN | DESIGNED REH | DRAWN REH | CHECKED JJH | DATE DRAWN 06-01-2020 | APPROVED BY RYAN E. HARMON | DATE APPROVED XX-XX-2020 | DRAWING NAME 1801_p-mrkg.dwg

PROJECT NO. 1801

CH1

SHEET 11 OF 22

90% PLAN SET

LEGEND:

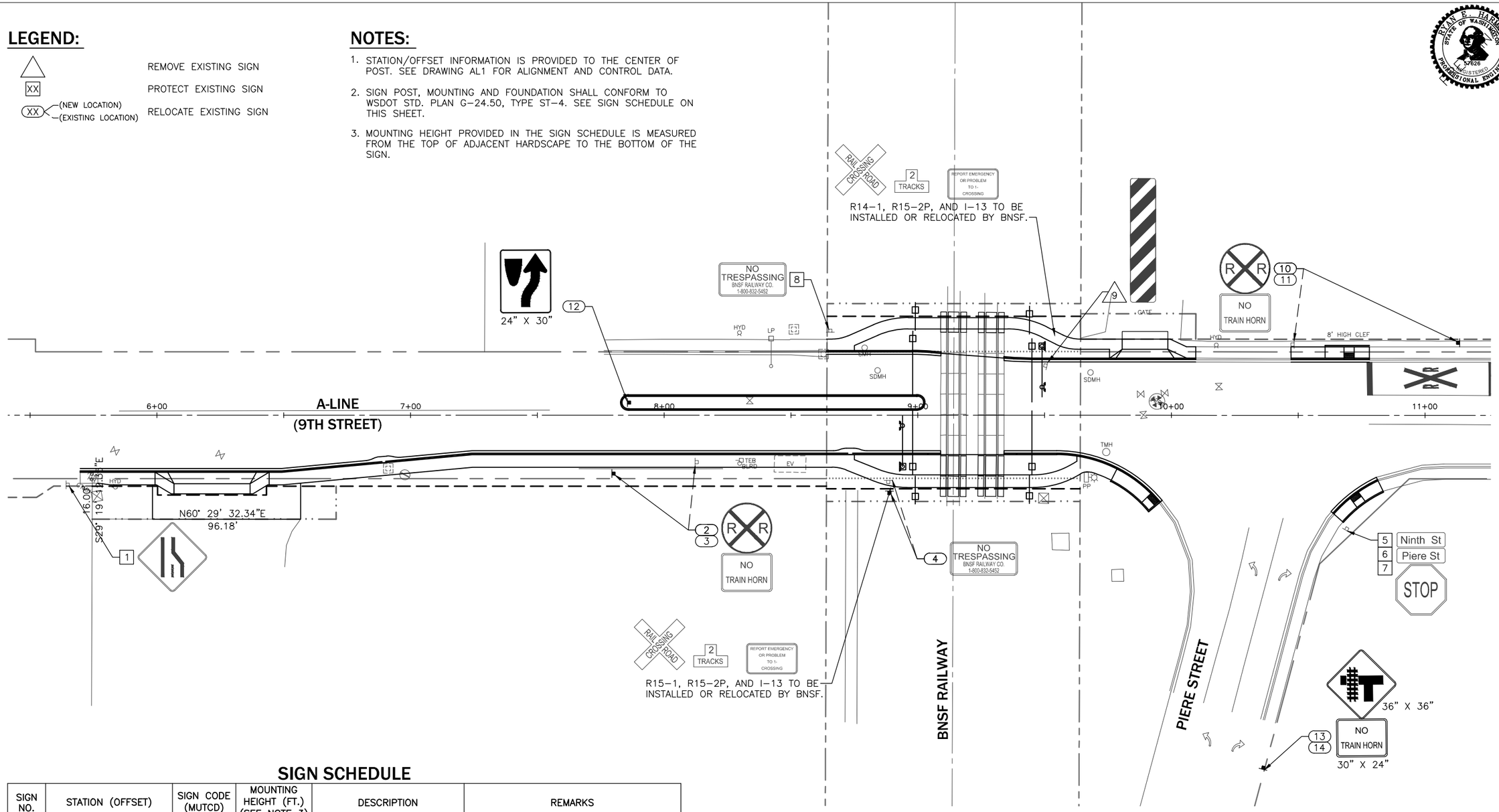
REMOVE EXISTING SIGN

PROTECT EXISTING SIGN

(NEW LOCATION) / (EXISTING LOCATION) — RELOCATE EXISTING SIGN

NOTES:

1. STATION/OFFSET INFORMATION IS PROVIDED TO THE CENTER OF POST. SEE DRAWING AL1 FOR ALIGNMENT AND CONTROL DATA.
2. SIGN POST, MOUNTING AND FOUNDATION SHALL CONFORM TO WSDOT STD. PLAN G-24.50, TYPE ST-4. SEE SIGN SCHEDULE ON THIS SHEET.
3. MOUNTING HEIGHT PROVIDED IN THE SIGN SCHEDULE IS MEASURED FROM THE TOP OF ADJACENT HARDSCAPE TO THE BOTTOM OF THE SIGN.



SIGN SCHEDULE

SIGN NO.	STATION (OFFSET)	SIGN CODE (MUTCD)	MOUNTING HEIGHT (FT.) (SEE NOTE 3)	DESCRIPTION	REMARKS
1	5+65.0 (27.5' RT)	W4-2	–	LANE ENDS	PROTECT EXISTING SIGN
2	7+80.0 (23.0' RT)	W10-1	8.0	GRADE CROSSING WARNING	RELOCATE EXISTING SIGN ON NEW POST
3		W10-9P	6.0	NO TRAIN HORN	MOUNT EXISTING SIGN BELOW SIGN NO. 2
4	8+88.8 (30.5; RT)	–	3.0	BNSF NO TRESPASSING SIGN	RELOCATE EXISTING SIGN TO NEW POST
5	10+69.1 (44.8' RT)	SNS	–	NINTH ST	PROTECT EXISTING SIGN
6		SNS	–	PIERE ST	
7		R1-1	–	STOP SIGN	
8	8+65.5 (33.4' LT)	–	–	BNSF NO TRESPASSING SIGN	PROTECT EXISTING SIGN
9	9+50.3 (19.6' LT)	OM3-R	–	OBJECT MARKER RIGHT	REMOVE EXISTING SIGN AND POST
10	11+13.0 (28.6' LT)	W10-1	8.0	GRADE CROSSING WARNING	RELOCATE EXISTING SIGN ON NEW POST
11		W10-9P	6.0	NO TRAIN HORN	MOUNT EXISTING SIGN BELOW SIGN NO. 10
12	7+85.5 (5.0' LT)	R4-7	7.0	KEEP RIGHT	INSTALL NEW SIGN AND POST
13	10+36.1 (140.0' RT)	W10-4	9.0	GRADE CROSSING AHEAD (LT)	INSTALL NEW SIGN AND POST
14		W10-9P	7.0	NO TRAIN HORN	INSTALL NEW SIGN BELOW SIGN NO. 13

90% PLAN SET

RYAN E HARMON — STATE OF WASHINGTON — 57626 — REGISTERED PROFESSIONAL ENGINEER

MARCO J. HUNG — STATE OF WASHINGTON — REGISTERED PROFESSIONAL ENGINEER

PRELIMINARY

RAILWAY-HIGHWAY CROSSINGS PROGRAM
9TH STREET CROSSING
SIGNING PLAN

City of Wenatchee

REVISIONS

DATE DRAWN	CHECKED	DATE APPROVED
06-01-2020	JJH	XX-XX-2020

SCALE: AS SHOWN	DESIGNED	DRAWN	APPROVED BY	DRAWING NAME
	REH	REH	RYAN E HARMON	1801_p-sign.dwg

PROJECT NO. 1801

SN1

SHEET 12 OF 22

May 28, 2021 - 9:20am rharmon X:\Engineering\City Projects\2018 Projects\1801 - 9th Street Rail Crossing\CAD\02-Design Drawings\B-Sheets\1801_P-SIGN.dwg Layout Name: SN1

EXHIBIT “E”

SECTION 130 GRANT APPLICATION

2017 Railway – Highway Crossings Program
(Section 130)
Application for Funding

Local Programs Division

Washington State Department of Transportation

Local Agency Name: City *of Wenatchee* Contact Person(s): *Matt Leonard* Title: *Public Works Director* Street Address: *1350 McKittrick Street* City, State, Zip: *Wenatchee, Wa 98801* Phone: *509-888-3204* Email: *MLeonard@WenatcheeWa.gov*	Name of Metropolitan or Regional Planning Organization: *Chelan Douglas Transportation Council* State Legislative District #(s): *12* Congressional District #(s): *10* See: http://app.leg.wa.gov/DistrictFinder/Home/

Crossing Name: *9TH ST*
USDOT Crossing number: *065838N*

WSDOT Region assigned to the jurisdiction: See http://www.wsdot.wa.gov/LocalPrograms/regional.htm for more information.

☐ Eastern ☒ North Central ☐ Northwest ☐ Olympic ☐ South Central ☐ Southwest

If any projects in this application involve roadways owned or managed by another jurisdiction, such as an City, County, Indian Tribe, or WSDOT, list the roadways: ____*N/A*_____

Please include a letter or email from each of the other jurisdictions that indicates concurrence with this application. Projects on state routes shall be coordinated through the appropriate WSDOT regional office. Contact the Region Local Programs Engineer at http://www.wsdot.wa.gov/LocalPrograms/regional.htm to request concurrence.

Comments: *This project does not involve and State, Tribal, or County roadways.*

Attachment: The following item must be included with the application.

- Detailed vicinity map, with clearly marked project limits, that shows the project's location.

General Project Information:

9th Street is an urban minor arterial in the City of Wenatchee, with a 2-track railroad crossing. It is listed in the City's adopted freight plan as a "supporting freight system" roadway, as it connected SR285 and Wenatchee Avenue with the industrial area to the east of the BNSF railroad tracks. Additionally, 9th Street is a connection from the zoned North Wenatchee Business District (NWBD) with the Waterfont Mixed Use (Waterfront) area on the other side of the railroad tracks. Located in the NWBD district in the vicinity of 9th Street are grocery stores, a local hospital, banks and restaurants. These are destinations for drivers and pedestrians in the Waterfront area, which has a large mix of recreation opportunities, as well as businesses and homes. Directly east of the railroad tracks on 9th Street is a large apartment complex that already has plans for expansion, which will further increase vehicle, pedestrian, and bicycle users crossing the railroad tracks as they approach the business district.

Our desire with this grant funding is to improve the railroad crossing at 9th and the railroad tracks for pedestrians, bicycles, and vehicles by clearly defining their routes, using both positive protection (Z Gates and automatic gates), clear routes (pouring concrete walkways over the tracks and connecting to existing sidewalk in all quadrants), and better signage and pavement markings. Currently there is no sidewalk crossing the tracks, and pedestrians must either enter into the paved lane, or walk out onto the gravel shoulder and step over rails to cross

back and forth. The goal of the project is to improve safety for those users, the vehicles on the roadway, and the daily trains which cross the tracks. One additional way that we will seek to improve safety for all users at the crossing is to install a small illumination system that will complete a lighting gap on 9th Street near the railroad crossing. Luminaires would be designed to provide light crossing of the tracks to a level that the City and BNSF agree to. BNSF will be expected to perform the work near the tracks within their right of way, by agreement with the City.

Roadway Data

Posted Speed Limit	*25 MPH*
Traffic Count/year (AADT)	4950
Busses per day	*98 year round, addl. +14 Nov-April*
Vehicles per day	4724
Commercial motor vehicles per day *(truck)*	124

☐ Sidewalks ☐ Principal Arterial
☐ Paths ☒ Minor Arterial
☐ Bike Lanes ☐ Major Collector
☒ Urban ☐ Minor Collector
☐ Rural ☐ Local Access

Railroad Data

Railroad Name	*BNSF*
Number of tracks	*2 MAIN*
Train Speed*	*50 MPH*
Trains per day*	*22*

Did not hear back from BNSF, this data came from UTC, could be lower at times.

*Obtain information from the Railroad. The Washington Utilities and Transportation Commission (UTC) can provide Railroad contact information. UTC Contact: Betty Young BYoung@UTC.WA.GOV 360 664-1202

Exposure Factor:
Number of trains per day multiplied by number of vehicles per day: *22 x 4950 = 108,000*

Existing Warning Devices: List existing warning devices, e.g. pavement markings, crossbucks, shoulder mounted signals, cantilever signals, automatic gates, etc.

Existing shoulder and cantilever mounted signals & automatic gates for vehicles in driving lanes, Northbound & sign Southbound. Stop bars painted on roadway prior to automatic gates. Westbound direction has a single chevron warning sign on the shoulder.

Accidents: Enter the number of train/vehicle accidents for the last five years. The UTC can provide information concerning train/vehicle accidents. UTC Contact: Betty Young: BYoung@UTC.WA.GOV 360 664-1202

No collisions have been reported in this location in the last 5 years.

Rating Factors:	Yes	No
Crossing Closure		X
Hazardous Materials Rail/Truck	X	

Bike/Pedestrian Use	X	
Truck Route	X	
Bus Route	X	
Traffic Signal less than 200 feet from Crossing/Limited vehicle storage		X
Crossing Grade more than 5%		X
Passenger Train Use	X	
Train Speed over 25 mph	X	
RR/Public reported Near Misses		X

Stopping Sight Distances:

Required Stopped: *1273 (in feet)*
Stop NE to NE: _____
Stop NE to SW: *TRAVELING WESTERLY LOOKING NORTHERLY AND SOUTHERLY 1682.82 FT*
Stop SE to NE: *TRAVELING EASTERLY LOOKING NORTHERLY AND SOUTHERLY 2033.61 FT*
Stop SW to SW: _____

The intersection angle of the grade crossing should be, as close to a right angle as is practical for the location so that sight distances for both the road user and the train operator will be optimized.

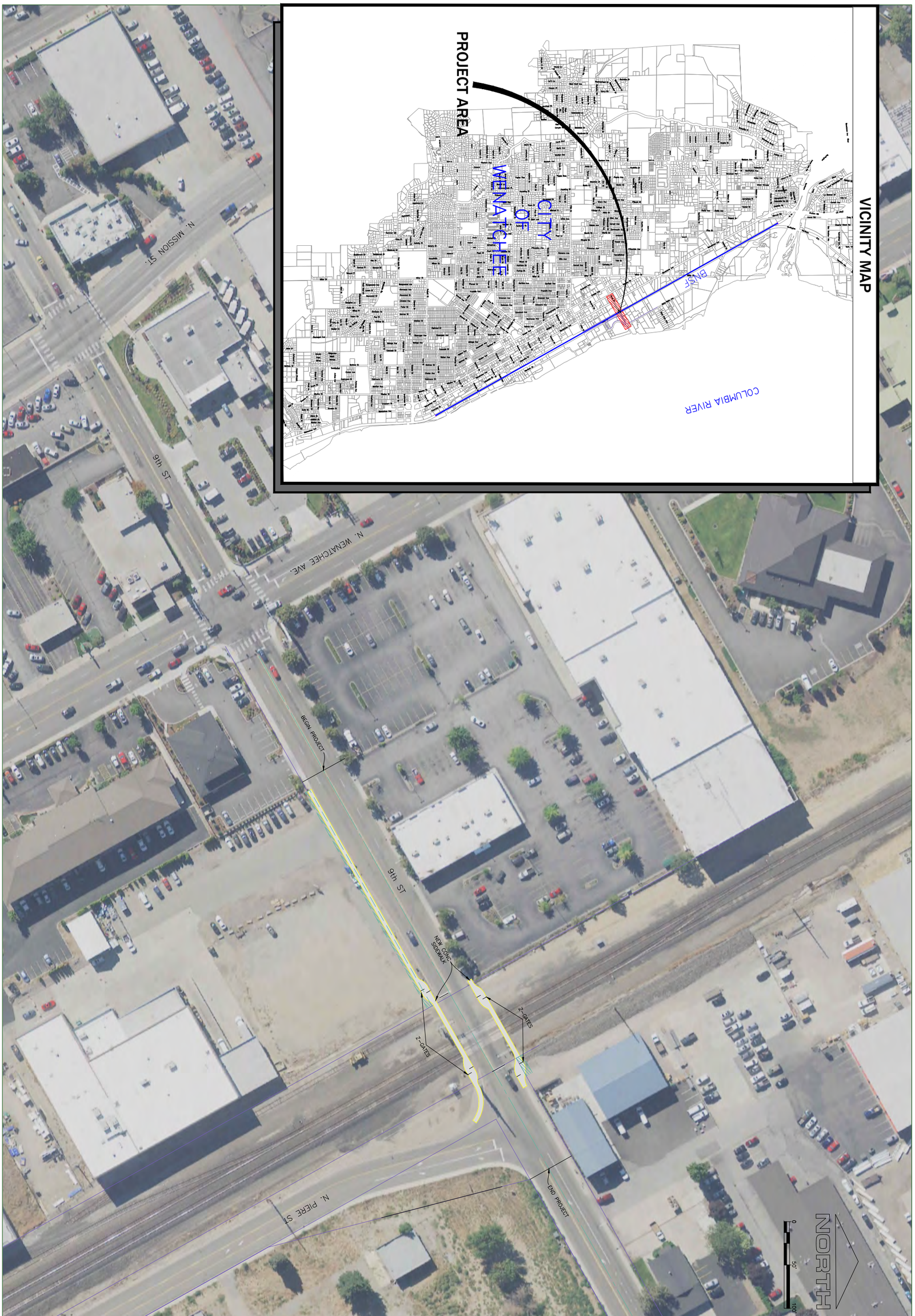
Crossing Angle: 90°

Project Schedule (enter dates as MM/YYYY)	
Project Milestone	*Estimated Date*
Project added to the Statewide Transportation Improvement Program (STIP)	*01/2018*
Begin PE (PE authorized by WSDOT/FHWA)	*06/2018*
Environmental documents approved (required for every project)	*10/2019*
Right of way completed (certification, if required)	*03/2019*
Railroad contract	*02/2019*
Contract advertised for roadway work (if required)	*04/2019*
Contract awarded (must occur within two years of selection)	*05/2019*
Open to traffic	*08/2019*

*Project Budget				
Phase	Total Cost[1]	Local Match	Local Match Source	Program Funds Requested[1,2]
Preliminary Engineering	$64,605	$6,461	Arterial Street Fund	$58,145
Right of Way	$15,000	$1,500	Arterial Street Fund	$13,500
Construction	$353,791	$35,379	Arterial Street Fund	$318,412
Total	$433,379	$43,340		$390,057

* Are ALL local match funds secured? Yes X No _____

1. Round all numbers to the nearest whole dollar (do not include decimals).
2. Projects require a ten percent local match per phase (preliminary engineering/design, right-of-way, and construction) for all eligible federal expenditures. If the construction phase is authorized by April 30, 2019 then that phase will be eligible for 100% funding (no local match required). Federal funds cannot be used as match for any phase.



SHEET 1 OF 1	SCALE: AS SHOWN	DATE DRAWN 8/4/2017	REVISIONS
PROJECT NO.	DESIGNED / DRAWN JBV	CHECKED	
	APPROVED BY	DATE APPROVED	
	DRAWING NAME		

City of Wenatchee

VICINITY MAP
2017 Highway Crossings Program
(Section 130)

EXHIBIT “F”

HIGHWAY – RAIL GRADE CROSSING DIAGNOSTIC EVALUATION REPORT

HIGHWAY-RAIL GRADE CROSSING DIAGNOSTIC EVALUATION REPORT

Street/Road Name:	USDOT Crossing No.:	Date:
9TH STREET	065838N	11-6-2017

DIAGNOSTIC ATTENDANCE

No.	Name	Affiliation	Phone No.	E-Mail
1.	CONNIE RAEZER	WSDOT	360.705.7459	raezerc@wsdot.wa.gov
2.	BETTY YOUNG	UTC	360.664.1202	byoung@utc.wa.gov
3.	STEPHEN SEMENICK	BNSF	206.625.6152	stephen.semenick@bnsf.com
4.	STEVEN FREEMAN	BNSF		steven.freeman@bnsf.com
5.	PAUL MAHRE	WSDOT	509.667.3090	MahreP@wsdot.wa.gov
6.	WILLIAM WONCH	WSDOT	360.705.7379	William.Wonch@wsdot.wa.gov
7.	GARY OWEN	CITY OF WENATCHEE	509.888.3204	gowen@wenatcheewa.gov
8.	JENNIFER SAUGEN	CITY OF WENATHEE	509.888.3213	Jsaugen@wenatcheewa.gov
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				

CONTACTS

(Contact name, agency or company, department, address, phone number, e-mail address)

School District:

BOB SANFORD, WENATCHEE SCHOOL DISTRICT, TRANSPORTATION, 509.662.6168, sanford.robert@wenatcheeschools.org

Transit:

LAUREN LOEBSACK, LINK TRANSIT, PLANNING OFFICER, 509.664.7600, lauren1@linktransit.com

Other (Specify):

Other (Specify):

Other (Specify):

Other (Specify):

Other (Specify):

HIGHWAY-RAIL GRADE CROSSING DIAGNOSTIC EVALUATION REPORT

Street/Road Name: 9TH STREET	USDOT Crossing No.: 065838N	Date: 11-6-2017

DIAGNOSTIC INFORMATION

Funded By: [X] SECTION130 [ ] STATE [ ] RR [ ] OTHER _____

Initiated By: [ ] STATE [ ] RR [X] LOCAL [ ] OTHER _____

Purpose of Diagnostic: TO IMPROVE RAIL CROSSING SAFETY FOR PEDESTRIANS, BICYCLES, & VEHICLES.

LOCATION INFORMATION

Railroad Name:	County:	City *(In or Near)*:
BNSF	CHELAN	WENATCHEE

R.R. Line / I.D.:	Nearest R.R. Timetable Station:	R.R. Milepost:	ENS Sign Present?	If Yes, #:
NORTHWEST SCENIC 701	843180	165 1.3	[ ]	

RAILROAD INFORMATION

DAILY TRAIN MOVEMENT*		MAXIMUM SPEED OF TRAIN			TYPE AND NUMBER OF TRACKS		
PASSENGER	2	PASSENGER	50	mph	MAIN	2	If Other, Specify:
FREIGHT	20	FREIGHT	45	mph	OTHER		

*CHECK IF LESS THAN ONE MOVEMENT PER DAY [ ]

CROSSING ANGLE DEGREES: 90.17°

Can two trains occupy crossing at same time? [X] Yes [ ] No

Can one train block the motorist's view of another train at the crossing? [X] YES [ ] NO

If Yes, explain: PARALLEL TRACKS AT SAME GRADE

Crossing is Quiet Zone? [X] Yes [ ] No

Xing Surface	TRACK	SURFACE TYPE	WIDTH (Feet)	CONDITION (Poor, Fair, Good, New)
	EASTERLY	CONCRETE PANELS	49'	GOOD
	WESTERLY	CONCRETE PANELS	49'	GOOD

Crossing adjacent or within railyard? [ ] Yes [X] No

FIVE-YEAR ACCIDENT DATA FROM WUTC

TOTAL ACCIDENTS	0	Number with Injuries		Number with Fatalities		Number with Property Damage Only	

Have any near misses occurred? [ ] Yes [ ] No

Explain:

Source of Data: FEDERAL RAILROAD ADMINISTRATION

Adjacent Railroad Crossings within ¼ Mile

USDOT No.	Street/Road Name	Warning Devices	AADT

This report of survey is undertaken in order to comply with 23 United States Code Section 130. The use of this data is governed by 23 United States Code Section 409 and shall not be subject to discovery or admitted into evidence in a federal or state court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

HIGHWAY-RAIL GRADE CROSSING DIAGNOSTIC EVALUATION REPORT

Street/Road Name:	USDOT Crossing No.:	Date:
9TH STREET	065838N	11-6-2017

EXISTING WARNING DEVICES

Type of Passive Warning Device

Type	Qty	NB	SB	WB	EB	Type	Qty	NB	SB	WB	EB
☒ R15-1				1	1	☐ R1-2					
☒ R15-2				1	1	☐ W3-2					
☒ W10-1				1	1	☐ R8-10					
☐ W10-2						☐ R10-6					
☐ W10-3						☐ W10-5					
☐ W10-4						☐ W10-11					
☐ R8-8						☐ W10-12					
☐ R1-1						☐ R15-8					
☐ W3-1						☒ W10-9				1	1
☐ R3-5						Note: Choose direction that is closest to direction of traffic flow over crossing.					

Is the crossing illuminated? ☐ Yes ☒ No

See "Typical MUTCD Signs at Highway-Rail Crossings" on page following.

Pavement Striping

Type		Qty.	Location(s)
☒	Stop Bars	2	EASTBOUND & WESTBOUND
☐	RxR		
☐	No Passing		
☒	Lane Lines		DOUBLE YELLOW EASTBOUND & WESTBOUND
☐	Other		

Type of Active Warning Device

	Flashing Light Type	Qty.	Lenses 8"	Lenses 12"	LED
☒	Mast Mounted Flashing Lights			4	
☒	Cantilever Flashing Lights			8	
☒	Back Lights			4	
☒	Side Lights			4	

	Gate Type	Qty.	Location(s)
☒	Entrance	2	EASTBOUND & WESTBOUND
☐	Exit		
☐	Pedestrian		
☐	Pedestrian Swing		

	Other Devices	Qty.	Location(s)
☐	Bells		
☐	Modified Blank Out Sign w/ Train Indicator		
☐	R3-1 Blank Out Sign		
☐	R3-2 Blank Out Sign		
☐	Other Blank Out Sign ( )		
☐	Other Specify:		

Device Notes:

TRAFFIC SIGNAL INTERCONNECTION AND PREEMPTION

Are highway traffic signals interconnected?	☐ Yes ☒ No	Is preemption existent at the crossing?	☐ Yes ☒ No
Do pre-signals exist at the crossing?	☐ Yes ☒ No		

CLOSURE

Can roadway realignment be accomplished to allow crossing consolidation? If yes, provide sketch. ☐ Yes ☒ No

Sketch:

Impact of Closure:

This report of survey is undertaken in order to comply with 23 United States Code Section 130. The use of this data is governed by 23 United States Code Section 409 and shall not be subject to discovery or admitted into evidence in a federal or state court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

HIGHWAY-RAIL GRADE CROSSING DIAGNOSTIC EVALUATION REPORT

Street/Road Name:	USDOT Crossing No.:	Date:
9TH STREET	065838N	11-6-2017

ROADWAY INFORMATION

Agency Having Jurisdiction (Road Owner):	Highway Type:	AADT:	Truck Traffic:
CITY OF WENATCHEE	MINOR ARTERIAL	4,950	10 %

Vehicle Speeds	School Bus Operation	Hazardous Materials	Pedestrians	Roadway Surface: CONC. ASPH.
Posted 25 m.p.h.	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	Roadway Width: 40'
Typical 28 to 33 m.p.h.	4 No. / Day	10 No. / Day	Curb & Gutter	Roadway Condition: FAIR
			☒ Yes ☐ No	Number Lanes: 3

Is Shoulder Present?	If Yes, Width:	Is Shoulder Surfaced?	Is Sidewalk Present?	If Yes, Width:
☐ Yes ☒ No		☐ Yes ☐ No	☒ Yes ☐ No	4.5'

Channelization (Medians w/ Gates): ☐ All Approaches ☐ One Approach ☒ None

Special Conditions Required as a Result of Nearby Highway Intersections:

PIERE ST. INTERSECTS 9TH ST. 128' EAST OF THE MAIN TRACK CENTER LINE, HINDERING THE OPTION OF USING A MEDIAN TREATMENT.

TYPE OF DEVELOPMENT

☐ Open Space ☒ Residential ☒ Industrial ☐ Institutional ☒ Commercial

Planned developments that could affect AADT?	If yes, explain:
☒ Yes ☐ No ☐ Unknown	CONSTRUCTION OF PIERE STREET APARTMENTS

SHARED PATHWAY CROSSING INFORMATION

Yes	No	Crossing Information	Pedestrian and Bike Trips	AADT
☐	☒	Is Crossing Surface Smooth?	Pedestrian:	80
☐	☒	Is Adequate Lighting Available?	Bicycle:	30
☐	☒	Does Crossing Panel Extend 1' Behind Back of Path?	Notes:	
☐	☒	Is Path Width Adequate? (48" Minimum)		
☐	☒	Are Flange Gaps 2½" or Less, or Flange Fillers Used?		

☐ Yes ☒ No Is the crossing adjacent to a passenger station? If yes, picture or sketch access from station:

This report of survey is undertaken in order to comply with 23 United States Code Section 130. The use of this data is governed by 23 United States Code Section 409 and shall not be subject to discovery or admitted into evidence in a federal or state court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

HIGHWAY-RAIL GRADE CROSSING DIAGNOSTIC EVALUATION REPORT

Street/Road Name:	USDOT Crossing No.:	Date:
9TH STREET	065838N	11-6-2017

PICTURES OR COMPREHENSIVE SKETCH OF CROSSING

(Include location of warning devices, nearby schools, emergency services facilities, and other landmarks):

SEE ATTACHED EXHIBIT "A"

HIGHWAY-RAIL GRADE CROSSING DIAGNOSTIC EVALUATION REPORT

Street/Road Name:	USDOT Crossing No.:	Date:
9TH STREET	065838N	11-6-2017

RECOMMENDATIONS

ARE IMPROVEMENTS TO THE CROSSING RECOMMENDED?	☐ Yes ☒ No	If No, Explain: ACCOMMODATION FOR PEDESTRIANS & BICYCLES NEEDED

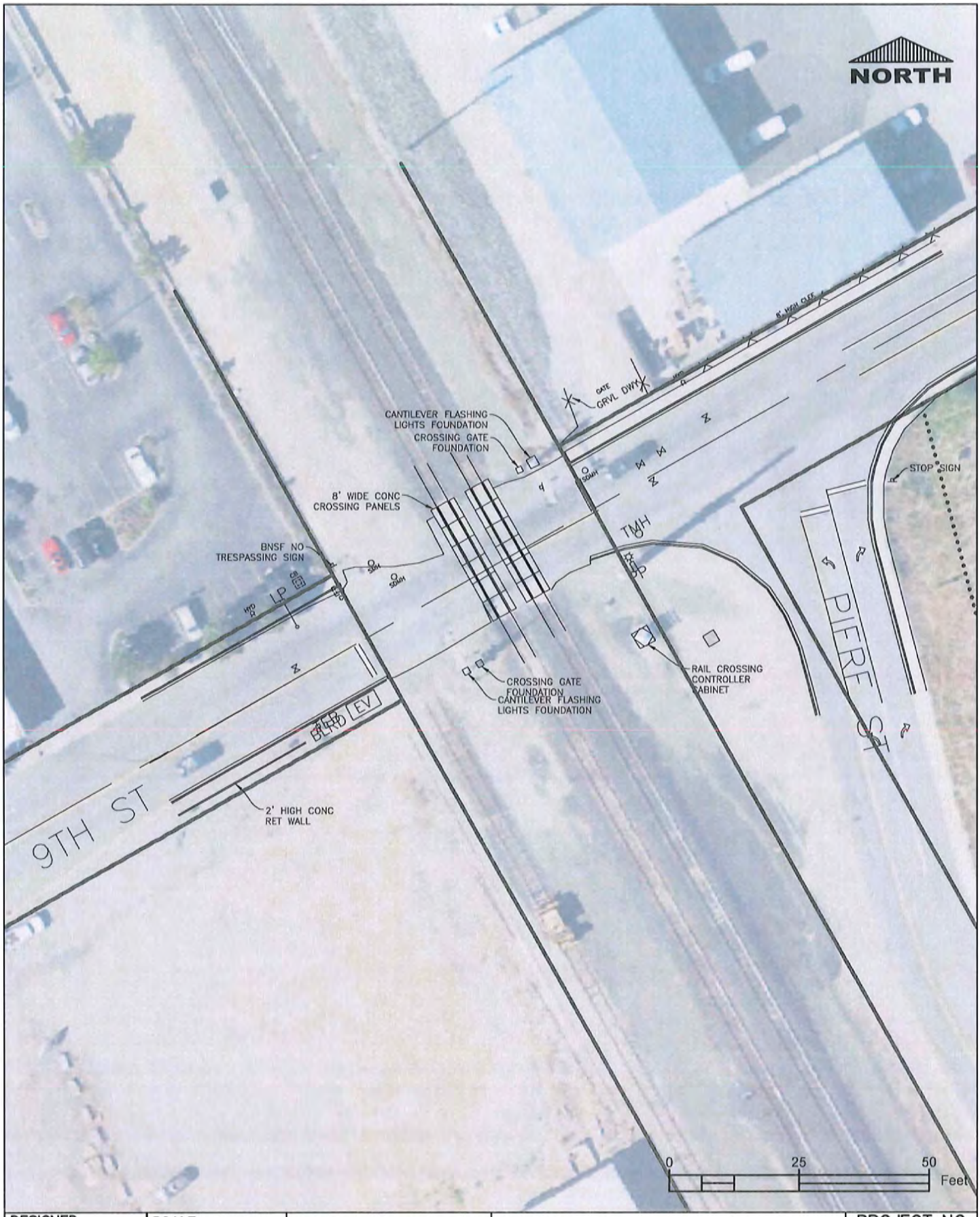
If Yes, what improvements?

Yes	No	Type of Improvement	Describe
☐	☐	Sight Improvement	
☐	☐	Crossing Surface	
☐	☐	Roadway Approaches	
☐	☐	Highway Traffic Signs	
☒	☐	Crossing Signals	UPDATE TO CURRENT STANDARDS
☐	☐	Crossing Closure	

Prepared By:	Title:	Date:
GARY OWEN	CITY ENGINEER	11-6-2017

Comments:

This report of survey is undertaken in order to comply with 23 United States Code Section 130. The use of this data is governed by 23 United States Code Section 409 and shall not be subject to discovery or admitted into evidence in a federal or state court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.



DESIGNED	SCALE 1:50	City of Wenatchee	EXHIBIT "A"	PROJECT NO.
DRAWN JBV	DATE 11-06-2017			
CHECKED	REVISION		9TH ST CROSSING CONDITIONS	SHT 1 OF 1
FILE				

R1-1

R1-2

R3-1a
Activated Blank-Out

R3-2a
Activated Blank-Out

R8-8

R8-9

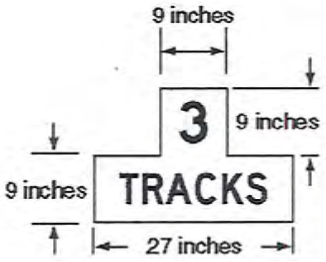
R8-10

R8-10a

R10-6

R10-6a

R15-1



R15-2P

R15-3P

R3-5 is a left turn oriented example.

R3-5

W10-1

W10-1aP

W10-2

W10-3

W10-4

W10-5

W10-5P

W10-7
Activated
Blank-Out

W10-8

W10-9

W10-9P

W10-11

W10-11a

W10-11b

W10-12

W10-13P

W10-14P

W10-14aP

W10-15P

Note: The W10-11 sign is a W10-3 sign modified for geometrics. Other signs can be oriented or revised as needed to better portray the geometrics of the roadways and the tracks.

R15-8

Sign examples from pages 753 & 759 of 2009 MUTCD. R3-5 example is from http://www.trafficsign.us/r3.html

EXHIBIT “G”

WENATCHEE VALLEY URBANIZED AREA FREIGHT STUDY

transpoGROUP

WENATCHEE
VALLEY URBANIZED AREA FREIGHT STUDY

PREPARED FOR:
Wenatchee Valley Transportation Council

Presented by Transpo Group
11730 118th Ave NE Suite 600
Kirkland, WA 98034

P 425.821.3665
F 425.825.8434
www.transpogroup.com

August 2014 | #12276 |

Freight Study for

WENATCHEE VALLEY URBANIZED AREA

Prepared for:
Wenatchee Valley Transportation Council

August 2014

Prepared by:

11730 118th Avenue NE, Suite 600
Kirkland, WA 98034-7120
Phone: 425-821-3665
Fax: 425-825-8434
www.transpogroup.com

12276.00

Table of Contents

Appendix

Figures

Tables

Developing the Wenatchee Freight Study

The Wenatchee urbanized area serves as the hub of a larger economic region with major commercial, agricultural, and industrial activities in central Washington. The region has lacked a well-defined approach for identifying and prioritizing transportation system improvements to support truck freight. This study was prepared to assist the Wenatchee Valley Transportation Council (WVTC) and its member agencies in:

- Defining freight routes in the greater Wenatchee urban area
- Improving signage to direct freight trucks to the desired routes
- Identifying and prioritizing transportation system improvements to enhance freight travel

WVTC studies are *advisory* in nature and do not impose a requirement for implementation or commitment of funding by WVTC member agencies. The Freight Study provides a regional planning level assessment of conceptual improvements to support freight mobility. It will support the region in incorporating freight needs into the Metropolitan Transportation Plans. Appendix A includes the WVTC policy statement related to the use of regional planning studies.

Regional Context and Freight Mobility Issues

Freight truck infrastructure is somewhat limited in the Wenatchee urban area. Currently there are only a few designated freight routes which results in trucks using a variety of roadways, many of which do not adequately accommodate the geometric or operational needs of freight truck traffic.

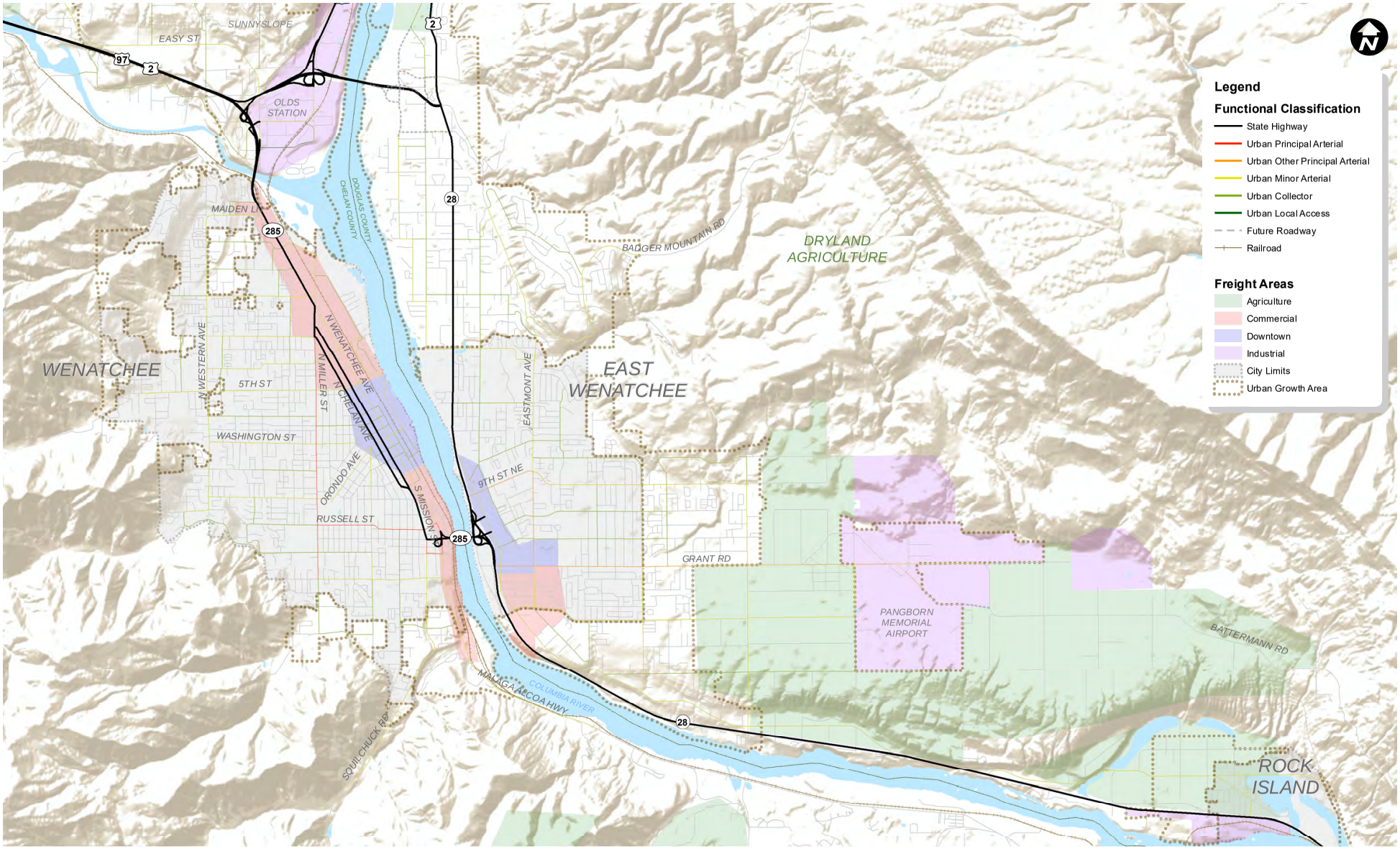
Figure 1 illustrates the general boundaries of freight areas in the region, including agricultural areas in Douglas County, and the industrial areas of Olds Station and Ohme Garden. Industrial uses also are designated at Pangborn Memorial Airport east of East Wenatchee. Commercial land uses also generate freight trucks. These include the downtown commercial areas of Wenatchee and East Wenatchee and other growing commercial districts. Some of the designated commercial areas currently are developed as agricultural related storage and packing plants or smaller scale industrial type land uses.

As shown on Figure 1, many of the freight areas are adjacent to or relatively close to state highways. However, most of the freight-related land uses do not have direct access to/from the highways, requiring use of arterials, collectors or local streets for a portion of their truck trips. This is especially true in Douglas County.

Truck freight traffic in the region, especially on the non-state highway roadways encounters a variety of issues and decision points for truck drivers. These range from physical constraints, congestion, operating in an urban setting mixed with other modes of travel, and lack of signage. Some local area examples of these issues are shown on Figure 2.

Project Objectives

WVTC and its member agencies decided that a systematic approach was needed for addressing freight mobility issues in the region. The Metropolitan Transportation Plan (MTP) and local agency Comprehensive Plans provide some discussion and policy direction to improve truck freight, but there is no region-wide plan or priorities.



Greater Wenatchee Region Freight Areas

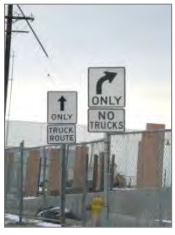
FIGURE 1

WVTC Freight Study

Q:\Projects\12\12276.00 - WVTC Freight Mobility Study\GIS\MXD\August2014\FIG1_FreightAreas&FuncClass.mxd

transpoGROUP

Figure 2. Examples of Wenatchee Area Freight Mobility Issues

Issue	Description	Example
Physical constraints	The currently signed truck route in Wenatchee has constraints including small turn radii, short turn pockets, and low underpasses.	
Rail crossings	Rail crossings create both safety concerns and delays.	
Public/private roadways	Worthen Street through the Columbia Colstor complex is largely on private property.	
Delays to freight resulting from general traffic congestion and commercial driveways	Freight movement through the City of Wenatchee's downtown core often conflicts between commercial use and regional freight mobility.	
Overlapping of freight routes with transit service and/or non-motorized uses (transit stops, bike routes, pedestrian crossings coincide with truck routes)	There are often trade-offs between intermodal road uses and the limited rights-of-way that may restrict what can be accommodated.	
Routing decisions	Truck drivers are required to navigate through congested areas and make decisions quickly. Making the wrong turn delays trucks and can affect other travel modes.	 
Signage	Although good signage may exist, not all truck drivers follow them.	

The study set out to provide answers to a range of freight related questions:

- How do trucks for each freight zone currently enter and exit the region, and how do they connect within the greater Wenatchee urban area?
- Why do the truck drivers use the routes they use and where do they obtain their information on routing options?

How would the freight community like to get their information and how would they use a new freight route plan once it is available?

In addition to understanding the objectives of freight users, a successful freight route plan also needs to consider the concerns of local communities. These include answers to questions such as:

- What are the issues along existing and de facto truck routes?
- What existing or potential conflicts with other travel modes are most important?
- What are critical elements of local land use plans that must be considered in defining routes?

The resulting product of the study includes the following components:

- Freight Route Plan Map
- Freight Route Signing Plan
- Freight System Transportation Improvements

Agency and User Group Coordination

Development of the study and recommended plans and improvements was guided by the Technical Advisory Committee (TAC) of the WVTC. The Freight Study also was reviewed by the WVTC Executive Council as its role as the region's transportation policy board. In addition, input from the freight users was obtained at key stages in the preparation of the plan. An outreach program to the general public was not conducted as part of the Freight Study. A decision was made at the beginning of the project, and revisited at various stages of the project, to focus the outreach to the freight users who will have the most insights on truck routes, issues, and potential solutions.

TAC members reviewing potential freight system improvement concepts.

Technical Advisory Committee

The WVTC TAC consists of staff from member agencies representing the Washington State Department of Transportation (WSDOT), Chelan and Douglas Counties, and cities in the region. In addition Link Transit and the Port Districts are also represented. WVTC staff led the TAC meetings.

The TAC meets on a monthly basis to discuss a full range of transportation items including the MTP, federal and state programs, regional grants, and major projects. Because the freight study encompasses the greater Wenatchee urban area it involves a broad number of

agencies in the region. Therefore, WVTC and member agencies decided to use the TAC to guide the development of the Freight Study.

The TAC met six times to formally discuss and provide direction on the Freight Study. The meetings were used to define freight related issues and to provide input on designation of freight routes, signing, and improvement projects. The TAC also assisted in developing the interface and coordination with freight users. The TAC also reviewed the draft documentation for the Freight Study prior to review by the WVTC Executive Board.

Executive Council

The WVTC Executive Council is the Wenatchee region's transportation policy board. It is comprised of elected officials and appointed officials from its member agencies. The Executive Council authorized the preparation of the Freight Study.

The WVTC Executive Director updated the Executive Council during the course of the development of the plan. In addition, two formal presentations of the Freight Study were provided to the Executive Council. The first covered the draft freight route plan as developed with the direction of the TAC. The second meeting presented the draft plan, including recommended freight routes, signing plan, and improvement projects.

Adoption of the Freight Study by The WVTC Executive Council will provide the regional framework for defining and prioritizing transportation system improvements in the region. The Freight Study also will provide a basis for future updates of the MTP. The WVTC action does not, however, require member agencies to take specific actions, but will be used in making regional decisions related to transportation funding and priorities.

Freight User Groups

The project team worked with the TAC to identify and contact representatives of different types of freight users. The groups reflected regional and local area freight and distributors, fruit packers and shippers, and retail operations. The following user group representatives provided input on the Freight Study:

Regional Freight Group

- Eagle Systems – Jeff Lang, Creston Knutson

Local Freight Group

- Oak Harbor Freight – Mike Combs
- Eagle Transfer (see Eagle Systems)
- Columbia Distributing – Brad Selland
- Waste Management – Dave Lowe
- Wenatchee Valley Sand and Gravel – Jake Holt

Fruit/Grain Packing and Shipping Group

- Stemilt – Jay Fulbright
- McDougall and Sons – Scott McDougall
- Columbia Colstor – Russ Lytle
- Northwest Wholesale – Greg Rosenau
- Central Washington Grain Growers (Waterville) – Paul Katovich

Retail Group

- Albertsons – Rob Fox
- Wenatchee Downtown Association – Alan Walker
- Chamber of Commerce – Shiloh Schauer

At the beginning of the study, each of the companies/agencies contacted were asked a series of questions to help guide the discussion on current practices, problem areas, navigation tools, and generally any other topic that affects freight mobility in the greater Wenatchee region. The standard list of questions is in the Freight Study Supporting Materials document. When the interview was in person, the freight user representative was presented a map to help identify current freight routes and areas of concern. If the interview was over the phone, the representative would describe verbally their various freight routes and perceived problem areas. The summary of the interviews is included in the Supporting Materials document. Key direction/input from the freight users at the beginning of the study includes:

- Current freight routes are chosen based on safety and efficiency. Whenever possible, trucks avoid areas with narrow lanes, tight turn radius returns, and actual or perceived congestion.
- Most trucks seem to follow Wenatchee Avenue and the currently signed truck route along Worthen Street. Oak Harbor Freight preferred the Chelan Avenue/Mission Street one-way couplet. Congestion was identified as the primary reason for choosing either Wenatchee Avenue or the one-way couplet streets.
- When traveling from one end of the valley to the other (north/south), users typically chose SR 28 (Sunset Highway) as the primary route as opposed to using Wenatchee Avenue or the one-way couplet streets through Wenatchee.
- Several locations were identified as problem areas for moving freight – these are documented in the Supporting Materials document.
- Off-tracking into adjacent lanes and over sidewalks plays a pivotal role in identifying which routes truck drivers will follow.

Freight Mobility Stakeholder Questions

1. Are your freight delivers/shipments managed internally or provided by others?
2. What issues either support or impede freight mobility in the local area?
   Do your freight trips:
   a. Primarily connect to/from the Wenatchee urban region from/to outside the Wenatchee region?
      i. If yes which is the primary external connection (or provide general percentages)?
         1. US2 (west)
         2. US 97A (north)
         3. US2/US 97 (north)
         4. SR 28 (south)
         5. Malaga Alcoa Highway (south)
         6. Squilchuck Road (south)
         7. Other _____
   b. Intra-regional (origins and destinations in Wenatchee urban area)
   c. Through trips – neither origin or destination within Wenatchee urban area
3. Using this blank map, identify your current primary truck routes (ingress/egress). Are there seasonal changes?
4. Which routes do you typically try and avoid and why?
5. Are there specific problem areas in the valley you are aware of?
6. If the issues identified in the previous question were "fixed", would you use that route?
7. What navigation tools do you use? If there were discrepancies between the navigation tools and signing which would govern?
8. What polices are in place for your drivers to follow in determining their route (only right turns, etc.)
9. What end user tools would you want see come out of this study and how would you like to use them (e.g. planning the route for a driver before starting, while in route (like a GPS), or providing input back to agencies on issues)? If a web-based map and delivery tool were created, would you use it? How?
10. What issues do you encounter with loading/unloading? I.e. curbside/on-road deliveries.
11. What issues do you encounter with pedestrians, bicyclists, or transit?
12. Anything else you would like to discuss concerning local freight mobility?

A range of questions were used to solicit initial input from freight user group representatives.

- Users identified the need to properly sign the truck routes and designate the right turn lane for trucks at multi-lane intersections. This provides the truck the best opportunity to off-track, if necessary.
- Signage is the primary "end-user" tool. Other navigation tools mentioned were phone GPS units and word of mouth.
- Another area of concern mentioned by the freight users was road grade. This was primarily for trucks traveling east/west turning to or from one of the primary north/south roadways.

- For the most part, freight users did not express concern with other modes of traffic such as bicyclists and transit except along Worthen Street. One user noted that the recent development along the waterfront has brought additional bicycle and foot traffic along Worthen Street.

Following developing the draft freight route plan and preliminary concepts for potential freight-related improvement projects, a follow-up packet was sent to the freight user group representatives. The representatives were asked to review and comment on the draft freight routes improvements. The comments could be provided in writing or through meetings or phone calls with project team members. The project team reached out to several user group representatives who had not responded in order to incorporate their comments. The questions are included in the Supporting Materials document.

The following feedback was received from the second phase of stakeholder outreach related to the draft freight routes and the initial freight improvement concepts:

- The proposed freight routes seem to adequately support truck freight travel to, from and within the Greater Wenatchee area.
- All of the listed roadway improvements are important for continued growth in freight deliveries. One user mentioned that improvements at Chelan Avenue and Miller Street should have higher priority during the planning of improvements.
- The proposed plan seems to appropriately address the necessary changes to restrict freight traffic through the downtown corridor on Wenatchee Avenue from 2nd Street to Kittitas Street.

One area of concern raised by the freight users relates to the timing, sequencing, and interim routing for trucks during construction of the proposed improvements. These items will need to be detailed during the design and implementation of the improvements, similar to most transportation projects.

General Community

Although not a focus of the outreach program, the general public and other stakeholders were able to provide input on the Freight Study. The WVTC Executive Director has provided updates at the Executive Council meetings, which are open to the public. The Executive Council also formally considered public comments on the Freight Study at their meeting in August 2014. This review included review of public comments on the Freight Study. The public comments supported consideration of pedestrians and bicycle needs in planning for freight mobility. In addition, comments identified specific concerns related to additional truck traffic using Orondo Avenue between Chelan Avenue and Wenatchee Avenue. The WVTC press release and written comments on the public review draft are included in Appendix B.

Additional presentations were made by WVTC during the public review period. These included workshops with the Wenatchee Planning Commission and City Council. The workshops were used to discuss the Freight Study, including the designated routes, improvements, and signing plans. The discussions highlighted the challenges in addressing the potential impacts between trucks, bicycles, and pedestrians. In addition, the desire to minimize impacts on adjacent properties and parking was highlighted.

Report Organization

The Freight Study for the Wenatchee Valley Urbanized Area consists of two documents. This study report provides an overview of the study process and recommendations including the:

- Freight Route Designations
- Freight Signs
- Freight System Transportation Improvements
- Plan Implementation

In addition to this report, additional documentation is included in the Freight Study Supporting Materials document. This consists primarily of materials prepared for and discussed at the TAC meetings, and the TAC meeting summaries. They also include materials and summaries from the coordination with the freight user group representatives. These materials include summaries of:

- Traffic Volume and Truck Count Data
- Collision Data
- Freight Route Criteria/ Evaluation Process

Freight Route Designations

The WVTC Freight Study was developed to improve the mobility and efficiency of truck freight into, out of, and within the Wenatchee urban area. It identifies the most appropriate, or desired routes for primary truck movements and identifies physical and operational improvements to better accommodate truck freight on the designated truck routes. The plan will provide the framework for prioritizing freight related improvement projects within the MTP and local agency plans, which will in turn support funding decisions.

Framework for Establishing Truck Routes in the Greater Wenatchee Urban Area

Based on the limited level of actual signed and designated truck routes, the project team and TAC decided that the study should begin with a clean slate – that is, the routes currently used by truck freight may or may not be the best truck routes. Just because trucks use a specific route, does not mean that an alternative corridor would not be better, especially if supported with appropriate signing and capital improvements. The Freight Study also identifies and prioritizes transportation system improvements to better facilitate freight mobility and safety. Designating several roadways as freight routes that serve the same freight movements would result in many more improvements which would make funding and implementing the plan more difficult. Therefore, the freight route designations focused on identifying the most appropriate routes to serve particular freight origins and destinations, with a focus on inter-regional freight hauling and large trucks.

The following questions were used to guide the development of criteria in developing the recommended freight route plan:

- What can/should be on the freight route?
- What should not be the freight route?
- Are there specific agency policies restricting a facility from being a freight route?
- Are the freight routes intuitive – will freight companies and truck drivers use them?
- What will it take to upgrade the route to make it a good, intuitive, safe and efficient truck route?

Freight Route Definitions

Given the large number and types of freight users in the region, a system for defining various levels of freight routes was developed. Several types and levels of freight classifications were considered based on the specific types of freight (e.g. agricultural, fruit packing, commercial deliveries) as well as the amount and frequency of truck traffic. Many of the agricultural routes and fruit packing operations are seasonal with high volumes of truck activity during certain times of the year. Others, like commercial deliveries, happen all year round.
The resulting freight plan focuses on three categories of roadways -- “Freight Routes”, “Supporting Freight System,” and “Trucks Restricted,” as described below. The freight plan definitions essentially serve as the functional classification for truck freight movement. These definitions were used to guide the development of the freight signing plan as well as Identifying and prioritizing the freight-related transportation system improvement projects.

- **Freight Route** consists of major roadways that are the backbone of the freight mobility system. These roadways are expected to carry the highest volume of truck freight. They connect the Wenatchee urbanized area with the primary regional freight corridors and the rest of the state. They also provide for freight movement through the Wenatchee urban area and provide direct connections with major industrial areas

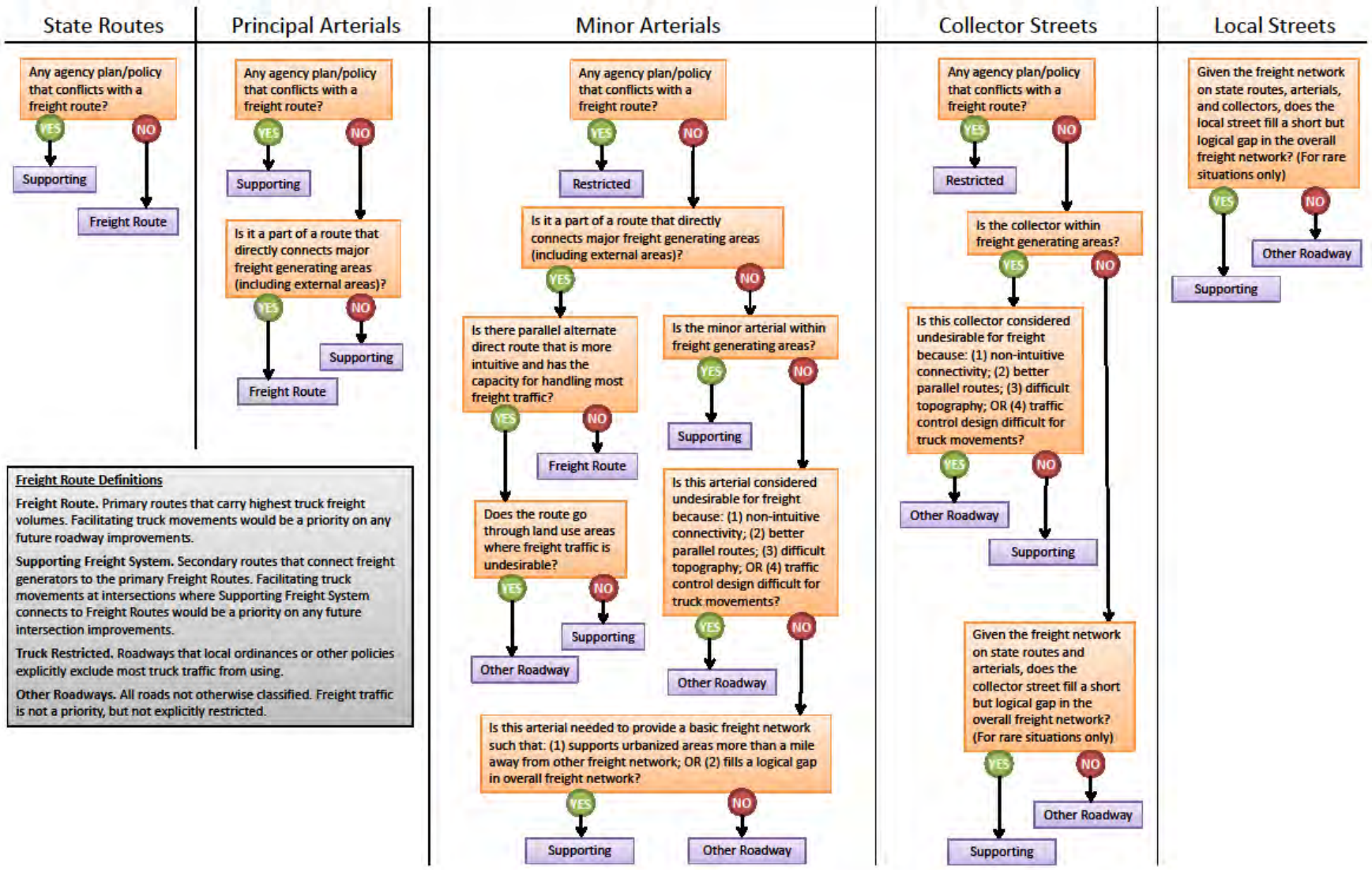
in the region and the airport. Facilitating truck movements would be a priority of the Freight Study for roadway and intersection improvements on these corridors.

- **Supporting Freight System** include other selected roadways that are not classified as a "Freight Route" but serve as important connecting routes between the Freight Routes and key agricultural, industrial, and major commercial areas. Facilitating truck movements at intersections where Supporting Freight System connects to Freight Routes would be a priority for future intersection improvements in the Freight Study. There are two major types of roadways in this category:
    - Roadways (arterials, collectors, or local) located within or adjacent to industrial, commercial, and agricultural areas per designated land use plans.
    - Roadways (primarily minor arterials) that provide the circulation and connecting road system for trucks servicing areas that have limited freight activity (such as western Wenatchee residential areas).
- **Trucks Restricted** roadways are defined as those that freight activity is considered undesirable or problematic. Trucks Restricted designations include roadways that local ordinances or other policies explicitly exclude most truck traffic from using (See 2009 *Manual on Uniform Traffic Control Devices (MUTCD)* Section 2B.39). Local deliveries would be allowed, but the Freight Study would not identify improvements that would support the use of those roadways for through truck traffic. The Freight Study should identify potential improvements or other methods that are appropriate for restricting all trucks except local deliveries on these routes. These roadways would be explicitly identified on a map and freight signing plan.
- **Other Roadways** include all roadways not otherwise classified. Freight traffic is not a priority for these roadways, but also is not explicitly restricted.

Freight Route Criteria and Screening

A "Decision Tree" (see Figure 3) was developed to assist in the classification of roadways within the greater Wenatchee Urbanized Area. It builds from the purpose and objectives of the Freight Study and input from the TAC and freight user group representatives. The Decision Tree incorporates input related to the following criteria:

- **Federal Roadway Functional Classification** – Primary freight movement should be on higher classification roadways which are designed for trucks and higher volumes of traffic.
- **Agency Plans and Policies** – The regional freight route designations need to take into account agency plans that restrict trucks or that identify/prioritize transportation or land uses that would not be compatible with the accommodation of large trucks. Furthermore, the freight system should include roadways that an agency specifically designates as a truck route within their jurisdiction.
- **Land Use** – The freight route designations need to serve major agricultural, commercial, and industrial areas, while minimizing impacts to residential areas, schools, or other similar areas.
- **Directness of Route**–The freight routes should provide logical routes; otherwise they probably will not be used as designated.
- **Traffic Operations and Safety**– Routes should provide for reasonable travel speeds and reduce conflicts with other travel modes; improvements should be identified and prioritized to address traffic safety and operations issues along designated freight routes and the supporting system



Decision Tree for Designating Freight Routes

WVTC Freight Study

Q:\Projects\12\12276.00 - WVTC Freight Mobility Study\GIS\MXD\April 2014\FIG3_DecisionTree.mxd

FIGURE
3

transpoGROUP

The Decision Tree was used to screen each roadway for inclusion as a designated Freight Route, part of the Supporting Freight System, or as a Trucks Restricted facility. The screening process typically started at the top – Federal Functional Classification and then worked work down the branches as needed to come to a conclusion. For example, State Highways by design support freight activity and therefore are designated as Freight Routes without the need to review land use or other criteria.

The decision tree basically follows the following assessment for each roadway in the region:

1. Does an agency have policies in place that conflict with the roadway being designated as a freight route?
2. Does the roadway/ corridor directly connect to major freight generating areas (agricultural, commercial, industrial)?
3. Does the route go through or impact areas where truck freight traffic is undesirable?
4. Are there other roadways that better serve the function of this roadway as a freight route or supporting route or would require lower levels of investment to serve freight traffic?
5. Does the roadway fill in a gap in the freight circulation system, including connections not well served by other designated freight routes or supporting freight routes?

Recommended Freight Route Designations

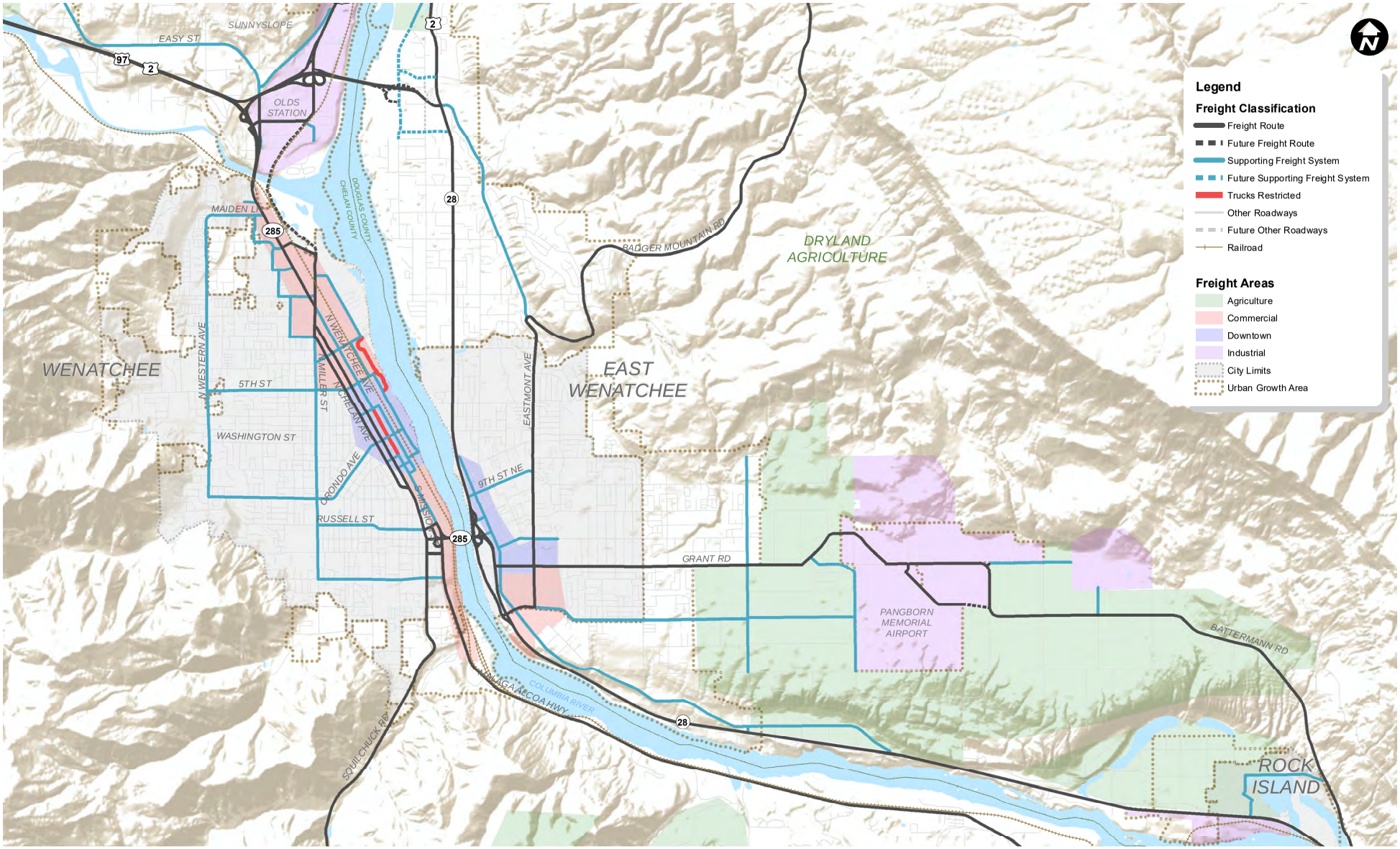
The decision tree process was applied to develop draft route designations for the regional freight route plan. It included review of roadway classifications, land use maps, bicycle and pedestrian system plans, and transportation system conditions. Traffic data related to truck volumes, traffic congestion, and collisions were also reviewed and analyzed. The recommended freight route designations are shown on Figure 4A. Figure 4B provides an enlarged view of the freight routes in the core of the Wenatchee region. It reflects the results of an interactive process to refine the initial decision tree results based on input from the TAC, WVTC Executive Council, and freight user groups.

As shown on Figures 4A and 4B, the designated Freight Routes primarily consist of the state highways, including US 2/97, US 97A, SR 285, and SR 28. In addition, the Freight Route designation is applied to major roadways connecting the urban area with the adjacent rural freight areas. These include:

- Squilchuck Road
- Malaga Alcoa Highway
- Battermann Road
- Grant Road
- Eastmont Avenue
- Badger Mountain Road

There are also some key arterials within Wenatchee and East Wenatchee that complete the designated Freight Routes. These include Miller Street, Hawley Street and the proposed Confluence Parkway north of downtown Wenatchee. These facilities provide for major freight movements from the waterfront to SR 285 and eventually to US 2/97. South of downtown Wenatchee, short segments of Ferry

Key arterials entering the Wenatchee urban areas are designated as freight routes.



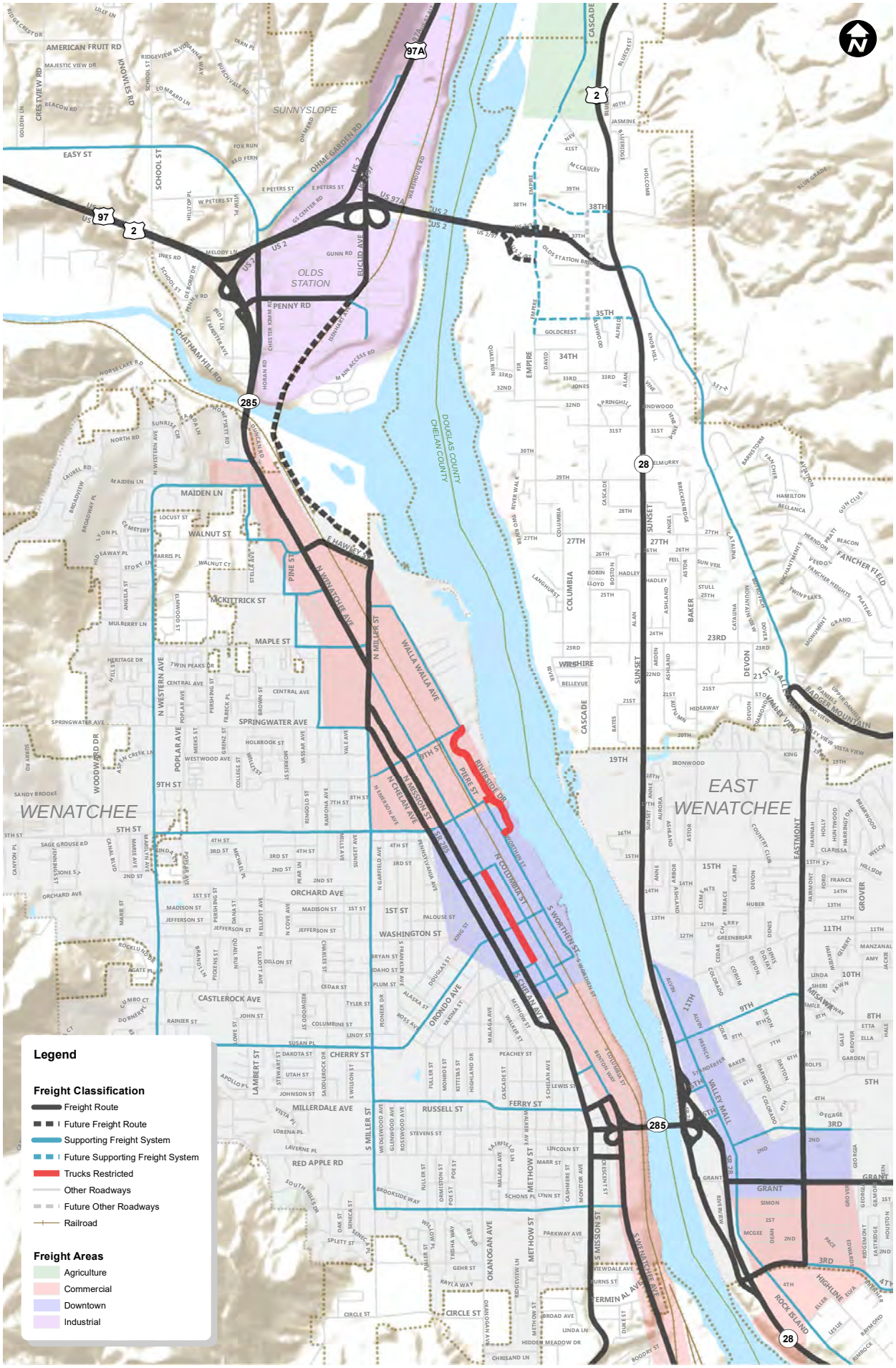
Recommended Freight Route Designations

WVTC Freight Study

Q:\Projects\12\12276.00 - WVTC Freight Mobility Study\GIS\MXD\July2014\FIG4A_FreightRoutes.mxd

FIGURE **4A**

transpoGROUP



Recommended Freight Route Designations - Regional Core

FIGURE **4B**

WVTC Freight Study

Q:\Projects\12\12276.00 - WVTC Freight Mobility Study\GIS\MXD\August2014\FIG4B_FreightRoutes_City.mxd

transpoGROUP

Street and Marr Street are Freight Routes that support access and circulation between S Wenatchee Avenue and Mission Street, consistent with recent WSDOT improvements for the SR 285/George Sellar Bridge corridor.

Easy Street, Penny Road, and Euclid Avenue are designated as Freight Routes in the Olds Station subarea north of the Wenatchee River. Much of the Olds Station area is designated for industrial development and these roadways provide for the system to connect to the state highway system and the proposed Confluence Parkway

In East Wenatchee and Douglas County, other Freight Routes include 3rd Street SE and Highline Drive. These roadways connect SR 28 with Grant Road and Eastmont Avenue. This route will direct freight trucks away from the more congested intersection of Grant Road/SR 28. It also provides connections to/from the commercial areas south of Grant Road and to Valley Mall Parkway via Rock Island Road. To better accommodate and support trucks connecting to/from the industrial and agricultural areas in the vicinity of Pangborn Memorial Airport, Airport Way and its future extension Van Well Street/4th Street is also designated as a Freight Route.

Figures 4A and 4B also show the designated roadways comprising the Supporting Freight System. As previously defined many of these routes connect industrial, commercial, and agricultural areas to the Freight Routes. These include streets in or near downtown Wenatchee and downtown East Wenatchee. They also provide freight access and circulation to the N Wenatchee Avenue commercial district and within the City of Rock Island. Future Supporting Freight System roadways also are defined for the proposed commercial area in the vicinity of US 2/SR 28.

Other roadways included as part of the Supporting Freight System serve the western portion of the City of Wenatchee, the Sunnyslope subarea north of Wenatchee, and the areas east of East Wenatchee. The recently completed extension of Eastmont Avenue (between SR 28 and Badger Mountain Road) is also designated as part of the Supporting Freight System. These roadways help complete a system of roadways for freight mobility.

The “Trucks Restricted” designation is currently limited to two roadways in and near downtown Wenatchee. The City of Wenatchee has adopted a policy to restrict large trucks on Wenatchee Avenue between 2nd and Kittitas Streets within the downtown core. They are planning on installing “truck diverters” to physically restrict large trucks from entering downtown Wenatchee. Northbound large trucks on Wenatchee Avenue approaching Kittitas Street and southbound trucks on 2nd Street will be physically restricted from entering this section of Wenatchee Avenue. Advance directional signs and regulatory signs will be needed to facilitate the closure of this segment of Wenatchee Avenue to trucks.

The City of Wenatchee will be restricting large trucks traveling on Wenatchee Avenue through its downtown.

The other restricted roadway is Riverside Drive between 9th Street and Worthen Street. This roadway was designed and constructed to provide access to Riverfront Park and provide an alternative to the industrial roadways such as Worthen and Piere Streets. Riverside Drive includes mini-roundabouts (65 to 100 foot diameter) which do not accommodate larger vehicles such as freight trucks.

Large trucks should not use Riverside Drive due to the small radius roundabouts.

The roadway also provides access to parking lots serving the park and the Apple Loop Trail. Trucks have been observed trying to navigate the corridor and being obstructed by the geometric dimensions, especially the mini-roundabouts. These trucks can cause damage to the roadway. Therefore, the Freight Study designates this section of Riverside Drive as restricted to trucks to help direct truck drivers to alternative routes. Additional signing and improvements to further support this restriction are discussed in the next section of this report.

Freight Signs

Simply designating certain roadways as Freight Routes or as part of the Supporting Freight System may not change how freight truck drivers use the local roadways. To better support identification and use of the designated freight routes, a freight signing plan was developed. The signing plan was prepared to reflect the definitions of Freight Routes and the Supporting Freight System. A primary purpose of the signing plan is to direct trucks to the designated Freight Routes and away from the "Trucks Restricted" roadways. Signing to/from the Supporting Freight System is typically more limited to providing guide signs, as opposed to regulation.

Freight Route Signing Methodology

The Manual on Uniform Traffic Control Devices (MUTCD) specifies the shape, sizes, color, symbols and content of traffic signs. The MUTCD states that, to be effective, a traffic control device should meet five basic requirements:

1. Fulfill a need
2. Command attention
3. Convey a clear, simple meaning
4. Command respect from road users
5. Give adequate time for proper response.

Consistent truck related signage in the WVTC area will help meet these requirements. Truck signing should focus on four areas:

- Route designation
- Intersection Signing
- Trailblazer/Guide signing
- Designating truck related restrictions

Route Designation

Route designation signing is used to continuously identify truck routes to drivers. The R14-1 sign is considered the standard for delineating and signing a truck route. Typical applications include the posting of a standalone sign or the attachment of directional arrows to designate truck routes. Signing should be placed at regular intervals or where a demonstrated need is identified. It is recommended that all primary freight routes be signed at half mile intervals using an R14-1 "TRUCK ROUTE" sign. Placement of these signs should be coordinated with placement of intersection signing as described below to avoid duplication and minimize the potential for over use of signing.

Intersection Signing

The purpose of intersection signing is to inform drivers of the intersection of two freight routes and designate freight route direction at these intersections. Signing should consist of an R14-1 "TRUCK ROUTE" sign with a supplemental arrow plaque showing directional designation of intersecting freight routes. An example is shown to the right.

The intersection sign should be placed at the intersection of freight routes as well as in advance of the intersection in order to give drivers adequate time for deceleration or lane changes. Advanced signing should be placed a minimum of 150 feet from intersections on arterial and collector roadways with a posted speed of 35 mph or below, and 350 feet for arterial and collector roadways with posted speeds of 40 mph or greater.

Trailblazer/Guide Signing

Trailblazer or guide signing should be used to direct trucks to freight routes or to provide advanced notice of prohibitions or complex situations. An example would be alerting trucks of the need to use a certain lane in preparation for a required turning movement. Trailblazer/Guide signs should consist of white lettering on a green background.

Truck Related Restrictions

Signing should also be provided in areas where specific truck restrictions are in effect. These restrictions would include weight restriction and dimensional clearance warning signs for structures, as well as delineating areas where trucks are prohibited. An example of this would be signing for the prohibition of trucks through the downtown area of Wenatchee Avenue.

Recommended Freight Signage

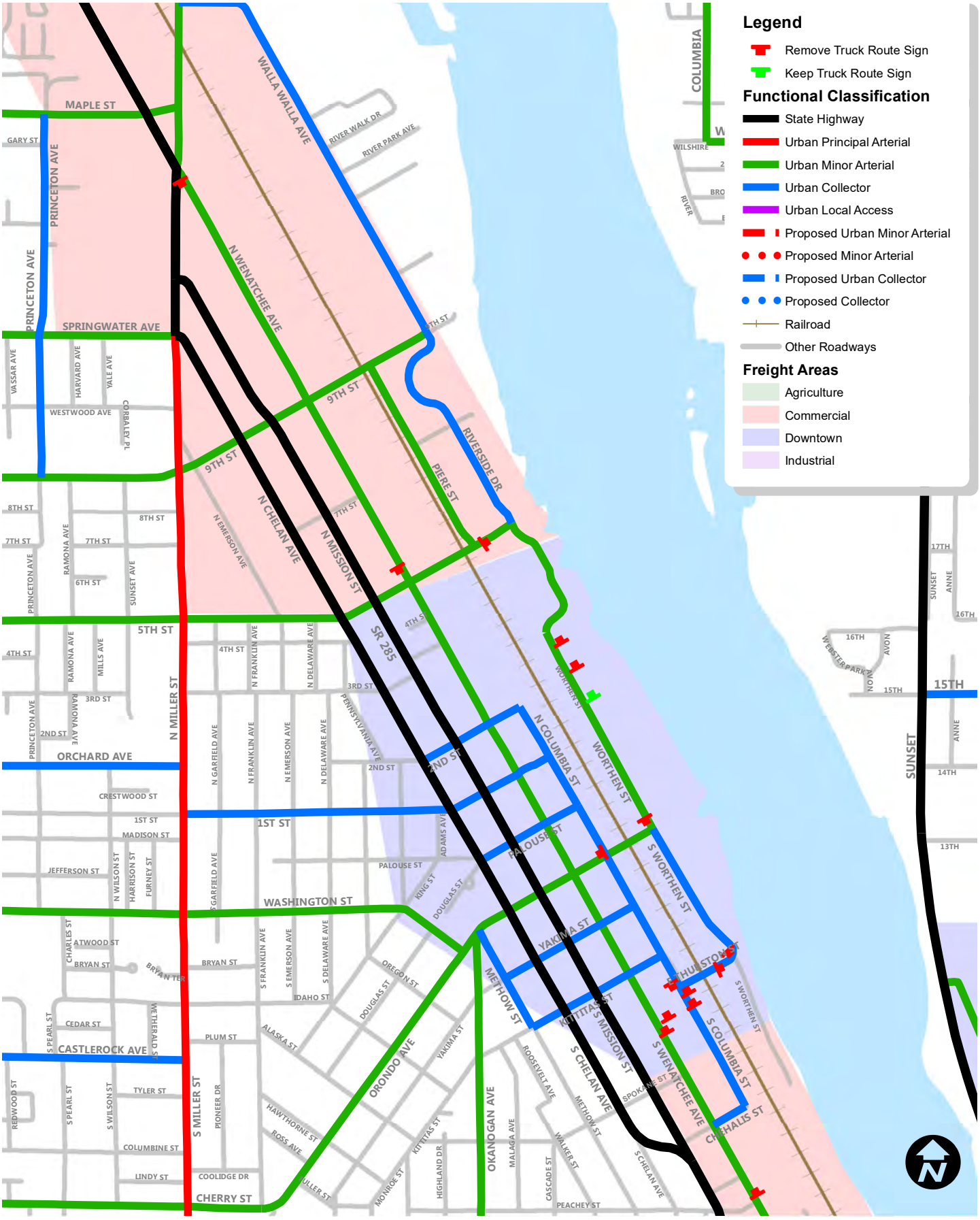
The freight signing plan builds from existing freight signage, especially on the state highways. It also calls for removing or replacing some existing truck signage as well as addition of regulatory and directional or guide signs. The signing plan focuses on the downtown Wenatchee and downtown East Wenatchee areas.

City of Wenatchee Regional Freight Route Signs

Figure 5 shows the existing truck route signs near downtown Wenatchee that should be removed and replaced/updated based on the Freight Study sign plan. Removal of most of the existing truck route signs is in keeping with the “clean slate” approach used in designating the freight routes. It was decided that most of the existing signs did not adequately address the needs for the revised truck routes, especially those related to the “Trucks Restricted” classifications of Wenatchee Avenue in downtown and Riverside Drive.

Figure 6 shows the regional freight route sign plan including existing freight signs such as those recently installed as part of the WSDOT improvements to the SR 285 George Sellar Bridge. A larger version of the Sign Plan is provided in the pocket at the end of this Freight Study report. It should be noted that not all recommended signing is shown in Figure 6. For example, Route designation and some intersection signing is not shown since their installation is more generic and is not meant for a unique situation. In addition, the signing shown is conceptual. Final design and approval of individual signs is needed prior to implementation.

Existing directional/guide signs on the regional highways serving the City of Wenatchee already provide directional information for trucks and general traffic for entering the region to connect to Wenatchee or continuing through the region. Eastbound traffic on US 2/97 is directed to SR 285 to enter Wenatchee or to take the loop ramp to continue to US 97A or across the US 2/97 Odabashian Bridge to Douglas County.



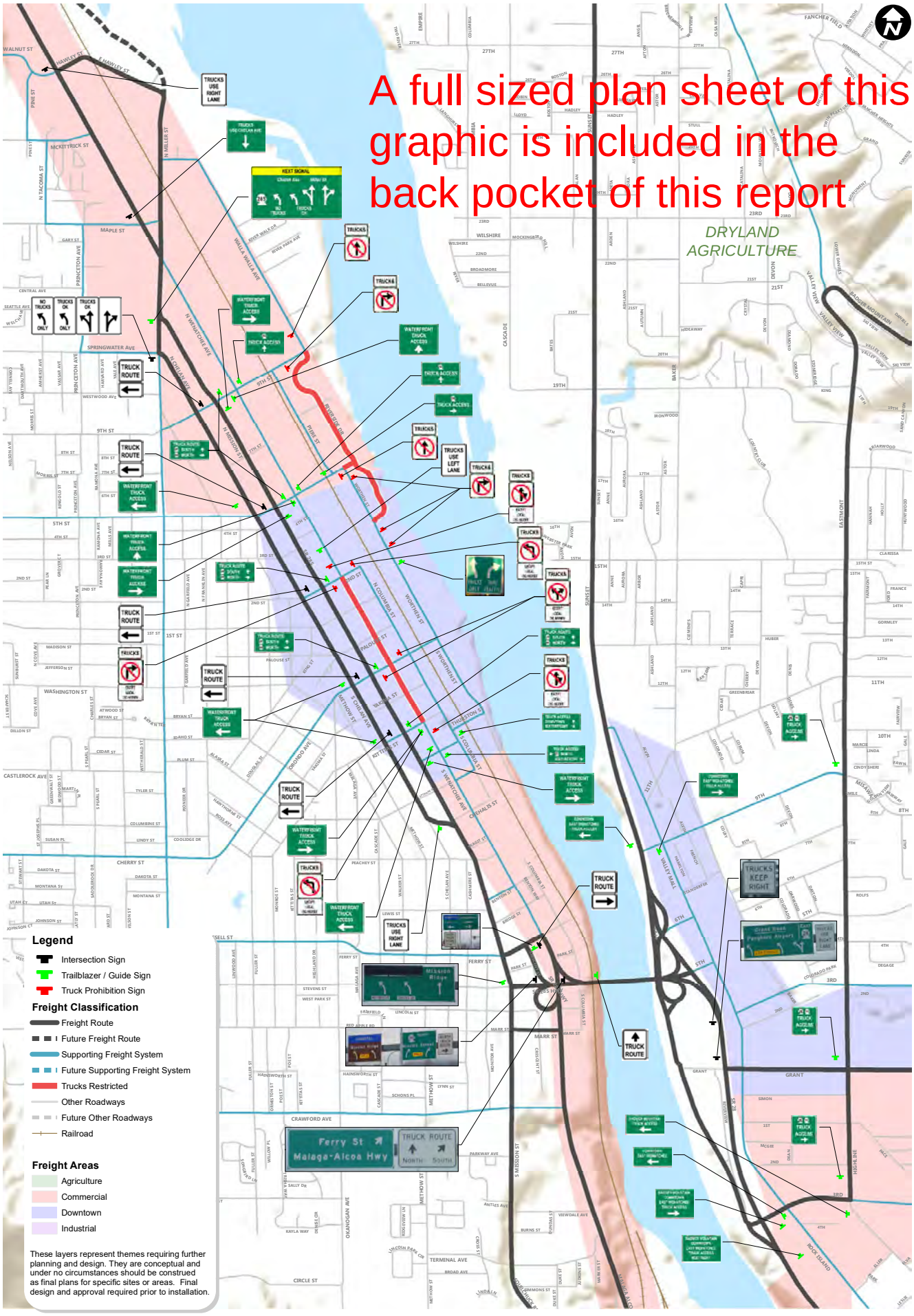
Existing Wenatchee Truck Signage To Be Removed

FIGURE **5**

WVTC Freight Study

Q:\Projects\12\12276.00 - WVTC Freight Mobility Study\GIS\MXD\April 2014\FIG5_Existing_Truck_Signage.mxd

transpoGROUP



Recommended Freight Signs

WVTC Freight Study

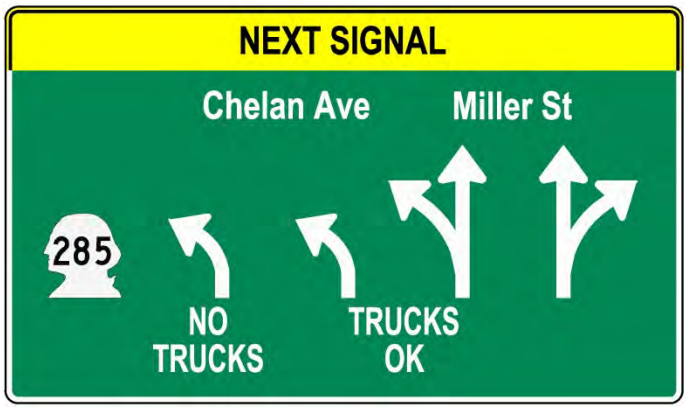
FIGURE **6**

Q:\Projects\12\12276.00 - WVTC Freight Mobility Study\GIS\MXD\August2014\FIG6_FreightSignage_11x17.mxd

transpoGROUP

Similarly westbound traffic on US 2/97 crossing the Odabashian Bridge is directed to SR 285 to enter Wenatchee. Northbound vehicles exiting Wenatchee have directional signing to direct them to the east or west on US 2/97. While not specifically designed for freight trucks, the existing highway guide signs provide adequate directional signs to/from the regional routes. Based on discussions with freight users and analysis of truck volume data, regional trucks connecting between US 2/97 west of Wenatchee and East Wenatchee, primarily cross the Columbia River via US 2/97 and connect with SR 28 (Sunset Highway). Therefore, additional signs directing regional freight trucks on US 2/97 to East Wenatchee were not recommended as part of the Freight Study Sign Plan.

Trucks travelling southbound on N Wenatchee Avenue may be destined to the waterfront, downtown Wenatchee, or other destinations accessible via Miller Street or the SR 285 Chelan Avenue/Mission Street one-way couplet. The signing plan accommodates and directs southbound trucks entering Wenatchee with a destination along the Wenatchee waterfront to turn left at Hawley Street. All other southbound trucks on N Wenatchee Avenue will be signed to use the rightmost lane (curb lane) to continue to downtown Wenatchee and other destinations via SR 285 (Chelan Avenue/Mission Street couplet). Use of the southbound curb lane will result in the trucks being able to continue to Miller Street and/or turn onto Chelan Avenue without changing lanes. This signing concept is continued southward along N Wenatchee Avenue at Maple Street and on Miller Street approaching Mission Street. Truck signs for the area south of Miller Street and north of Peachey Street are discussed as part of the Downtown Wenatchee signing plans, discussed below.



With planned improvements along Miller Street, southbound trucks on N Wenatchee Avenue will be guided to Chelan Avenue without changing lanes.

WSDOT's recent improvements to the SR 285 Sellar Bridge includes new truck route and guide signs.

New truck route signs are in place to guide trucks entering/exiting Wenatchee to/from East Wenatchee via the George Sellar Bridge. These were designed and constructed as part of the recent WSDOT project. Trucks are directed to/from Mission Street or S Wenatchee Avenue using Ferry Street or Marr Street.

Downtown Wenatchee Freight Route Signs

The City of Wenatchee has adopted a policy to restrict through truck traffic on Wenatchee Avenue in its downtown. The City plans to install truck diverters at Kittitas Street (northbound) and at 2nd Street (southbound). The diverters will, however, allow delivery trucks that enter this section of Wenatchee Avenue from side streets, such as Orondo Avenue, to exit downtown via Wenatchee Avenue at these locations.

Truck drivers on southbound Wenatchee Avenue approaching 2nd Street will see a sign noting that trucks are not allowed to continue south (except for local deliveries). These truck drivers would have bypassed the truck route signs at 5th Street to turn right to connect to SR 285. The southbound trucks that passed up turning at 5th Street will be restricted from going straight (south) or turning right (west) at 2nd Street. Instead they will be directed to turn left onto eastbound 2nd Street until such time as improvements are made to increase the turn radius on the northwest corner of the intersection of Wenatchee Avenue/2nd Street to accommodate large trucks. The southbound trucks would turn left onto eastbound 2nd Street and then they would turn south on Columbia Street.

Northbound trucks approaching Kittitas Street will be directed to turn left toward SR 285 Chelan Avenue/Mission Street. The north-to-east right turn onto Kittitas Street also will not be allowed due to the insufficient turn radius. Truck traffic approaching this section of Wenatchee Avenue on the intersecting cross-streets also will be signed as being restricted from turning left or right onto Wenatchee Avenue, except for local deliveries.

The remainder of the freight sign plan for downtown Wenatchee and the surrounding vicinity is designed to direct trucks to use the SR 285 Chelan Avenue/Mission Street one-way couplet or S Wenatchee Avenue. These include signs directing southbound trucks on Chelan Avenue to use 5th Street, Orondo Avenue or Kittitas Street to access the waterfront. As noted before, downtown deliveries would use Orondo Avenue to access the businesses.

Northbound truck traffic on Mission Street would be directed to the waterfront via Thurston, 5th, and 9th Streets. Northbound trucks on Mission Street also would be allowed to turn east onto Thurston Street or Orondo Avenue, but these streets would not be signed for truck access to the waterfront.

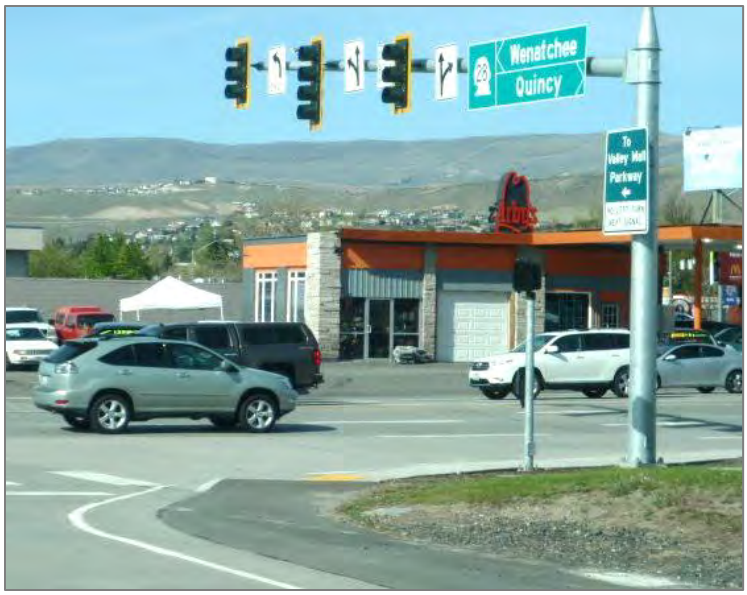
Several east-west cross-streets will be signed for trucks to connect to northbound Mission Street or southbound Chelan Avenue. These include 9th Street, 5th Street, 2nd Street, Orondo Avenue, and Kittitas Street which are all designated as part of the Supporting Freight System.

Northbound trucks on S Wenatchee Avenue that want to return to SR 285 or other locations south of downtown Wenatchee will be signed to use Thurston Street to connect with Columbia Street and then return via Spokane Street. Northbound trucks on S Wenatchee Avenue also will be directed to SR 285 (Mission Street) via Thurston Street. If the northbound trucks continue north of Thurston Street they will be directed to make a left turn onto westbound Kittitas Street to connect to Chelan Avenue.
The signing plan also includes new or replacement signs to direct trucks away from Riverside Drive. The plan also directs trucks to Chelan Avenue/Mission Street couplet to provide positive directional signage in this area.

East Wenatchee Vicinity Freight Route Signs

Truck signing plans for East Wenatchee are simpler than those for the Wenatchee side of the Columbia River. This is due to the simpler street system as well as the lack of any “Trucks Restricted” streets. One of the primary elements of the freight signing plan for the East Wenatchee Area is to direct trucks around downtown East Wenatchee and Wenatchee Valley Mall while still providing for local commercial deliveries. Figure 6 shows the conceptual freight signing plan for the downtown East Wenatchee and the surrounding area.

Northbound trucks on SR 28 approaching the urban area destined to downtown East Wenatchee or Badger Mountain Road would be signed to turn right onto 3rd Street SE. Trucks accessing downtown Wenatchee and the commercial areas along Valley Mall Parkway would be directed to turn left onto northbound Rock Island Road. This signed route by-passes the east-to-north left-turn restriction from Grant Road to Valley Mall Parkway. The primary Freight Route would be signed to turn north onto Highline Drive to continue to Badger Mountain via Eastmont Drive. Trucks also could turn onto Grant Road via Highline Drive but that would not need to be specifically signed.



Freight route signs in East Wenatchee need to direct trucks for commercial deliveries as well as regional access.

Southbound trucks on SR 28 approaching the downtown commercial district of East Wenatchee would be directed to turn left onto 9th Street and then turn south onto Valley Mall Parkway. Southbound trucks continuing through to Rock Island or Quincy are currently signed to use the right lane approaching Grant Road. Trucks approaching Grant Road can turn left to freight destinations east of East Wenatchee such as Pangborn Memorial Airport or various agricultural areas, but cannot turn left onto Valley Mall Parkway.

Trucks entering east Wenatchee from Badger Mountain will be signed to use Grant Road to connect with SR 28 and SR 285. Trucks continuing to southbound SR 28 would continue south on Highline Drive and turn right onto 3rd Street SE.

Freight System Transportation Improvements

The freight route plan and associated freight signing plan were developed considering the potential need for improvements to enhance the mobility and safety of truck movements in the region. Intersection or roadway improvements can improve freight mobility in the region by making it easier for trucks to use the designated freight routes and supporting freight system. This helps reduce potential negative impacts where trucks are not desired or where existing roadways would need extensive upgrades to accommodate trucks. Furthermore, improvements along the designated freight routes can help reduce safety issues that affect trucks moving into, out of, and through the urban area. In addition, the improvements to support freight mobility and safety need to consider the potential for conflicts with other travel modes.

Identifying the Need for Freight System Improvements

In order to define the appropriate types of transportation system projects to improve freight mobility and safety in the region, the team needed to understand the level of truck traffic, truck travel patterns, and collision data. The improvements also needed to take into account where the freight routes interfaces with the pedestrian and bicycle routes. The improvements also needed to consider state and local agency Transportation Improvement Programs.

Truck Travel Patterns and Volumes

Improvements on the designated freight routes needs to be based, at least in part, on an understanding which routes the larger trucks are currently using and the relative volume of truck traffic in each corridor. Review of data from WSDOT, WVTC, and local agencies provided insights into truck travel patterns and volumes. Graphics summarizing daily traffic counts and truck volumes on state highways and other facilities are included in the freight Study Supporting Materials document.

The highest truck volumes (all sizes) in the urban area are found on the two bridges entering the City of Wenatchee. Approximately 2,800 trucks per day use N Wenatchee Avenue across the Wenatchee River. WSDOT count data show a similar volume of trucks using the SR 285 George Sellar Bridge across the Columbia River. Other roadways with high volumes of trucks include the US 2/97 Odabashian Bridge at the north end of the region and SR 28 in Douglas County. These two state highways carried 1,200 to 1,700 trucks per day in 2012/2013. Approximately 1,500 trucks per day use SR 28 between US 2/97 and East Wenatchee.

As previously noted, the City of Wenatchee is planning to restrict trucks travelling through its downtown on Wenatchee Avenue. Trucks will be directed to the SR 285 one-way couplet streets (Chelan Avenue/Mission Street). The existing count data show 1,300 trucks a day on the couplet in the vicinity of 7th Street. However, only 600 trucks per day use SR 285 south of downtown Wenatchee (Mission Street south of Chehalis Street). Truck volumes On Wenatchee Avenue range from 200 trucks per day north of downtown to 300 trucks per day south of downtown.

As discussed above, the total volume of trucks entering/exiting Wenatchee on SR 285 is higher than the truck volumes on SR 28 north of East Wenatchee. However, evaluating the changes in the volume of trucks on various segments of SR 285 in Wenatchee indicates that the majority of regional “through” truck trips use SR 28 (Sunset Highway). This finding is consistent with the responses from the freight user group representatives during the initial part of the Freight Study. It is also verified by data from the Washington State University Truck Traffic Survey conducted for WSDOT in 2013-2014.

Collision Analysis

To provide a basis for quantifying safety issues, collision data were obtained from WSDOT for a five year period (2007-2011). Summaries of these data are provided in the Freight Study Supporting Materials document. During the five year period, a total of almost 700 collisions were recorded in the greater Wenatchee region. Roadways and intersections with the highest number of collisions were primarily located along the state highway system. These facilities carry the highest volume of traffic so they have a greater potential for collisions to occur. As previously noted, the decision tree designated all state highways in the region as Freight Routes.

Of the nearly 700 total collisions during the five year period, 68 involved trucks. This is an average of 13.6 truck collisions per year. Locations and summaries of truck collision data also are included in the Supporting Materials document. There was no predominate type of collision involving trucks. Approximately one fifth of the 68 truck collisions involved striking a fixed object such as a traffic signal or utility pole, mailbox, fire hydrant, or similar roadside object. The other collisions involving trucks were fairly evenly split between angle-type, rear-end, and sideswipe accidents. Many of the truck collisions appear to be related to turning movements where trucks could not stay in the correct lane. Some of these collisions involve trucks going up on a sidewalk. Other resulted from trucks “off- tracking” into an adjacent lane. Sometimes the off-tracking would be into a travel lane or turn lane in the same direction, while other truck collisions likely involved trucks crossing into a lane for traffic travelling in the opposite direction. These types of truck collisions suggest improvements that enhance the turn radius for trucks at intersections along the freight routes.

Non-Motorized System

By its nature, the street system in the Wenatchee region serves multiple travel modes. Cars, trucks, and buses take up the most room and generally use the same physical space—the travel lanes and driveways. Bikes and pedestrians take up much less room but also may need to travel along or cross the freight routes. In these cases there is potential for conflicts between trucks and bicyclists or pedestrians.

These interactions between modes can result in trade-offs in the level of improvements to serve freight and the improvements needed for bicycles and pedestrians. Improvements to improve the turn radius of trucks will increase pedestrian crossing distances. In addition, improvements to better facilitate trucks may eliminate opportunities to provide a bicycle lane. The design of each roadway to accommodate will need to address these trade-offs, especially if the roadway corridor is restricted by available rights-of-way, existing buildings, utilities, or other constraints.

As discussed earlier in the Freight Study, designating the Freight Routes and Supporting Freight System took into consideration the regional *Bicycle Master Plan* (WVTC, May 2013) which was adopted by WVTC in 2013. As potential improvement concepts were developed to enhance freight, the Freight Study also considered the bicycle routes. The TAC discussed various improvement strategies for each corridor that may best accommodate the different travel modes. The TAC noted that the options and trade-offs will need to be reviewed in more detail during the design and implementation of the improvements.

Recommended Freight Improvement Projects

Based on the freight route designations and associated analysis of traffic volumes, operations, and safety, concepts for potential transportation system projects to improve freight travel in the region were developed. Three levels of projects were identified. The first level included improvements along the designated freight routes that had been recently constructed, were under construction, or were funded for construction. Many of these improvements already address the some of the identified freight issues. The second level

included reviewing improvement projects that had previously been identified as part of other transportation studies in the Wenatchee urban area. These include plans for N Wenatchee Avenue, SR2/97 and SR 28 (Sunset Highway). These also include local roadway improvements identified as part of other local area transportation analyses. The third level includes potential new freight-related transportation system improvement projects identified as part of the Freight Study. Concepts for these projects went through several reviews with the TAC to balance improvements for freight trucks against impacts on other travel modes, project costs, property impacts, and other related factors. The various freight-related improvement concepts also were presented to the freight user group representatives for comment.

Figure 7A shows the locations of the identified transportation improvements along the freight system routes for the overall study area. Figure 7B provides more detail of the same information for the key corridors in Wenatchee and East Wenatchee. The three levels of the improvement projects include:

- Improvements Completed or Schedule for Completion in the Near Term
- Improvements Previously Identified in Other Plans
- Improvements Evaluated as Part of the WVTC Freight Plan

Tables 1, 2, and 3 summarize the projects in each category. Tables 2 and 3 include planning level cost estimates and priorities. Cost estimates and priorities are not included for the projects on Table 1 because they are either already complete or funded for completion in the near-term. Appendix C provides more detailed illustrations of the potential improvement concepts.

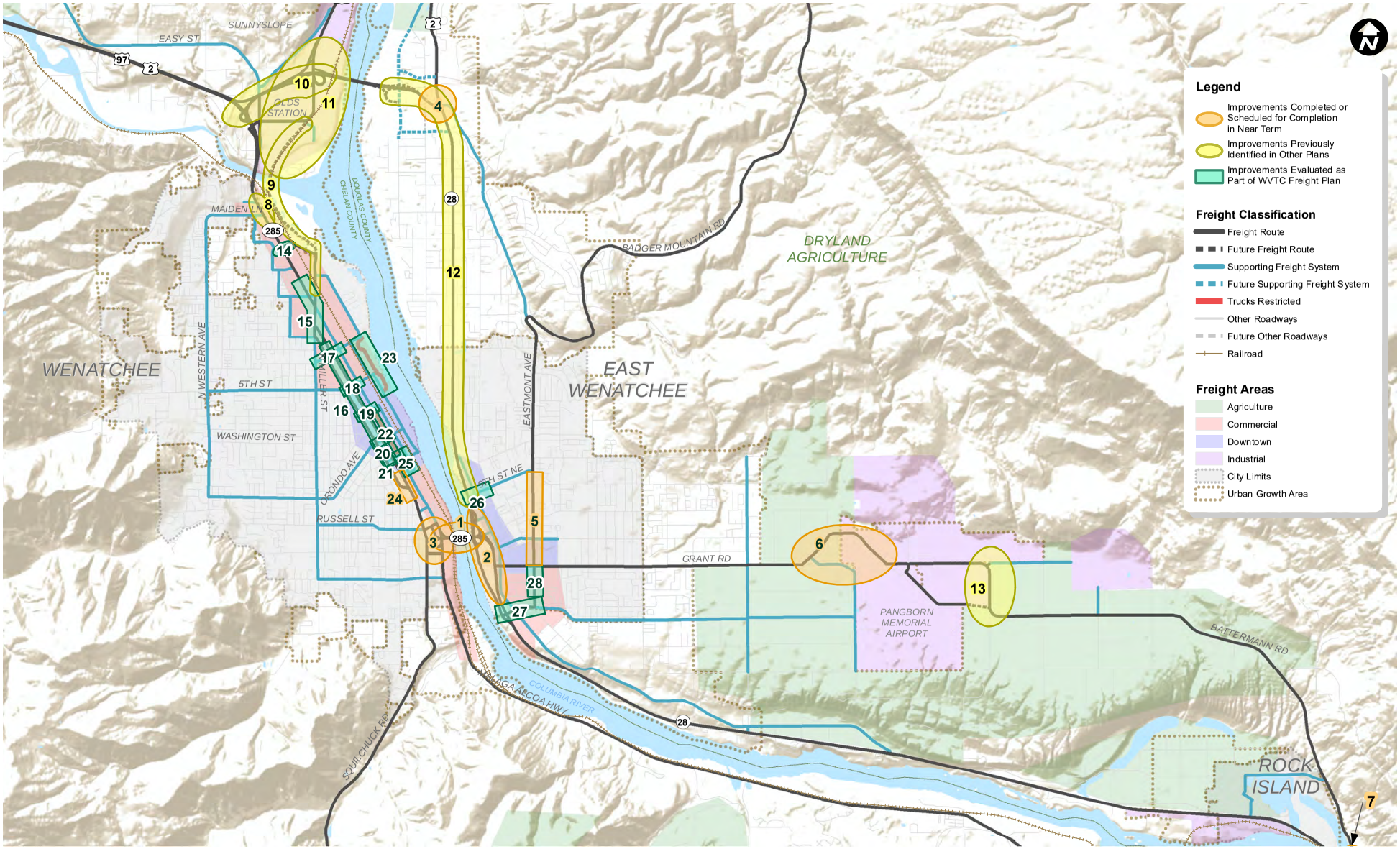
The planning level cost estimates for the projects on Table 2 were obtained from the prior planning documents, as applicable. Planning level cost estimates for the projects identified during the Freight Study (Table 3) were prepared by RH2 Engineering based on concept level designs and local area cost factors. Appendix D includes the project cost estimate worksheets.

The relative project priorities shown in Tables 2 and 3 only reflect the needs of the regional freight system. They were established based on the study objectives and discussions with the WVTC TAC. Input from the freight user group representatives also were incorporated into the project priorities. The ultimate priority of the freight projects for funding and implementation by WSDOT and local agencies will also need to consider their other types of transportation system improvements and availability of funding. WVTC and its partners will use the Freight Study to identify which of the freight-related improvements are appropriate for inclusion in the Metropolitan Transportation Plan (MTP) which supports the regional allocation of federal and state transportation funding.

Improvements Completed or Scheduled for Completion in the Near Term

As shown on Table 1, there are seven transportation improvements that have been recently completed (or will be constructed in the near term) on the designated freight system. These are shown in the orange color on Figures 7A and 7B. Projects 1, 2, and 3 were recent WSDOT improvements to the SR 285 George Sellar Bridge connecting East Wenatchee and Wenatchee. This is a key state highway freight route serving the region. The improvements included adding an eastbound lane to the bridge which reduces conflicts associated with merging and weaving movements.

Improvements also were made to the east and west ends of the bridge. Improvements on the East Wenatchee side of the bridge include a southbound bypass on SR 28. Trucks travelling on SR 28 benefit from this improvement due to reduced delays and safety conflicts. The east side project improvements also provide more left turn capacity from southbound SR 28 to eastbound Grant Road, serving freight access to industrial and agricultural areas near Pangborn Memorial Airport.



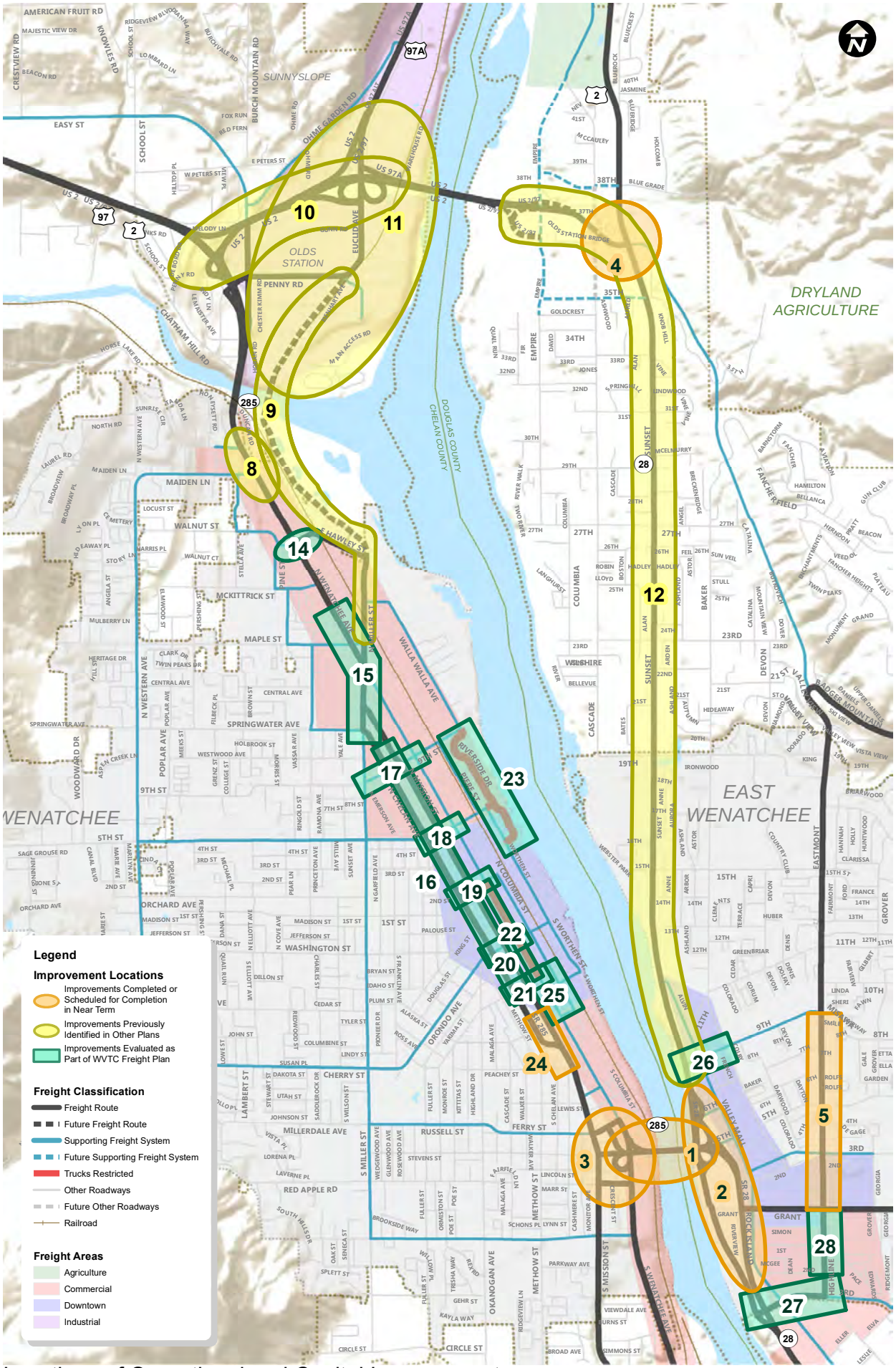
Locations of Operational and Capital Improvements Along Freight Route System

FIGURE **7A**

WVTC Freight Study

Q:\Projects\12\12276.00 - WVTC Freight Mobility Study\GIS\MXD\April 2014\FIG7A_Improvements.mxd

transpoGROUP



Locations of Operational and Capital Improvements Along Freight Route System - Regional Core

WVTC Freight Study

FIGURE **7B**

Q:\Projects\12\12276.00 - WVTC Freight Mobility Study\GIS\MXD\August2014\FIG7B_ImpsLocations_City.mxd

transpoGROUP

Table 1. Improvements Completed or Scheduled for Completion in the Near Term

Ref Key[1]	Location (Limits)	Description	Benefit to Freight	Comment
1	SR 285 Sellar Bridge (Mission Street to SR 28)	Construct additional eastbound lane.	Additional roadway capacity and reduced merging and weaving.	Complete 2011
2	East End of Sellar Bridge (9th Street to 3rd Street SE)	Construct southbound bypass of Grant Road and modify Grant Road intersection.	Southbound trucks bypass intersection delays; reduces conflicting traffic movements; improved signage.	Complete 2013
3	West End Sellar Bridge (Mission Street to Wenatchee Avenue)	Construct new westbound off-ramp from SR 285, upgrade local streets to facilitate trucks, and improve intersection capacity.	Reduces conflicts and congestion at west end of Sellar Bridge and enhances connections to/from the bridge and local freight areas.	Complete 2013
4	US 2/97 at SR 28 (intersection)	Widen intersection and connect to Eastmont extension.	Reduces congestion and delineates truck lanes at major intersection.	Completed 2013
5	Eastmont Avenue (Grant Road to 9th Street)	Reconstruct arterial to three lanes and install traffic signal at 3rd Street NE.	Improves lane delineation and traffic controls.	Completed 2013
6	Grant Road/Union Avenue (State Avenue to Airport Way)	Realign Grant Road and Union Avenue at north end of Pangborn Airport.	Maintains continuous east-west roadway to serve industrial and agricultural areas.	In design, construction expected to be complete in 2015
7	SR 28/Batterman Road (intersection)	Construct right turn lane and illumination.	Separates turning trucks from through traffic to enhance safety and operations.	Complete 2010

1. Location reference for Figures 7A and 7B.

Table 2. Improvements Previously Identified in Other Plans

Ref Key[1]	Location (Limits)	Description	Cost Estimate Range[2]	Freight System Priority[3]	Benefit to Freight	Comment
8	N Wenatchee Avenue (South of Maiden Lane to Horse Lake Road)	Construct intersection improvements and new frontage roads.	$1.6 to $2.1 million[4]	Low to Medium	Reduces driveway turn movements and overall congestion.	Identified in *North Wenatchee Transportation Master Plan*.
9	Confluence Parkway (Miller Street/N Wenatchee Avenue to Euclid Avenue)	Construct new arterial bypass of N Wenatchee Avenue including new bridge over Wenatchee River.	$70 to $85 million[4]	High	Provides more direct connection for freight between US 2/97 and freight areas in Wenatchee and Olds Station; reduces delays and conflicts encountered along N Wenatchee Avenue.	Identified in *North Wenatchee Transportation Master Plan*. Cost does not include Hawley Street Grade Separation project or improvements at US 2/Euclid Avenue Interchange.
10	US 2 (SR 285 Interchange to Euclid Avenue Interchange)	Implement short term safety improvements at US 2/Easy Street. Construct new interchange at US 2/97/SR 285/Easy Street and modify existing US 2/97 interchange at Euclid Avenue.	$34.6 to $41.9 million[4]	High	Provides more direct east-west route for freight on US 2/97 and improves connectivity to Wenatchee and Olds Station. Reduces existing safety issues.	Identified in *North Wenatchee Transportation Master Plan*.
11	Olds Station Industrial Area Roadway Improvements	Construct new and upgrade existing roads in Olds Station to improve access and circulation.	$4.6 to $5.7 million	Low	Enhances local freight access and circulation.	Identified in *North Wenatchee Transportation Master Plan*. Improvements would be tied to development in Olds Station.
12	US 2/SR 28/Sunset Highway (Empire Avenue/US 2 to SR 28/9th Street)	Widen SR 28/Sunset Highway to five lanes, improve intersections, and implement access management. Construct grade separation of US 2 at Empire Avenue to serve future local circulation roadways.	$200 to $250 million[5]	High	Adds significant capacity along major Freight Route serving through trucks and local freight. Access management and future interchange at Empire Avenue will improve safety by reducing conflicts.	Recommended in *SR 28 – Eastside Corridor Project* (2006 EIS)
13	Van Well Street (Grant Road to 4th Street)	Improve roadway and widen shoulders.	Not Available	Low	Wider roadway and shoulders will better serve larger freight vehicles.	Project identified as part of Waste Management improvements. Not a priority for regional freight system.

1. Location reference for Figures 7A and 7B.
2. Costs in 2013 dollars unless otherwise noted.
3. Relative priority from a regional freight perspective for resolving existing issues and implementation of recommended freight routes; does not reflect or commit WSDOT or local agency priorities for transportation projects.
4. Cost from *North Wenatchee Transportation Master Plan* (2010 dollars).
5. Cost estimate from 2006 EIS inflated to 2013 at approximately 4 percent per year.

Table 3. Improvements Evaluated as Part of WVTC Freight Study

Ref Key[1]	Location (Limits)	Description	Cost Estimate Range[2]	Freight System Priority[3]	Benefit to Freight	Comment
14*	Hawley Street/N Wenatchee Avenue (intersection)	Improve turn radii at intersection and modify traffic signal.	$168,000 to $234,000	Medium Low	Improved turn radius will reduce off-tracking of trucks into adjacent travel lanes or onto the sidewalk.	Short term improvement which could be integrated with potential project to grade separate Hawley Street at railroad tracks which is identified in *North Wenatchee Transportation Master Plan.*
15*	Miller Street (N Wenatchee Avenue to Chelan Avenue)	Improve Miller Street/Mission Street intersection radius and lane alignments. Modify Miller Street approaching Chelan Avenue to allow left turns from three lanes (left, left, left/through, through/right). Adjust signal timing to reduce traffic queues.	$855,000[4]	High	Changes allow trucks to stay in same lane while traveling south from N Wenatchee Avenue to Chelan Avenue or Miller Street. Provides additional capacity for left turns from Miller Street to Chelan Avenue, a major freight pattern.	Additional improvements including access management along this section of Miller Street are identified in the *North Wenatchee Transportation Master Plan*. Project is supported by freight users' group comments.
16	SR 285 Couplet North Segment (9th Street to Kittitas Street)	Revise signal timing to improve progression and reduce traffic stops. Modify roadway striping to provide wider right and center travel lanes at existing "pinch" points.	Low	High	Reduces delays and number of times vehicles will need to stop at signals along the one-way couplet. Improved signal timing also reduces safety conflicts by maintaining more consistent travel speeds. Wider travel lanes will improve safety for trucks on couplet.	Recommendations from City of Wenatchee Safety Study for the couplet.
17*	9th Street (Wenatchee Avenue to Chelan Avenue)	Signing only; no physical improvements recommended.	$3,000 to $4,000	High – signing only	Directs trucks away from Wenatchee Avenue which will be closed to through trucks at 2nd Street.	See Freight Study Sign Plan (Figure 6).
18A*	5th Street (Wenatchee Avenue to Chelan Avenue)	Convert 5th Street to three lanes and adjust parking and modify traffic signals.	$93,000 to $126,000[5]	High	Improvement improves truck turn radii and reduces off-tracking into adjacent lanes.	Cost of curb bulbs not included; the curb bulbs are part of City of Wenatchee Safety Study recommendations.
18B*	5th Street (Wenatchee Avenue to Chelan Avenue)	Maintain existing four lane cross section and allow trucks to off-track into adjacent lanes until additional improvements are made.	$5,000 to $10,000[5]	High	Signing directs trucks to desired freight routes.	Cost of curb bulbs not included; the curb bulbs are part of City of Wenatchee Safety Study recommendations.
19A*	2nd Street (Wenatchee Avenue to Chelan Avenue)	Modify turn radius for southbound Wenatchee Avenue to westbound 2nd Street.	$110,000 to $150,000	High	Downtown truck diverter will require trucks to turn at 2nd Street. Modified southbound right turn radius will better facilitate truck movements.	Some off-tracking of trucks still required to/from 2nd Street as shown in Appendix C.
19B*	2nd Street (Wenatchee Avenue to Chelan Avenue)	Sign to restrict south-to-west right turn for trucks until radius improvements described in project 19A are installed. Direct trucks to use left-turn lane to turn east on 2nd Street to Columbia Street.	$1,000 to $2,000	High	Downtown truck diverter will require trucks to turn at 2nd Street. Until southbound right-turn radius improvements are made trucks will be required to turn left onto eastbound 2nd Street to reduce conflicts of off-tracking.	Some off-tracking of trucks still required to/from 2nd Street east of Wenatchee Avenue as shown in Appendix C.
20A*	Orondo Avenue (Wenatchee Avenue to Chelan Avenue)	Convert Orondo Avenue to three lanes with bicycle facilities and parallel parking and modify traffic signals.	$130,000 to $175,000[5]	High	Downtown truck diverter will require more trucks to use Orondo Avenue between waterfront, downtown, and SR 285 couplet. Improvement reduces off-tracking into adjacent lanes.	Cost of curb bulbs not included; the curb bulbs are part of City of Wenatchee Safety Study recommendations.
20B*	Orondo Avenue (Wenatchee Avenue to Chelan Avenue)	Convert Orondo Avenue to three lanes with bicycle facilities and angle parking and modify traffic signals.	$130,000 to $175,000[5]	High	Downtown truck diverter will require more trucks to use Orondo Avenue between waterfront, downtown, and SR 285 couplet. Improvement reduces off-tracking into adjacent lanes.	Cost of curb bulbs not included; the curb bulbs are part of City of Wenatchee Safety Study recommendations.
20C*	Orondo Avenue (Wenatchee Avenue to Chelan Avenue)	Maintain existing four lane cross section and allow trucks to off-track into adjacent lanes until additional improvements are made.	$5,000 to $10,000[5]	High	Signing directs trucks to desired freight routes.	Cost of curb bulbs not included; the curb bulbs are part of City of Wenatchee Safety Study recommendations.

Table 3. Improvements Evaluated as Part of WVTC Freight Study (Cont'd)

Ref Key[1]	Location (Limits)	Description	Cost Estimate Range[2]	Freight System Priority[3]	Benefit to Freight	Comment
21*	Kittitas Street (Wenatchee Avenue to Chelan Avenue)	Modify curb radius at Wenatchee Avenue/Kittitas Street. Install new traffic signal at Kittitas Street/Chelan Avenue.	$435,000 to $575,000	High	Downtown truck diverter will require northbound trucks to turn left onto westbound Kittitas Street requiring improved turn radius. Traffic signal at Chelan Avenue will facilitate trucks accessing southbound SR 285.	Cost does not include pavement upgrades for Kittitas Street.
22	Downtown Wenatchee Avenue (2nd Street to Kittitas Street)	Install southbound truck diverter on Wenatchee Avenue at 2nd Street and northbound diverter at Kittitas Streets. Restripe Wenatchee Avenue and other streets to accommodate sign truck routes to allow only local deliveries.	Not available, City funded.	High	Restricting non-local trucks in downtown Wenatchee will reduce conflicts with local traffic, parking, pedestrians and bicycles. Trucks will be directed to routes that are more compatible for large vehicles.	See Appendix C for concept designs for 2nd Street (project 19) and Kittitas Street (project 21). City of Wenatchee policy direction; diverters planned to be constructed in 2014.
23*	Riverside Drive/Worthen Street (1st Street to 9th Street)	Provide hanging sign to visually restrict large trucks from entering Riverside Drive at 9th Street or 5th Street.	$20,000 to $54,000	Medium	Will help keep trucks from entering Riverside Drive which is not designed to accommodate large vehicles.	
24	SR 285 Couplet/Mission Street South Segment (Spokane Street to Peachey Street)	Restripe Chelan Avenue approaching Mission Street to shift lanes to reduce off-tracking. Restrict left turns along Mission Street between Chehalis Street and Peachey Street.	Very Low	High	Reduces off-tracking and conflicts with left turns.	Project complete 2014.
25*	Thurston Street (Kittitas Street to Spokane Street)	Restripe Thurston Street to three lanes to provide left turn lane to northbound Columbia Street. Sign truck access to waterfront via Thurston Street.	$5,000 to $7,000	High	Restriping Thurston Street will improve truck turn radius reducing off-tracking. Provides improved alternative route with installation of downtown truck diverters.	
26	9th Street NE (SR 28 to Baker Avenue)	Reconfigure Valley Mall Parkway to three lanes. Install traffic signal at intersection of 9th Street/Valley Mall Parkway.	$2.00 to $2.25 million[6]	Medium	Traffic signal will reduce the percentage of times trucks stop at intersection. Three lane roadways will reduce off-tracking and improve safety.	City of East Wenatchee Transportation Improvement Program projects.
27*	3rd Street SE (SR 28 to Highline Drive)	Install traffic signals at 3rd Street SE/Rock Island Road and 3rd Street SE/Highline Drive.	$750,000 to $850,000[7]	High	Provides alternative, less congested freight route to Grant Road	City of East Wenatchee Transportation Improvement Program projects.
28	Highline Drive (3rd Street SE to Grant Road)	Upgrade Highline Drive to match Eastmont Avenue north of Grant Road.	$90,000[7]	Medium	Provides consistency in road configuration for freight movement.	City of East Wenatchee Transportation Improvement Program project identifies constructing one segment of sidewalks on west side of roadway.

Conceptual project diagrams included in Appendix C for locations marked with an asterisk (*).

1. Location reference for Figures 7A and 7B.
2. Costs in 2013 dollars unless otherwise noted.
3. Relative priority from a regional freight perspective for resolving existing issues and implementation of recommended freight routes; does not reflect or commit WSDOT or local agency priorities for transportation projects.
4. Cost from City of Wenatchee grant applications ($315,000 for Chelan Avenue/Miller Street and $540,000 for Mission Street/Miller Street).
5. Cost does not include curb bulbs which are part of City of Wenatchee Safety Study recommendations.
6. Costs from City of East Wenatchee 2014 to 2019 Transportation Improvement Program including three lanes on Valley Mall Parkway between 6th Street and SR 28.
7. Cost estimate from City of East Wenatchee 2014 to 2019 Transportation Improvement Program.

Improvements on the west end of the Sellar Bridge also directly serve freight trucks. The improvements include developing a system of local streets to provide connections to/from SR 285 with S Wenatchee Avenue and the Malaga-Alcoa Highway. As shown on the Freight Sign Plan (Figure 6) the WSDOT project included new signs directing truck drivers to the designated freight routes.

WSDOT recently completed modifications at the interchange of SR 28 with SR 285 including a southbound by-pass of the Grant Avenue intersection.

Other completed or near term improvements are located in Douglas County or East Wenatchee. The most significant of these is the upgraded intersection at US 2/97 with SR 28. The intersection improvement provides additional overall capacity and identities the proper lanes for northbound trucks to use to turn west. This improvement also provides access to the recently constructed extension of Eastmont Avenue which is designated as part of the Supporting Freight System. These improvements are part of the SR 28 Wenatchee Eastside Corridor project (see project 12).

The other recent or near-term improvements that help serve freight include the City of East Wenatchee's project to reconstruct and upgrade Eastmont Avenue. This project provides improved lane delineation and surface conditions for freight trucks connecting with Badger Mountain Road and access for deliveries to the Wenatchee Valley Mall.

In the vicinity of Pangborn Memorial Airport, Grant Road and Union Avenue are being realigned around the north side of the airport. This project is in design and will maintain the continuous arterial for east/west traffic and freight in the area.

The intersection of SR 28/Battermann Road also was upgraded to add turn lanes and illumination. This improvement helps separate trucks turning right (west-to-north) from through traffic, thereby improving safety and operations.

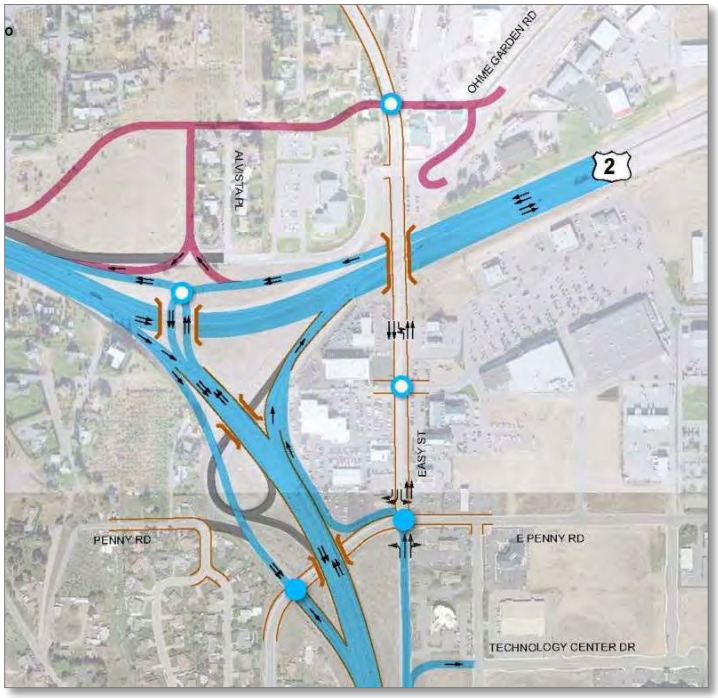
Improvements Previously Identified in Other Plans

The Freight Study also builds from and incorporates projects identified in previous planning efforts that will support and enhance the recommended freight route plan. As shown on Figures 7A and 7B, these are primarily located on the state highway system. Table 2 summarizes these improvements.

The *North Wenatchee Transportation Master Plan* was adopted by the WCTC Executive Council in February 2011. It specifically took into account freight mobility and safety in developing its recommendations. The most significant of these recommendations is the construction of a new arterial parallel to SR 285/N Wenatchee Avenue. The new arterial, called the Confluence Parkway, would facilitate freight trucks connecting between US 2/97 and the Wenatchee waterfront. The new arterial would require construction of a new bridge

over the Wenatchee River and would include a grade separation of Miller Street with the railroad tracks. The Confluence Parkway would separate through traffic, including freight trucks, from the commercial traffic along N Wenatchee Avenue. This will greatly enhance freight mobility and safety in the northern part of the City of Wenatchee. The new corridor also will provide additional capacity for freight serving the range of commercial uses along N Wenatchee Avenue by moving through traffic off of the existing SR 285/N Wenatchee Avenue corridor.

The *North Wenatchee Transportation Master Plan* also recommends major upgrades to US 2/97 between US 285 and the Columbia River. These include reconfiguring the US 2/SR 285 interchange so eastbound traffic on US 2 does not need to exit the freeway to continue to the bridge or to US 97A. In addition, these improvements would eliminate the existing traffic signal at US 2/Easy Street which is a safety issue and impacts truck traffic flow by requiring through vehicles to stop at red lights on this major regional highway. More modest reconfigurations of the US 2/Euclid interchange are also included as recommendations in the *North Wenatchee Transportation Master Plan* in order to accommodate the higher volumes of traffic and trucks with the construction of the confluence Parkway. These combined projects are expected to cost up to $125 million or more so they will require regional coordination and significant levels of federal or state funding.



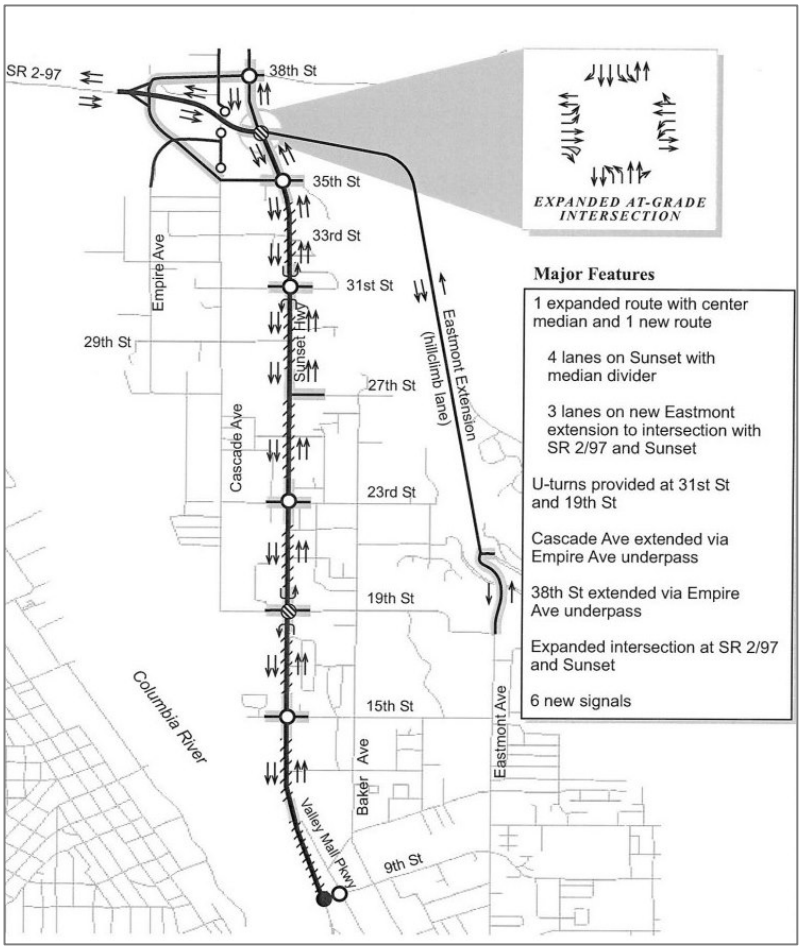
The North Wenatchee Transportation Master Plan recommends reconfiguring the US2 / SR 285 interchange to facilitate eastbound through traffic flows.

The *North Wenatchee Transportation Master Plan* also identifies improvements to roadways in the Olds Station area. These improvements will be tied to expanded development in the area, as well as the construction of the Confluence Parkway which will directly serve industries in the Olds Station area. Improvements also are identified in the *North Wenatchee Transportation Master Plan* that will reduce congestion and safety conflicts at intersections along N Wenatchee Avenue south of the existing Wenatchee River Bridge.

In the early to mid-2000's, agencies in the Wenatchee region evaluated alternatives for improving traffic operations and safety on the eastside of the Columbia River. The *SR 28 – Eastside Corridor Project* recommends widening of SR 28 to five lanes between US 2/97 and East Wenatchee. The recommendations also identify specific improvements at intersections and implementation of access management along the state highway. This corridor serves some of the highest volumes of truck traffic in the Wenatchee region so it is a very high priority; however, the high cost of the improvements will likely require phasing construction.

Based on existing operations and safety analyses, the initial phases should focus on completing improvements at major intersections similar to improvements at 19th Street NE. The next phases for the corridor should include continuing to construct a center two-way left turn lane between intersections. These would improve freight travel along the corridor by separating through traffic from turning vehicles which will improve safety and help maintain more reasonable traffic speeds.

The *SR 28 – Eastside Corridor Project* also recommends construction of an interchange at US 2 with Empire Way west of SR 28. This would allow development of the adjacent area as a commercial center without need for a traffic signal or other controls which would impact regional freight traffic. This improvement is not as important to the regional freight system as the improvements along SR 28 because trucks do not need to stop along this segment of US 2/97. However, installing a traffic signal or other type of traffic control would impact trucks using this major freight corridor.



Regional plans call for widening SR 28 between US 2/97 and East Wenatchee to five lanes.

Prior studies for the Waste Management site east of Pangborn Memorial Airport identified widening and shoulder improvements along Van Well Street. These would improve local area freight but are not a high priority for the regional plan since they primarily serve local freight needs.

Improvements Evaluated as Part of the WVTC Freight Plan

The state highway improvements that have recently been constructed or are adopted as part of other transportation plans address many of the most significant regional issues for freight trucks. These major improvements do not, however, address freight mobility and safety in and around the business districts in downtown Wenatchee and East Wenatchee.

Therefore, the Freight Study focused on defining additional improvements to help facilitate truck travel to/from the state highways and the industrial and commercial districts on both sides of the Columbia River. These are illustrated on Figure 7B and summarized in Table 3. Appendix C includes more details of the improvement concepts and the components of the freight improvements.

The recommended freight system improvements focus in on key intersections along the Freight Routes and at intersections along the Supporting Freight System in both Wenatchee and East Wenatchee (see Figure 4B). The focus areas include intersections where the Freight Routes intersect each other or at the most significant intersections of the Freight Routes with the Supporting Freight System roadways. Many of the improvements include constructing larger curb radii, modifications to existing striping, and changes to intersection traffic controls. The improvements were defined concurrently with and are intended to be supported by and help support the Freight Sign Plan. One of the key constraints in developing the concepts was minimizing the impacts of adjacent properties and buildings and need to acquire right-of-way.

The design vehicle used for defining freight-related improvements was a WB-67. This represents a semi-trailer with a 67 foot wheelbase and is the largest design vehicle used for state highways. At several locations, the recommended improvements will not accommodate the WB-67 vehicle. Some amount of off-tracking will be necessary to minimize the cost and impacts of providing the larger turning radius to serve trucks. In addition, some of the intersection improvements show locations that could allow an even greater amount of off-tracking which would further reduce the need for intersection modifications. This could provide interim solutions for those roadways until funding is secured for more significant improvements.

Planning level cost estimates were developed for the recommended improvements evaluated as part of the Freight Study. The cost estimates include the major elements needed to complete the recommended project with a few assumptions. None of the estimates include costs for road reconstruction or resurfacing. It is anticipated that the options recommending striping changes would likely be done concurrently with the next programmed pavement preservation project. Another assumption is that the existing signal system (controller, foundations, signal standards, mast arms, etc.) can accommodate the necessary modifications needed for the recommended lane re-channelization shown on several exhibits. Curb bulb-outs (shown in blue on the concept drawings in Appendix C) are not included in the planning level estimates. These are shown as a cross-reference to the City's SR 285 Safety Study project improvements. Cost estimate worksheets are included in Appendix D.

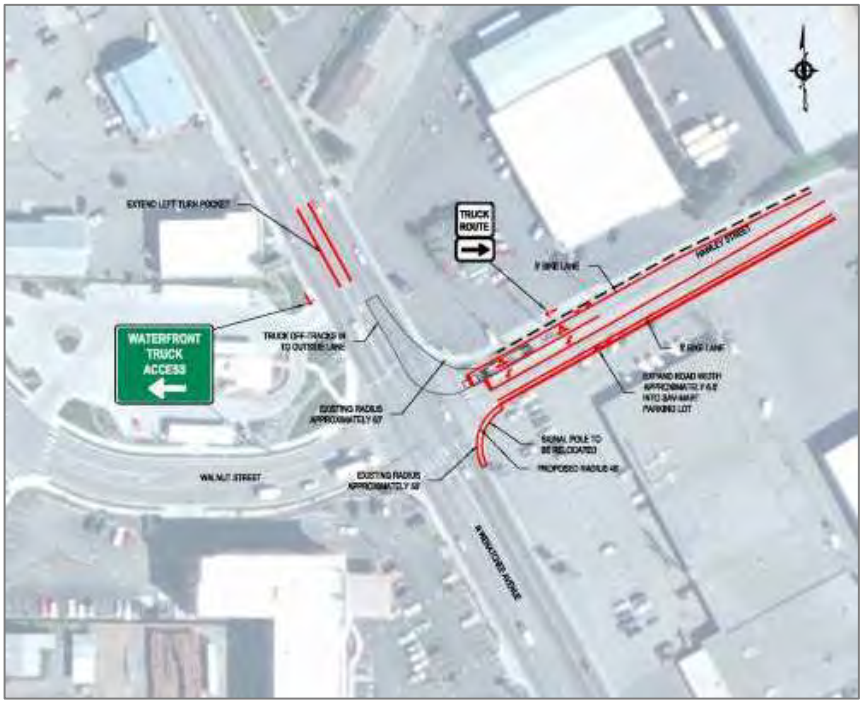
City of Wenatchee

The City of Wenatchee will be installing truck diverters on Wenatchee Avenue to prohibit trucks from travelling through its downtown. The Freight Study does not define the design of the diverters, but does identify improvements for the routes where the trucks will be redirected to per the Sign Plan. The Freight Route Plan and associated Freight Sign Plan identify the primary alternative truck route to be the SR 285 one-way couplet along Chelan Avenue (southbound) and Mission Street (northbound). This requires potential improvements along the couplet and the intersecting east-west side streets. Summaries of the projects are included on Table 3 with more information provided below. Conceptual design diagrams are provided in Appendix C for many of the improvements in the City of Wenatchee; these are designated with an asterisk (*) in in first column of Table 3

Some of the truck routes in Wenatchee coincide with primary bike and pedestrian routes. The improvements in these locations attempt to balance the need for larger turning radii to serve trucks without severely impacting the pedestrian and bicycle routes. In order to provide a comprehensive view of the preferred truck corridor, the conceptual design exhibits presented in Appendix C show the locations of possible curb bulbs as proposed by the City of Wenatchee's SR 285 Safety Study project. The recommended freight system improvements will not conflict with these pedestrian safety improvements. Costs for installing the curb bulbs are not included as part of the freight improvements but the safety improvement projects could be funded and constructed at the same time to help reduce total costs.

The Freight Study also considered the existing pavement conditions along the freight routes. Although a pavement analysis was not conducted, the existing pavement along the various freight corridors visually appears to be in relatively good condition and should be able to withstand the increase in the volume of trucks, at least in the near-term. The primary areas of concern are along Kittitas Street and Orondo Avenue where the roadways consist of a brick overlay. These roadways, however, are not major Freight Routes or even the highest volume Supporting Freight System corridors. These two roadways will primarily serve the truck drivers who missed the primary turns along the preferred, signed freight routes or trucks making local deliveries in downtown Wenatchee which are typically smaller trucks. Thus, the brick overlays should not encounter the total volume of freight travel, but instead only a relatively minimal amount. The existing pavement will eventually need a full pavement analysis due to age and increase in traffic, but for now, the existing pavement will be adequate to serve the new freight route.

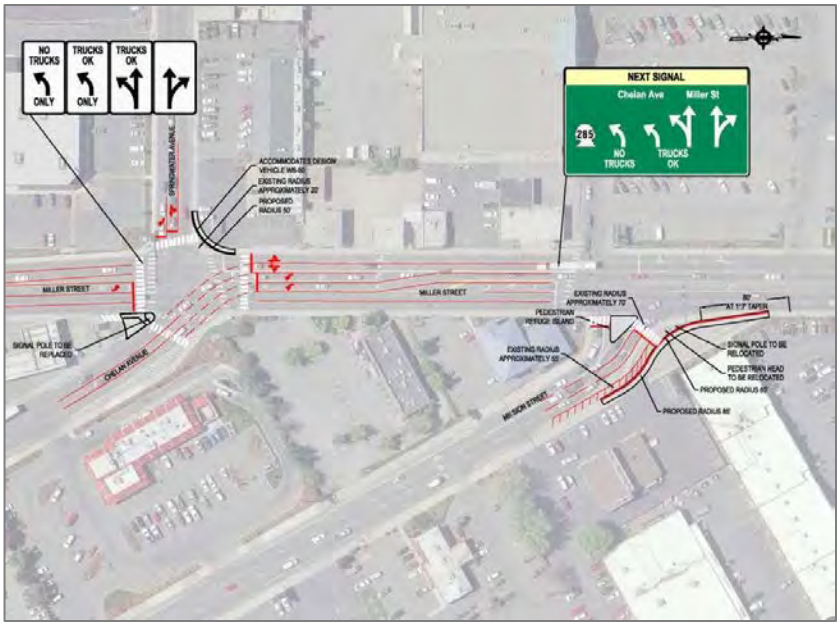
Hawley Street / N Wenatchee Avenue (project 14). The Freight Study examined the intersection of the Hawley Street and N Wenatchee Avenue to determine possible revisions to help improve the truck mobility while addressing the pedestrian and bicycle connections between N Wenatchee Avenue and the Apple Loop Trail. Increasing the curb radius on either the northeast or the southeast quadrant will help to improve the ability for trucks to make the west-to-north right turn onto N Wenatchee Avenue and reduce impacts of off-tracking. Changing either radius return will require modifications to the existing signal system. This widening will affect the adjacent property owners by eliminating some parking. The concept also includes lengthening the southbound left turn lane from N Wenatchee Avenue to Hawley Street to provide additional storage for trucks.



The curb radius at the intersection of Hawley Street with N Wenatchee Avenue needs to be increased to reduce the off-tracking of large trucks.

This project could be constructed as a standalone improvement. However, the *North Wenatchee Transportation Master Plan* includes recommendations for the Confluence Parkway which would reduce the volume of trucks needing to make these turn movements at this intersection. In addition, the *North Wenatchee Transportation Master Plan* identifies an improvement to grade-separate Hawley Street with the railroad tracks east of N Wenatchee Avenue. It is likely that the potential grade-separation project also would require other modifications at this intersection. Therefore, the project is listed as a medium-low priority. The priority would increase if the region decides not to pursue the Confluence Parkway or Hawley Street grade-separation project in the future.

Miller Street (project 15). In order to better direct and accommodate traffic and trucks between N Wenatchee Avenue and the SR 285 one-way couplet east of downtown Wenatchee, the City has applied for and received grants for improvements at the intersections of Miller Street with Chelan Avenue and with Mission Street. These improvements include restriping and signing/signal modifications to allow southbound trucks on Miller Street to make left-turns onto southbound Chelan Avenue from three lanes. The project will convert the center through lane into a shared through/left-turn lane. This improvement is supported by the Freight Sign Plan that will direct trucks to use the curb lane on southbound N Wenatchee Avenue to access Chelan Avenue or Miller Street without needing to change lanes.



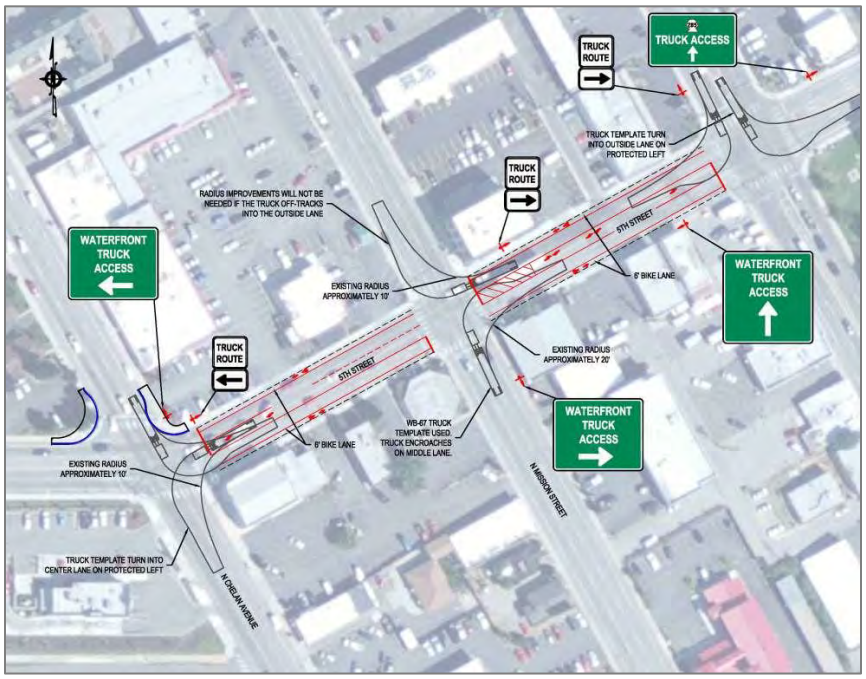
The City of Wenatchee is designing improvements on Miller Street to allow left-turns onto southbound Chelan Avenue from three lanes.

Other considerations for improvements at this intersection included removing one of the southbound through lanes on Miller approaching Chelan Avenue and widening the remaining three lanes to support truck turning radius needs. The WVTC TAC felt this would not provide sufficient storage at the intersection for the southbound through traffic movements. The City's grant application also included a modification of the curb radius at the northwest corner of this intersection to better accommodate delivery trucks to the shopping center.

The City also was awarded a grant for improvements at Mission Street/ Miller Street. These improvements provide a larger radius for the northbound right turns from Mission Street to Miller Street. It also provides an upgraded pedestrian crossing. Other alternatives for this location were evaluated but they did not provide any major improvements over the City's current plan for the intersection.

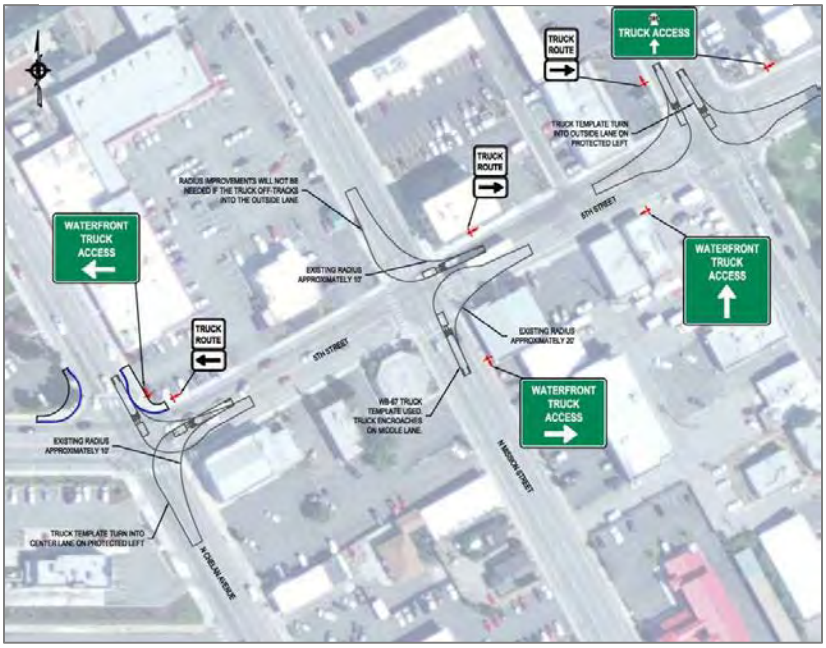
SR 285 Couplet North Segment (project 16). To better facilitate all traffic, including the larger freight trucks, the City of Wenatchee has prepared a study for updating the timing of the coordinated traffic signals along the north part of the one-way couplet (9th Street to Kittitas Street). The City study indicated that updating the signal timing would result in a slight increase in travel speeds along the couplet and would greatly reduce the number of vehicles needing to stop at signals along the corridor. This is accomplished by improving the "green band" on the one-way couplet. Reducing the proportion of vehicles that need to stop at red lights provides for more consistent travel times and also improves safety. Implementation of the signal timing revisions is a near-term priority to support increase freight use of the corridor.

9th Street (project 17). Several improvement strategies were evaluated for 9th Street between Wenatchee Avenue and Chelan Avenue. These include modifying curb radii and converting the existing four lanes to three lanes to accommodate truck turning needs. Based on the relatively low volume of large trucks and the associated impacts on adjacent properties, as well as costs, no physical improvements are recommended on this segment of 9th Street as part of the Freight Study. Additional truck signing is, however, identified to/from the couplet and the waterfront.



The Freight Study recommends converting 5th Street in Wenatchee from four lanes to three lanes between Chelan Avenue and Wenatchee Avenue to accommodate turn movements of large trucks.

5th Street (project 18A/ 18B). The Freight Study recommends converting 5th Street from four lanes to three lanes between Wenatchee Avenue and Chelan Avenue (project 18A). Unlike 9th Street, 5th Street carries significant volume of trucks because of its grade-separation with the railroad east of Wenatchee Avenue. Restriping the two blocks between Chelan Avenue and Wenatchee Avenue to one eastbound lane, two westbound lanes, and bicycle lanes on both sides of the roadway provides additional turning width for trucks entering and exiting 5th Street. This greatly reduces the potential impacts of truck off-tracking into an adjacent travel lane on 5th Street. The SR 285 Safety Study prepared for the City of Wenatchee shows that a 3-lane configuration will function without a noticeable loss in level of service at the three affected traffic signal locations on 5th Street. The proposed re-timing of the traffic signals along the Chelan Avenue/ Mission Street couplet (project 16) will allow more green time of



As an alternative, large trucks turning to/from on 5th Street would be allowed to continue to off-track into adjacent travel lanes.

the 5th Street approaches to these intersections which will reduce the potential for traffic queues to block adjacent intersections even with the lane reduction.

Even with the proposed changes, not all WB-67 truck turning movements at this intersection are possible without encroachment into some of the conflicting lanes. This is especially the case for the left turn from southbound Chelan Avenue to eastbound 5th Street. The TAC felt that this will not be a high volume truck movement and that infrequent encroachment is acceptable at this time.

The intersection of 5th Street and Mission Street also does not fully accommodate the WB-67 design vehicle with the proposed improvements. Restriping the block between Mission Street and Wenatchee Avenue will allow the design vehicle to make a right turn from Mission Street onto 5th Street by providing a single driving and bicycle lane in each direction and a center turn lane. The center turn lane could have a buffer at the intersection that would allow the truck to off-track. With this concept, the southeast corner will not need any radius alterations. The north-to-east right turn movement will require large trucks to encroach into the center northbound travel lane on Mission Street. This turn radius could be improved by shifting the travel lanes on Mission Street to the west; however, this will reduce the radius for trucks making the north-to-west left-turn movement. In order to modify the southeast corner to fully accommodate large trucks making the north-to-east right turn movement would require taking out the existing building at that location. The City should monitor the traffic operations and safety at this intersection to determine if modifications should be made over time. Some encroachment on the center through lane on Mission Street also will be needed to make the west-to-north right-turn movement. This is not expected to be a large volume movement for the large truck because they will likely turn north at Wenatchee Avenue. The northeast quadrant could include slight radius improvements. Alternatively, allowing trucks to off-track into the far outside lane (westernmost lane) on northbound Mission Street could avoid radius improvements in the northeast quadrant. The plan allows the off-tracking into the far lane, but the City may consider the radius improvements as the project is designed and implemented.

Prior to implementation, he City of Wenatchee would need to further explore the restriping this section of 5th Street from four lanes to three lanes as shown on project 18A. Project 18B maintains the existing four lane cross section. The concept diagram in Appendix C for project 18B shows the additional off-tracking of trucks under this configuration. The largest impact is for the north-to-east right turn from Mission Street to 5th Street. Traffic operations and safety at these intersections and roadway segments should be monitored to identify if additional issues develop with the additional off-tracking under this interim configuration.

2nd Street (project 19A/ 19B). The Freight Study examined the three intersections along 2nd Street at Chelan Avenue, Mission Street, and Wenatchee Avenue. 2nd Street will be the location of the north truck diverter on Wenatchee Avenue. With the new diverter, southbound trucks on Wenatchee Avenue will be required to turn eastbound or westbound onto 2nd Street. The south-to-east left turn requires off-tracking into the westbound lane on 2nd Street. This is anticipated to be a fairly low volume of large trucks because 2nd Street primarily serves parking lots for the convention center and access to the Apple Loop Trail. To better accommodate the southbound to westbound right turn the curb radius in the northwest corner needs to be increased which will encroach into the adjacent property owner's property. Reconfiguring the lanes on Wenatchee Avenue will reduce the level of encroachment into the adjacent property (project 19A). This reconfiguration will include restriping the left turn lane into a through and left lane, making the current through lane a right turn lane, and changing the current right turn lane into a striped or raised (mountable) truck apron for off-tracking.

From there, truck route signage guides trucks to turn north on Mission Street or turn south on Chelan Avenue. In both cases, expanding the curb radii was evaluated to reduce off-tracking which would require additional right of way. To expand the curb on the northeast quadrant of 2nd Street and Mission Street, the signal pole and fire hydrant will need relocation. In addition, the backside of the new sidewalk will require a barrier curb to accommodate the

grade change. Likewise, the southeast corner of 2nd Street and Chelan Avenue will require relocation of the signal pole, fire hydrant, and signal controller cabinet. This improvement will require a retaining wall due to the grade change. Alternatively, radius modifications or right of way impacts can be avoided at both the Chelan Avenue and Mission Street intersections by allowing the trucks to off-track into the outside lane. This is the recommendation for the base Freight Study. Truck volumes and impacts should be monitored, and if appropriate, one or more of these curb radii improvements could be considered in the future.

As previously noted for project 18A, truck route signs on southbound Wenatchee Avenue will first direct trucks to 5th Street to connect with SR 285. Prior to constructing the south-to-west right turn radius improvement shown on project 19A, the Freight Study recommends restricting trucks from making that right turn due to off-tracking into the eastbound traffic lanes on 2nd Street (or driving up and over the sidewalk). Signs would be installed to direct trucks to the southbound left-turn lane to turn east onto 2nd Street and connect with Columbia Street. This option should be monitored and could become the long-term freight route if no problems develop, reducing the need for the larger turn radius (project 19A).

Orondo Avenue (project 20A/ 20B/ 20C). Orondo Avenue is a unique road on the freight network in that it is both a primary pedestrian route as well as part of the Supporting Freight System. Orondo Avenue also serves several LINK Transit routes. It connects to the center of downtown Wenatchee. With the addition of truck diverters on Wenatchee Avenue, Orondo Street will be the primary freight route for downtown delivery trucks.

Existing infrastructure, including buildings, are right up to the back edge of sidewalk. Potential improvement concepts on this portion of Orondo Avenue focused on re-channelization and not increasing intersection radius returns. This route also overlaps with the SR 285 Safety Study, which recommends curb bulbs on the northwest, southwest and southeast corners of the Mission Street/Orondo Avenue intersection. The installation of curb bulbs will reduce pedestrian crossing distances.

The Freight Study recommends restriping the existing four-lane Orondo Avenue into a three-lane roadway (project 20A) as a way to provide increased turn radii for large trucks. This could include one lane in each direction, a center turn lane, bike lanes on both sides of the street, and parallel parking along the south side between Chelan Avenue and Wenatchee Avenue. Striping a buffer in the center lane at the Mission Street intersection would allow trucks to off-track as they make the north-to-east right turn to continue to the waterfront. Curb bulbs currently exist at the Chelan Avenue/Orondo Avenue intersection and due to this, the left turn from Chelan Avenue to Orondo Avenue will not accommodate the design vehicle WB-67. The ultimate design/configuration of the roadway also should address bus stops on Orondo Avenue and bus turn radii. All other movements from Orondo Avenue to either Chelan Avenue or Mission Street will be required to off-track into outside lanes of the couplet.

An alternative to the recommended configuration for this section of Orondo Avenue would include angle parking on the south side of the street with a striped bike lane in the westbound (uphill0 direction. Bicyclists traveling in the eastbound (downhill) direction would share the traffic lane.

Similar to 5th Street, the City of Wenatchee will need to further explore converting Orondo Avenue from four lanes to three lanes. Project concept 20C (Appendix C) illustrates the WB-67 truck turn template under the existing configuration. The north-to-east right turn movement from Mission Street to Orondo Avenue shows a significant off-tracking into the westbound travel lane. Similar to the project 18 discussion for 5th Street, it is recommended that traffic operations and safety at these intersections and roadway segments be monitored to identify if issues develop with the additional off-tracking under the existing configuration.

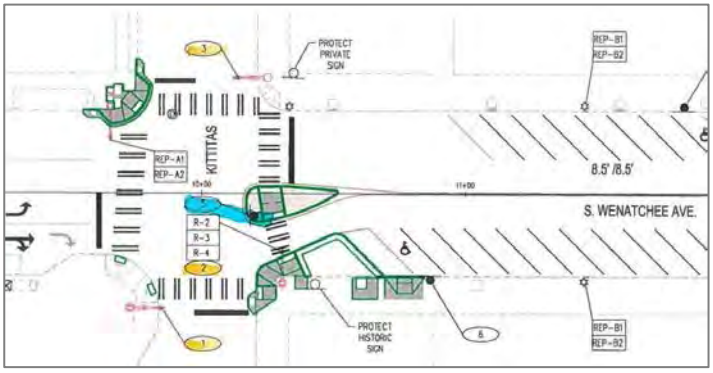
Kittitas Street (project 21). The Freight Study reviewed the need for improved turn radii at the intersections of Kittitas Street with Chelan Avenue, Mission Street, and Wenatchee

Avenue to support the redirecting truck drivers away from downtown Wenatchee Avenue. The Kittitas Street and Wenatchee Avenue intersection will require radius improvements at the southwest corner of the intersection. This will require some right of way acquisition and relocation of the existing signal pole and light pole. The "truck diverter" planned on the north side of the intersection will restrict trucks from continuing north on Wenatchee Avenue. Signs also will be installed to restrict right turns by northbound trucks onto eastbound Kittitas Street due to the tight radius.

The Freight Study evaluated options for widening the northeast curb return at Mission Street/ Kittitas Street to better accommodate trucks turning right onto Mission Street. This would require a retaining wall and right of way acquisition that will eliminate parking for the adjacent property. These improvements and impacts can be avoided if trucks are allowed to off-track into the outside lanes on northbound Mission Street. This TAC identified this as an appropriate solution for the initial Freight Plan because the potential conflicts for operations and safety appear to be very minimal. Other, more significant, turn radii improvements can be considered if specific issues develop with the off-tracking onto Mission Street.

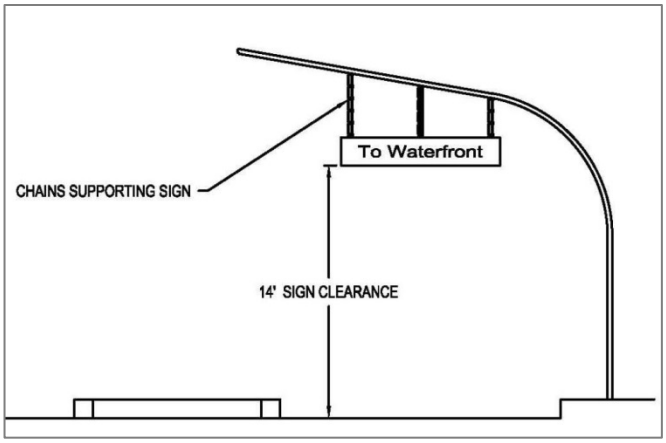
Improvements to Kittitas Street and Chelan Avenue would require enlarging the southeast curb radius to eliminate off-tracking. This change requires a retaining wall and relocation of a light pole. Like the Mission Street intersection, the curb radius improvement can be avoided if the truck is allowed to off-track into the outside lane. The TAC agreed that the volume of large trucks making the west-to-south left turns will likely be relative low and therefore, no radius improvements are recommended in the Freight Plan at this time. Trucks turning left from Chelan Avenue onto Kittitas Street may have issues entering the traffic stream on Chelan Avenue (especially if off-tracking into other lanes is necessary); for this reason, the Freight Study recommends installing a new traffic signal at this intersection, when warrants are met.

Downtown Wenatchee Avenue (project 22). The City of Wenatchee is planning to install "truck diverters" on Wenatchee Avenue to restrict through truck travel in downtown Wenatchee. The City is in the process of designing the diverters which will include some type of median that will not accommodate large trucks continuing onto Wenatchee Avenue in downtown. The diverter for southbound travel on Wenatchee Avenue will be at 2nd Street; the northbound diverter will be at Kittitas Street. Truck route signing and improvements along other streets in the area are recommended to direct trucks to appropriate freight routes such as the SR 285 one-way couplet.



Concept for truck diverter for restricting northbound through truck traffic on Wenatchee Avenue approaching Kittitas Street

Riverside Drive/Worthen Street (project 23). Riverside Drive was not designed to accommodate large trucks; it includes two smaller roundabouts that trucks cannot readily traverse. The TAC identified issues with larger trucks inadvertently using the roadway getting stuck on or otherwise impacting the small roundabouts. To help address this issue a simple set of hanging signs, similar to those used as height restrictions in parking garages, be installed. One would be installed on Riverside Drive just south of 9th Street. The other could be installed on 5th Street just east of Piere Street. These would be supported by revised signs as previously discussed.



SR 285 Couplet South Segment (project 24). During the course of the development of the Freight Study, the City of Wenatchee designed and implemented simple improvements on Chelan Avenue and Mission Street south of downtown Wenatchee. These included restriping southbound Chelan Avenue to smooth the lane transition as the couplet streets join together at Chehalis Street. The restriping is intended to reduce off-tracking into adjacent lanes and help reduce the associated safety and operational issues. The City also installed simple dividers that restrict left turns along Mission Street between Spokane Street and Peachey Street. This left-turn restriction affects relatively few vehicles and helps with the southbound lane transition from the one-way Chelan Avenue to the two-way, five-lane Mission Street.

The City of Wenatchee has modified the Chelan Avenue connection with Mission Street to reduce the impacts of off-tracking of large trucks.

S Wenatchee Avenue and Columbia Street (project 25). Alternatives for improvements at this location considered widening the southeast corner of Thurston Street and S Wenatchee Avenue or restriping Thurston Street to include two eastbound lanes. Widening the curb radius will affect the existing property by eliminating parking. However, it would allow large trucks to turn east onto Thurston Street while maintaining the current left-turn lane on Thurston Street approaching S Wenatchee Avenue and Columbia Street. The restriping alternative does not require any changes to the existing curbs or sidewalks; instead it eliminates the westbound-to-southbound left turn lane. Either improvement will provide easier access to the waterfront/downtown freight routes. The Freight Study recommends the restriping option be implemented and monitored prior to considering more expensive improvements.

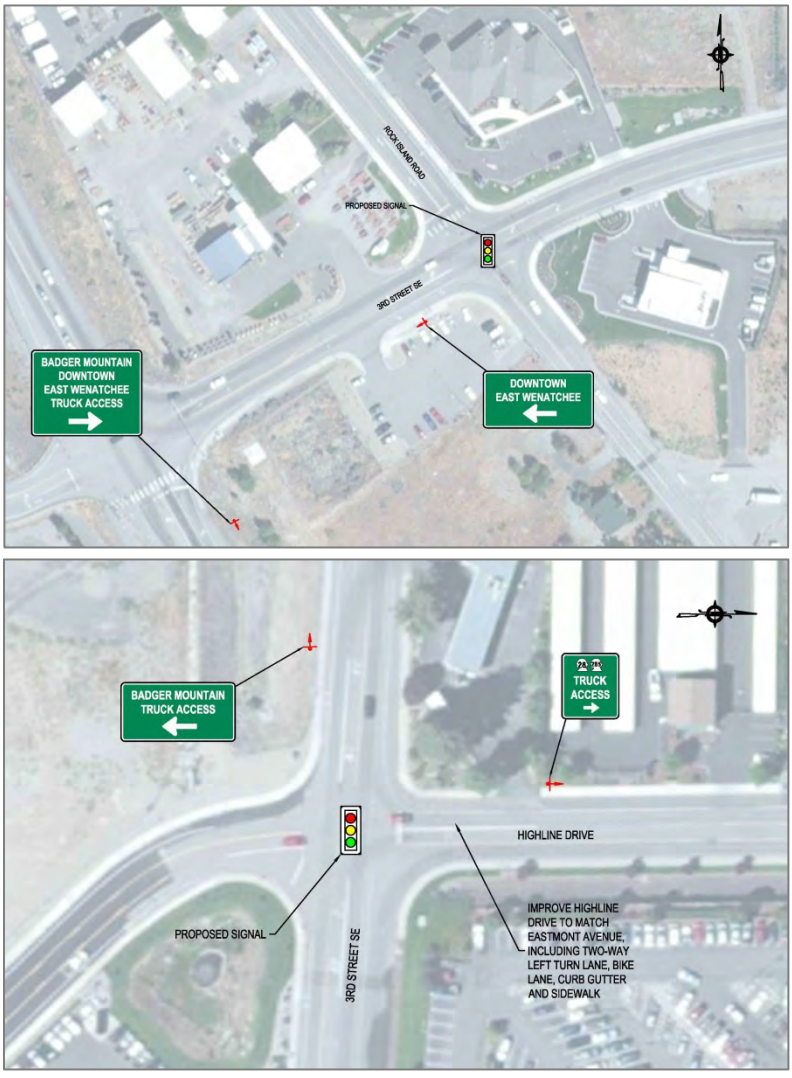
City of East Wenatchee

The Freight Study also identified additional freight-related improvements in East Wenatchee. These improvements are primarily limited to modifying intersections to provide traffic signals to facilitate left- turn movements and thereby reducing delays and improving safety along designated freight routes. The intersection improvements are compatible with the recent completed WSDOT improvements at the east end of the George Sellar Bridge and are included in the City of East Wenatchee's 2014-2019 Transportation Improvement Program.

9th Street NE (project 26). A limited volume of large trucks use 9th Street NE between SR 28 and Baker Avenue or Eastmont Avenue. However, 9th Street NE does provide access for some truck deliveries to the downtown East Wenatchee business district and Wenatchee Valley Mall. The City of East Wenatchee has programmed replacing the existing all-way stop at 9th Street NE/Valley Mall Parkway. This would eliminate the need for all trucks entering the intersection to stop, thereby reducing delays. The City also is planning to convert Valley Mall Parkway from four lanes to three lanes between 6th Street NE and SR 28.This would help freight by improving safety through provision of left-turn lanes at the intersection.

3rd Street SE (project 27). As previously noted, the Freight Study identifies 3rd Street SE east of SR 28 as a Freight Route. In order to better serve left turn movements by trucks from 3rd Street SE to the Rock Island Road/Valley Mall Parkway installation of a traffic signal is recommended, when warranted. Similarly, a traffic signal should be installed at the intersection of 3rd Street SE/Highline Drive, when warranted. These signals are included in the City of East Wenatchee Transportation Improvement Program for construction in 2019.

Highline Drive (project 28)
Highline Drive serves as a freight route between 3rd Street SE and the Eastmont Avenue/Grant Road intersection. Most of this segment of roadway includes three travel lanes with sidewalks on both sides. Although not critical for freight movement, the Freight Study includes a project to construct missing sections of sidewalk on the west side of the roadway. This type of improvement will provide a more consistent look and feel for this new freight route. The City of East Wenatchee's 2014-2019 Transportation Improvement Program includes a project to add sidewalks to a short segment of the roadway. As adjacent properties are developed it is anticipated other missing segments of sidewalks will be constructed.



Traffic signals are recommended to make it easier for trucks to make left turns to/from 3rrd Street SE at Rock Island road and Highline Drive.

Plan Implementation

Implementing the Freight Study recommendations will not occur overnight. A systematic process will help assure that the signing plan and freight-related improvements occur together so truck drivers (and other drivers) do not get confused. In most instances, it is recommended that proposed freight-system improvements needed to facilitate truck movements be constructed in advance or, or concurrently prior to installing the related truck route signs. This will help avoid forcing trucks onto existing roadways that cannot safely accommodate large vehicles. As improvement projects are being designed and implemented, it also will be important to seek additional input from affected freight user groups. This will help build support for the plan and associated improvements. The freight user groups also can provide insights into design features based on their experiences. It also is recommended that the freight route designations shown in Figures 4A and 4B be made available to freight users in the region so the desired routes become the routes of choice and habit.

The Freight Study does not commit or require local or state agencies to implement the recommended project. It provides a regional perspective of the priories for freight mobility in the Greater Wenatchee area. It will be used by WVTC in updating the Metropolitan Transportation Plan (MTP) and in prioritizing projects through transportation funding programs that it administers.

Priorities

The large regional freight related projects such as the Confluence Parkway, US 2/97 interchanges, and SR 28 (Sunset Highway) corridor will require many years to fund and implement. Priorities for these projects will be key parts of the updates of the Metropolitan Transportation Plan (MTP) for the greater Wenatchee area. Freight traveling into, out of, and through the region will benefit greatly from any and all of these projects, as discussed above.

The priorities for the local freight system improvements identified in Table 3 are generally independent from the regional improvements. The exception is the identified project at N Wenatchee Avenue/Hawley Street. This project may not be needed with the construction of the Confluence Parkway. Furthermore, the intersection improvement may be incorporated with the previously identified project to grade-separate Hawley Street and the railroad tracks. The larger, grade-separation Hawley Street project also would better address bicycle and pedestrian system connections as identified in the *North Wenatchee Transportation Master Plan*.

The other local area freight improvements identified in the Freight Study have been grouped into potential phases, as discussed below.

Phase 1. The City of Wenatchee is planning to construct the downtown truck diverters on Wenatchee Avenue in 2014. Critical to the success of the diverters is the signing plan directing truck drivers to the Chelan Avenue/Mission Street corridor. These include the signs to direct southbound trucks to use the curb lane on N Wenatchee Avenue and Miller Street to access Chelan Avenue. The truck route guide signs on the Chelan Avenue and Mission Street also are needed at the time the diverters are installed, otherwise truck drivers may use other local streets that cannot accommodate them or which require more circuitous travel. Truck counts should be conducted after the signs have been installed for a few months to confirm their effectiveness.

The City also should move forward with updating the signal timing plans for the Chelan Avenue/Mission Street one-way couplet signal system to support the revised freight route and signing plan. The City and WSDOT also could evaluate locations for minor lane widening/ restriping along the couplet to provide more shy distance for large trucks and buses. This

should help improve the truck driver's experiences along the corridor making it a more attractive route which is important to successful implementation of the overall plan. The Miller Street intersection improvements also should move forward as part of the first phase.

Other key signs needed during Phase 1 will be those on Wenatchee Avenue directing trucks to the east-west cross streets to access the SR 285 couplet. Truck travel patterns on Wenatchee Avenue approaching downtown also should be monitored to see if any modifications are needed to the Freight Sign Plan.

It is also recommended that freight-related improvements on Kittitas Street and 2nd Street be in place concurrent with the installation of diverters. Without the south-to-west right turn restriction (project 18B) or the curb radius improvements (project 18A) it will likely be very difficult for large trucks to effectively navigate the revised freight route to connect with the couplet or to the waterfront.

The two proposed traffic signals along 3rd Street SE are the highest priorities for implementing the Freight Study in East Wenatchee. The ability for truck drivers to make the needed left turns onto Rock Island Road or Highline Drive is critical to the success of the plan in the area. Prior to installation of the signals, traffic signal warrants should be evaluated.

Phase 2. Following the Phase 1 projects, the Freight Study recommends that the City of Wenatchee move forward with the converting 5th Street and Orondo Avenue from four to three lanes to better facilitate truck turning movements at the couplet. The three-lane modifications along 5th Street are most important since it is the key east-west Supporting Freight System route serving the Wenatchee waterfront. This project will require additional design studies, as well as public involvement, in order to finalize the design trade-offs between freight mobility and other travel modes in the corridor.

Similarly, design studies and public involvement activities should be initiated for the Orondo Avenue project. This will help define the ultimate cross section for the roadway which will be the primary route for truck deliveries to downtown, as well as serving as a primary pedestrian corridor and bicycle route.

Timing for Other Freight Improvements. The other identified local freight system improvements identified in Table 3 are fairly independent from other improvements. They can be implemented as funds become available. Many of these projects are very inexpensive requiring restriping, signage, and/or minor physical modifications.

The City of Wenatchee has already implemented the SR 285 South Segment project (project 24). The Riverside Drive and Thurston Street improvements can be implemented at any time; freight signs also should be implemented at the same time or prior to these projects.

The signal and other improvements at 9th Street NE/Valley Mall Parkway in East Wenatchee are not critical to the freight plan. They can be implemented as the City obtains funding.

Funding

The large regional freight supporting projects with require significant funding from state and federal programs. These will be identified in the fiscally constrained Metropolitan Transportation Plan.

Funding for the other projects will likely be the responsibility of the local agencies. This will include seeking grant or other outside funding. Because many of the projects are included as high priorities for freight mobility and safety, the grant applications for these projects can be identified as supporting regional priorities. WVTC also leads the regional prioritization for several grant and funding programs. These freight projects could be included in one or more of these programs.

Distribution of Freight Route Designations

To facilitate and encourage use of the designated freight route system in the greater Wenatchee area, it is important to get the information out to the freight community. As a priority, the Freight Study recommends that the Freight Route Designations (Figures 4A and 4B) be distributed to local and regional freight providers. This will make it simpler to locate than having the users read through the full report. These can be distributed as copies of the maps with a cover letter, or can be emailed to the businesses. In addition, these can be posted as separate hyperlinks on WVTC's web page, making it simple for freight users to access in the future as they need. It is also recommended that links to the maps be available on the web sites of the local cities, counties, and port districts.

The Recommended Freight Signs (Figure 6) also can be made available to freight users to consider in developing or revising their truck routing in the region. While not all of the signs will be installed immediately, this will provide insights to the overall plan so the freight users can be proactive instead of reactive.

As noted above, outreach to the freight users also should be considered as the various improvement projects are moving toward funding and construction. This should help encourage changes in their truck routing as they see improvements that help them use the desired routes.

The final Freight Study also will be available for review via the WVTC web site or at WVTC's Wenatchee office. This will provide the additional background on how the routes were designated, the signing plan, and freight related improvement projects.

Appendix A: Purpose and Limitations of WVTC Planning Studies

Appendix B: Public Review Comments on Draft Plan

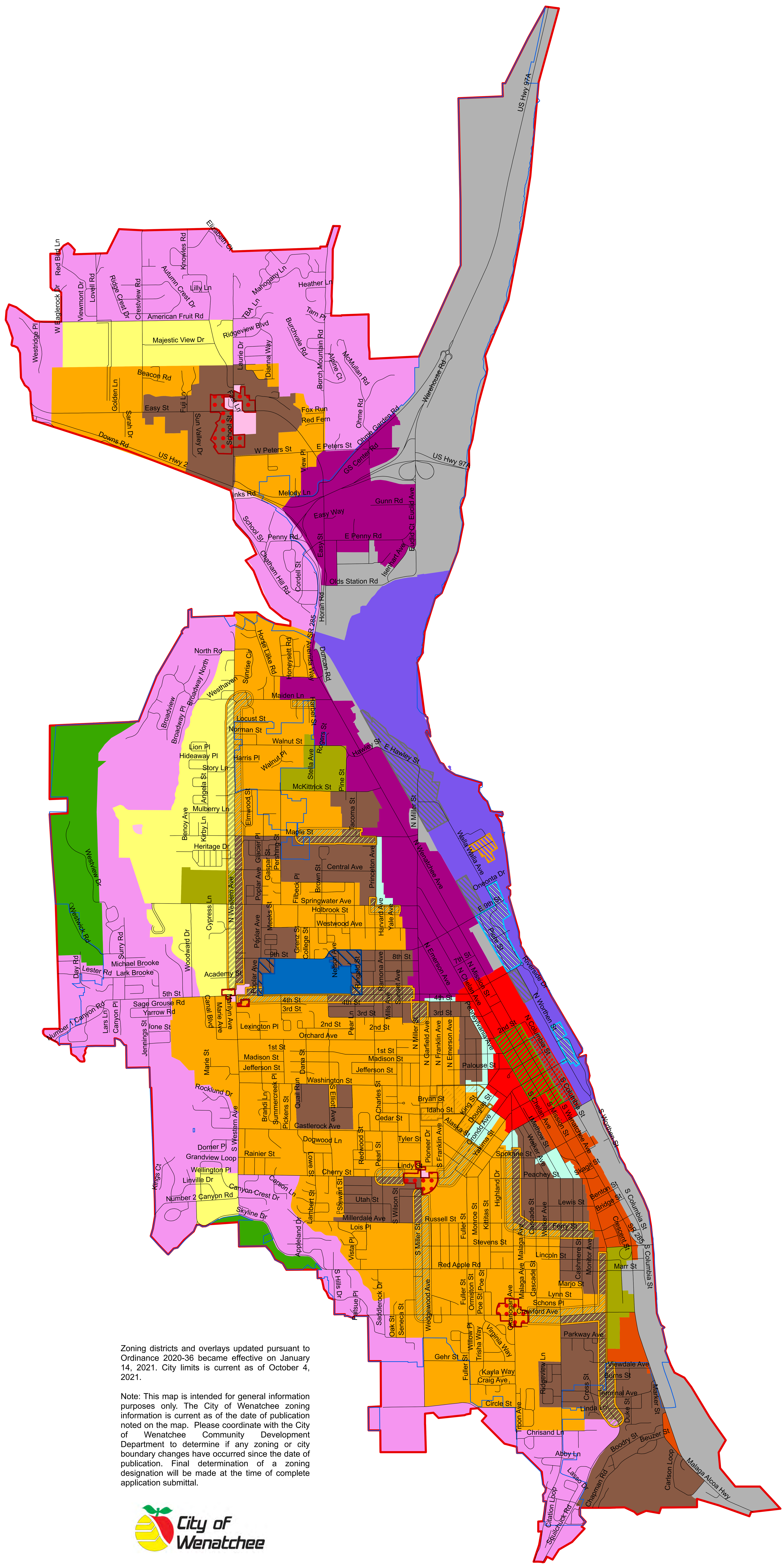
Appendix C: Freight Improvement Project Concepts

Appendix D: Project Cost Estimate Worksheets

EXHIBIT “H”

CITY OF WENATCHEE ZONING MAP

City of Wenatchee Zoning Map



Legend

- Streets
- City Limits
- Urban Growth Area

Overlay Districts

- CSO - Columbia Street Overlay
- HEO - Historic / Entertainment Overlay
- WMU - Industrial Overlay
- WMU - Pedestrian Overlay
- WMU - Recreational / Residential Overlay
- GHD - Grandview Historic District
- MRC - Mixed Residential Corridor
- CDO - College District Overlay
- CNO - Neighborhood Commercial Overlay

Zoning Districts

- NWBD - North Wenatchee Business District
- SWBD - South Wenatchee Business District
- CBD - Central Business District
- CN - Neighborhood Commercial
- CD - College District
- I - Industrial
- WMU - Waterfront Mixed Use
- OMU - Office Mixed use
- RMU - Residential Mixed Use
- RH - Residential High
- RM - Residential Moderate
- RL - Residential Low
- RS - Residential Single Family
- RFL - Residential Foothills Low

Zoning districts and overlays updated pursuant to Ordinance 2020-36 became effective on January 14, 2021. City limits is current as of October 4, 2021.

Note: This map is intended for general information purposes only. The City of Wenatchee zoning information is current as of the date of publication noted on the map. Please coordinate with the City of Wenatchee Community Development Department to determine if any zoning or city boundary changes have occurred since the date of publication. Final determination of a zoning designation will be made at the time of complete application submittal.

City of Wenatchee

N

0 0.5 1 Miles

EXHIBIT “I”

2022 LOCAL ROAD SAFETY PLAN

Local Road Safety Plan

A Systemic Safety Approach

City of Wenatchee
Department of Public Works
March 2022

Table of Contents

Introduction

The City of Wenatchee is committed to reducing or eliminating serious injury and fatality collisions on city roads. Typically, two approaches are used to reduce or eliminate collisions:

- The Spot Treatment Approach is a reactive method and is used to address specific locations where previous serious or fatal collisions have occurred
- The Systemic Safety Approach is a proactive method and is used to identify project locations by assessing public roads to determine areas with features flagged as high risk due to the association with previous serious or fatal collisions.

While the City utilizes both approaches to improve public safety; the primary focus of the City's Local Road Safety Plan is to facilitate Systemic Safety upgrades and improvements.

With a Systemic Safety Approach, the risk factors associated with serious injury or fatality collisions are used to identify locations that may be improved using engineering solutions. Locations with known high-risk features will be flagged and safety improvement projects for those locations will be prioritized accordingly. With a Systemic Approach, problem locations may be identified and corrected prior to the occurrence of serious or fatal collisions.

The City's Systemic Safety strategy was developed utilizing guidelines set forth in Washington State's Target Zero plan. The Target Zero plan emphasizes the importance of data-driven collision reduction strategies for the prioritization of low-cost, systemic projects that can be constructed in the near-term to improve safety for all drivers, cyclists and pedestrians on City roads.

Washington State Target Zero

Target Zero is the State's strategic highway safety plan with an ultimate goal of zero deaths or serious injuries on public roads by 2030. The plan was adopted in 2000 and it represents a collaboration of state, local and tribal agencies, law enforcement and many other private organizations.

From 2000 to 2014, annual traffic fatalities decreased 27% even with 18% population growth over the same period. This major improvement in safety was attributed to a number of factors including new or stricter laws, increased enforcement on targeted offenses, improved traffic safety equipment and rapidly evolving roadway engineering standards. From 2015 to 2017, traffic fatalities increased 23% and series injuries increased 7%, respectively, over the previous three-year period. The National Highway Traffic Safety Administration attributes the increase to job growth, lower fuel prices, and an increase in Vehicle Miles Traveled (VMT).

Target Zero Priorities

WSDOT cites that although improvements have been made, we are not on track to reach Target Zero by 2030. In order to reach this goal, we must utilize existing data to understand the root causes of crashes on our transportation infrastructure.

The City of Wenatchee utilized the 2019 Target Zero Priorities to identify locations and specific strategies for two priority levels:

> Priority Level 1: Factors that are associated with the largest number of fatalities and serious injuries in the state. Each of these factors is involved in at least 25% of fatality or serious injury collisions.

Priority Level 2: Factors that are not as common, occurring in less than 25% of total fatal and serious injury collisions.

While prioritizing locations and strategies, Target Zero recommends that established strategies should be chosen for implementation. Strategies are categorized as Proven or Recommended. Proven strategies have been determined to be effective through professional evaluation. Recommended strategies are documented best practices or Federal recommendations.

Additionally, Unknown strategies may also be considered. Unknown strategies are new or have limited evaluations. These strategies require additional evaluation to be included as part of a project and are included in Target Zero as a means of promoting and facilitating the development of innovative solutions.

Target Zero's plan is all-encompassing and refers to six implementation areas in order to achieve improved safety on public roads:

- Education and Outreach
- Enforcement
- Engineering
- Emergency Medical Services
- Evaluation
- Leadership/Policy

Education focuses on informing road-users on making good choices to improve their safety. Enforcement uses data-driven analysis to help law enforcement address target locations which have higher occurrences of fatal and serious injury collisions resulting from speeding or driver impairment. Engineering focuses on improved road design using practical solutions to reduce the number or severity of collisions. Emergency Medical Services promotes high-quality and rapid medical response to collisions. Evaluation entails collecting better data, gaining a greater understanding of the causes of fatal and serious injury collisions, and developing targeted strategies or initiatives to achieve the goal of Target Zero. Leadership/Policy notes that laws or rules may be changed or implemented in order to support safer roads.

For the City of Wenatchee's Local Road Safety Plan, the primary method used to improve safety on city roads will be the Engineering approach.

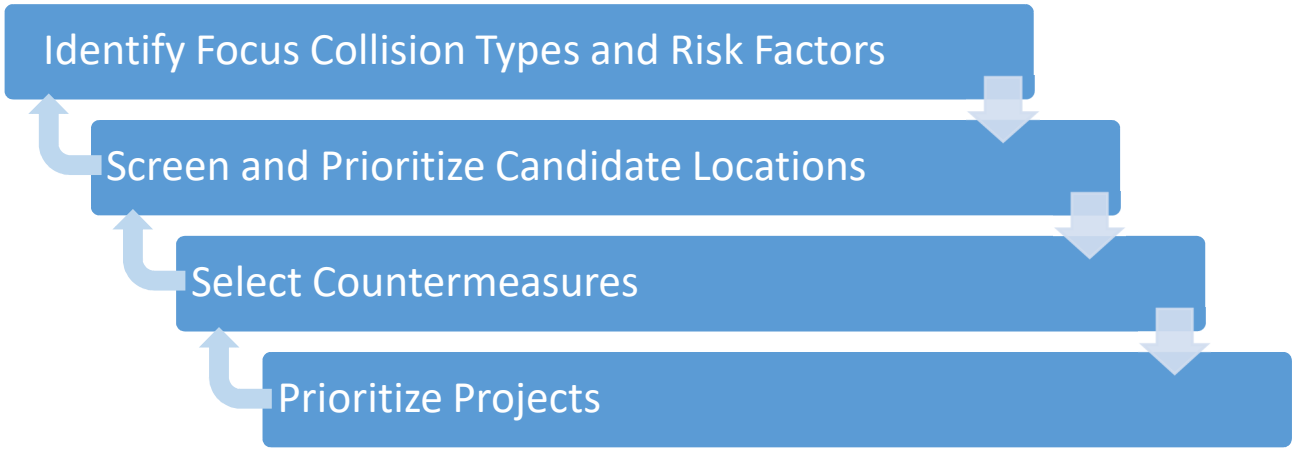
Limitations on Use

Under 23 U.S. Code § 409 and 23 U.S. Code § 148, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential collision sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from an occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

Identification of Relevant Risk Factors

In order to utilize a Systemic Safety Approach to determine the risk factors used to identify and prioritize project locations, historical collision patterns must first be analyzed and understood.

FHWA provided guidance for this process with its Systemic Safety Project Selection Tool. The guidance refers to the process as a 'Systemic Safety Planning Process'. The process is a Four-Step process which involves potential re-evaluation of the previous step. As the data is further analyzed, adjustments may need to be made to the previous step before continuing on. The process is detailed as follows:



Step 1 consists of identifying focus collision types and risk factors by evaluating relevant historical collision data. The identification of focus collision types and the associated risk factors requires the analysis of results from several data element types. At minimum, this data must include the **System Type** (state or local), the **Collision Type** (fixed object, rear-end, vehicle-pedestrian), the **Facility Type** (arterial or collector), the **Location Type** (urban, rural, intersection, segment) and **Location Characteristics** (topography, elements). Additional data may include **ADT**, **Roadway Features** (number of lanes, speed limit, pavement conditions) and **Intersection Features** (traffic control devices, lighting, type of intersection).

With all available data, the three major tasks which make up Step 1 are the following:

1. Select Focus Collision Types
2. Select Focus Facilities
3. Identify and Evaluate Risk Factors

Step 2 consists of screening locations to determine candidate locations based on present risk factors. Locations with higher numbers of risk factors and traffic volumes will be prioritized over locations with fewer risk factors. Similar to Step 1, three major tasks make up Step 2. These tasks are:

1. Identify Network Elements to Analyze
2. Conduct Risk Assessment
3. Prioritize Focus Facility Elements

Task 1 involves identifying the elements from focus facility types. For spot-based applications (curves and intersections), all relevant locations are identified first. For segment applications, corridors should be split into elements with consistent design. For the City, an effective way to identify individual segments is to divide corridors by cross-section.

Task 2 determines the number of risk factors present at each spot location or segment and Task 3 prioritizes the spot locations are segments with higher numbers of risk factors.

Step 3 consists of the selection of low-cost, proven countermeasures to reduce or eliminate risk factors at the candidate locations. Each candidate location will be analyzed to determine the type of countermeasure that will be implemented easiest and also be the most effective. These projects should be for the near-term and should not require major changes for effective implementation. The major tasks that make up Step 3 are:

1. Assemble Comprehensive List of Countermeasures
2. Evaluate/Screen Countermeasures
3. Select Countermeasures for Deployment

To complete Step 3, the City has attained a list of relevant countermeasures and screened them for effectiveness through available resources. Through screening, the City has eliminated those which are known to be poor or inconsistently performing from its list of countermeasures considered for deployment.

Step 4 consists of prioritizing selected projects. For the City, projects will be prioritized based on a cost-benefit analysis. The priority projects will be determined based on the best safety improvements for the lowest cost. The major tasks that make up Step 4 are:

1. Create Decision Process for Countermeasure Selection
2. Develop Safety Projects
3. Prioritize Safety Project Implementation

The first task involves developing a means to consistently assign countermeasures to focus facility locations. The second task involves applying the decision process to select one or more countermeasures to implement and the third task prioritizes the projects based on available funding, complexity or other considerations.

As previously mentioned, each step may require re-evaluation and modification before progressing onto the next.

WSDOT Data Analysis

WSDOT has provided a Collision Database Summary for January 1, 2016 to December 31, 2020. This data was compiled from collision reports filed by the Wenatchee Police Department, Chelan County Sheriff's Office and Washington State Patrol for collisions that occurred within the City of Wenatchee. The data includes information such as **collision type** (e.g. hit pedestrian, hit fixed object, rear-end collision), **roadway conditions** (e.g. lighting, weather/visibility, speed limit) and **contributing circumstances** (e.g. inattention, driving under the influence of alcohol or drugs, failure to obey signal). Data provided by WSDOT has been included in Appendix A. In addition to the WSDOT Crash Data provided, a City map highlighting the Fatal and Serious Injury collisions has been included in Appendix B.

Table 1 – WSDOT Data (Number of Serious Injury and Fatal Crashes)

	2016	2017	2018	2019	2020	*2016-20*	*%Δ 11-15 v 16-20*
Wenatchee	8	5	5	7	6	*31*	*29.2%*
Eastside Cities	188	192	203	187	242	*1,012*	*21.9%*
All Cities	1,053	1,031	1,068	1,026	1,068	*5,246*	*15.1%*
All Public Roads	2,410	2,455	2,433	2,454	2,606	*12,358*	*12.7%*

Table 2 – WSDOT Data (All Crashes)

	2016	2017	2018	2019	2020	*2016-20*	*%Δ 11-15 v 16-20*
Wenatchee	542	518	526	531	421	2538	5.3%
Eastside Cities	13,123	12,802	12,630	12,723	10,048	61,326	11.1%
All Cities	62,913	62,087	59,480	54,385	39,982	278,847	1.4%
All Public Roads	122,385	121,053	115,977	111,670	86,269	557,354	6.6%

As shown in the above tables, the City of Wenatchee's incidences of Fatal and Serious Injury Collisions are increasing faster than averages throughout the state of Washington. However, the total collision rates are not trending up as quickly as other cities on the Eastside of Washington State. This may partially be due to the significant growth the Wenatchee area has been experiencing in recent years as well as several other factors.

Table 3 below presents the overall average percentage rates for the state as compared with the same collision types for the City of Wenatchee.

Table 3 – WSDOT Data for Collision Statistics

	Fatal/Serious Injury Collisions Only		***Total Collisions***	
	City of Wenatchee	**Statewide (All Cities)**	**City of Wenatchee**	**Statewide (All Cities)**
Overall Collision Numbers				
# of Collisions	31	5,246	2,538	278,847
# of Fatal Collisions (% of Total)	4 (12.9%)	751 (14.3%)	4 (0.2%)	751 (0.3%)
# of Serious Injury Collisions (% of Total)	**27 (87.1%)**	4,494(85.7%)	27 (1.1%)	4,494 (1.6%)
# of Drug/Alcohol-Related Collisions	4 (12.9%)	757 (14.4%)	128 (5.0%)	14,834(5.3%)
Total # of Fatalities	4	786	4	786
Total # of Injuries	38	6,843	1,061	114,666
By Collision Type				
Hit Pedestrian	**32.3%**	29.5%	2.6%	2.9%
Hit Fixed Object	16.1%	16.8%	6.6%	11.1%
Angle (T)	9.7%	16.6%	**28.3%**	25.8%
Rearend	**12.9%**	4.9%	**29.9%**	23.5%
Hit Cyclist	6.5%	9.7%	1.3%	1.8%
By Junction Relationship				
Intersection Related	**54.8%**	47.5%	**50.7%**	50.4%
Non-Intersection (Not Related)	38.7%	44.0%	35.2%	35.4%
Driveway Related	6.5%	8.1%	**13.5%**	13.3%
By Driver Contributing Circumstances				
Inattention / Distraction[E]	19.4%	20.5%	**32.9%**	30.8%
Exceeding Safe / Stated Speed[E]	**32.3%**	19.0%	4.3%	7.9%
Under Influence of Alcohol / Drugs[E]	12.9%	15.1%	4.9%	5.1%
Failing to Yield	**12.9%**	12.2%	16.8%	19.7%
Following Too Closely	**9.7%**	2.0%	**20.2%**	10.6%
By Traffic Control				
No Traffic Control	**65.1%**	60.7%	**60.0%**	57.9%
Stop Sign	**14.0%**	8.1%	**9.3%**	9.1%
Signals	18.6%	28.2%	27.4%	29.9%
By Facility Use (Pedestrians)				
Roadway	**50.0%**	40.5%	**30.4%**	26.4%
Marked Crosswalk	30.0%	36.5%	47.8%	49.0%
Unmarked Crosswalk	**10.0%**	7.0%	5.8%	8.7%

Bold Text = Exceeds State's Average
E = Enforcement Related

Table 4 below looks further into which risk factors are common in Fatal / Serious Injury Collisions. Due to the increased probability that Hit Pedestrians and Hit Bicyclist crashes can result in a Fatal / Serious Injury Collisions, all Hit Pedestrian and Hit Bicyclist crashes were also analyzed.

Table 4 –Statistics of Potential Fatal / Serious Injury Collisions

	Potential Fatal/Serious Injury Collisions Only	
Overall Collision Numbers	**2016-2020**	**%**
# of Potential Fatal / Serious Injury Collisions	117*	100
By Collision Type		
Hit Pedestrian	65	55.6%
Hit Cyclist	33	28.2%
By Speed Limit		
25 MPH	25	21.4%
30 MPH	63	53.8%
By Junction Relationship		
Intersection Related	72	61.5%
Non-Intersection (Not Related)	25	21.4%
Driveway Related	20	17.1%
By Traffic Control		
No Traffic Control	36	30.8%
Signals	36	30.8%
Stop Sign	44	37.6%
Pedestrian Crosswalk?		
Yes	21	30.4%
No	33	47.8%
Pedestrian Crossing Distance		
≤ 34	8	6.8%
35-50	34	29.1%
> 50	28	23.9%
Driveway Present (w/in 100ft)		
Yes	111	94.9%
No	6	5.1%
On Street Parking?		
Yes	54	46.2%
No	63	53.8%
Land Use		
Residential	39	33.3%
Commercial	75	64.1%
Industrial	3	2.6%
Roadway Classification		
Arterial	91	77.8%
Local Access	22	18.8%
Pedestrian Generator Present?	**89**	76.1%
Yes	89	76.1%
No	28	23.9%

*Potential Fatal/Serious Injury Collisions is inclusive of 31 total fatal/serious injury crashes as well as 55 non-fatal/serious injury "Hit Pedestrian" and 31 non-fatal/serious injury "Hit Cyclist" incidences.

Targeted Focus Areas

The City of Wenatchee has chosen to establish Priority Levels for targeted safety projects based on the most common types of serious injury and fatal collisions. As 2016-2020 WSDOT data indicates, the most common serious injury and fatal collisions are Hit Pedestrians, Hit Fixed Objects, Sideswipe, Rear End and Angle (T) Crashes.

Potential Serious Injury and Fatal Collisions were evaluated to determine the Risk Factors listed in this section. Evaluation data is included for reference in the following section.

Priority Level 1 Collisions

Priority Level 1 collisions are Hit Pedestrians at Intersections. As Pedestrian Hits are the most common fatal/serious injury collision type in the City of Wenatchee, it is our top priority to reduce collisions involving pedestrians. Cyclists may also be included in this category if crossing at an intersection or using a crosswalk.

Table 5 – Priority Level 1 Risk Factors

Engineering Risk Factors	Enforcement/Education Risk Factors
30 MPH Speed Zones	Driver failing to yield
Crosswalks at Non-signalized Intersection or midblock crossings	Driver speeding
Poor Visibility / Poor Sight Distance	Driver inattention
Inadequate Signing / Lack of Advance Warning Signs	Pedestrian inattention
Arterial Roadway	Ped. crossing against traffic signal
Pedestrian Generator Proximity	DUI
Lack of Leading Pedestrian Intervals	
Pedestrian Crossing more than 35-ft	
Presence of Driveway	
On Street parking	
Commercial Land Use	

1) **30+ MPH Speed Zones** are a risk factor as higher speed collisions are more likely to result in a serious or fatal injury.
2) **Crosswalks at Non-Signalized Intersections or Midblock Crossings** are more likely to have vehicle-pedestrian or vehicle-cyclist collisions.
3) **Poor Visibility/Poor Sight Distance** includes all visibility factors such as inadequate lighting or obstructions at an intersection. Obstructions may include parked vehicles near a crosswalk, buildings or any other object that may reduce sight distance.
4) **Inadequate Signing/Lack of Advance Warning Signs** for crosswalks may reduce driver attentiveness for crossing pedestrians and increase the likelihood of a collision.
5) **Functional Classifications** of Principal Arterial and Minor Arterial. These roads have many pedestrian crossings with or without traffic signals and higher traffic volumes.
6) **Pedestrian Generator Proximity** is a risk factor. Crosswalks near Pedestrian Generators such as schools, bus stops or bus stations, medical facilities, government buildings or downtown areas are at higher risk for collisions.
7) **Lack of Leading Pedestrian Intervals** increases risk at signalized intersections. Leading Pedestrian Intervals have been shown to reduce crashes at intersections by approximately 60% according to the CMF Clearinghouse.

8) **Pedestrian Crossing greater than 35-ft** is a risk factor. For crossings longer than this, the pedestrian is placed in the path of traffic for a greater amount of time.
9) **Driveway Presence** within 100 ft is a risk factor as it increases potential encounters between Vehicles and Pedestrians.
10) **On Street Parking** is a risk factor as it reduces sight distance for pedestrian and vehicles especially when combined with other factors.
11) **Commercial Land Use** is a risk factor. This land use has a high volume of pedestrian and vehicle conflict points.

Priority Level 2 Collisions

Priority Level 2 collision types include Hit Pedestrian at Driveways, Hit Fixed Objects, Sideswipe, rear end and Angle (T) crashes. As these are the next most common fatal/serious injury collision types in the City of Wenatchee, it is a high priority to reduce collisions in this category. These fatal/serious injury collisions were reviewed and the following risk factors were identified as common at these crashes.

Table 6 - Priority Level 2 Risk Factors

Collision Type	Engineering Risk Factors	Enforcement/Education Risk Factors
Hit Pedestrian at Driveway	30 MPH Speed Zones	Driver failing to yield
	Poor Visibility / Poor Sight Distance	Driver speeding
	Roadways wider than 3 lanes	Driver inattention
	TWLTL	Pedestrian inattention
	On Street Parking	Ped. crossing against traffic signal
	Commercial Land Use	DUI
	Arterial Roadway	
	Pedestrian Generator Proximity	
Hit Fixed Objects and Sideswipe	30 MPH Speed Zones	Driver inattention
	Fixed Objects adjacent to Roadway (Utility Poles or Light Poles)	Driver speeding
	Roadway on Curve	DUI
	Truck Route	
	Poor Visibility / Poor Sight Distance	
	Commercial Land Use	
	Arterial Roadway	
Rear End	30 MPH Speed Zones	Driver inattention
	Poor Visibility / Poor Sight Distance	Driver speeding
	On Street Parking	Driver following too close
	Pedestrian Crosswalk	DUI
	Arterial Roadway	Pedestrian inattention
	Inadequate Signing / Lack of Advance Warning Signs	Ped. crossing against traffic signal
	Inadequate signal visibility	

	Pedestrian Crossing more than 35-ft	
	Pedestrian Generator Proximity	
Angle (T)	Uncontrolled Thru Movement	Driver disregarding traffic control devices
	Poor Visibility / Poor Sight Distance	Driver exceeding Speed Limit
	On Street Parking	Driver Inattention
	Inadequate signal visibility	Driver failing to Yield
	Four Leg Intersection	

1) **30+ MPH Speed Zones** are a risk factor as higher speed collisions are more likely to result in a serious or fatal injury.
2) **Poor Visibility/Poor Sight Distance** includes all visibility factors such as inadequate lighting or obstructions at intersections or driveways. Obstructions may include parked vehicles, buildings or any other object that may reduce sight distance.
3) **Roadways wider than 3 lanes** is a risk factor. These roadways have more traffic volume and also may make the driver more "rushed" to get out of or into traffic leading to crashes.
4) **Two-way-left-turn Lanes (TWLTL)** is a risk factor as these lanes are used to make turn movements into and out of driveways.
5) **On Street Parking** is a risk factor as it reduces sight distance for pedestrian and vehicles especially when combined with other factors.
6) **Commercial Land Use** is a risk factor. This land use has a high volume of pedestrians, bicyclists and vehicles.
7) **Functional Classifications** of Principal Arterials and Minor Arterials is a risk factor for Hit Pedestrian at Driveways, Hit Fixed Objects, and Rear End Collisions. These roads have many pedestrian crossings with or without traffic signals, higher traffic volumes and speeds.
8) **Pedestrian Generator Proximity** is a risk factor. Crosswalks near Pedestrian Generators such as schools, bus stops or bus stations, medical facilities, government buildings or downtown areas are at higher risk for collisions.
9) **Utility Poles or Light Poles** are a risk factor due to their common presence adjacent to the roadway. In many locations throughout the city they are located just beyond the edge of the roadway. At locations where it is possible to relocate Fixed Objects, this is the preferred solution.
10) **Curved Roadways** are common locations for off the road collisions which is a risk factor for fixed object collisions. They are also common locations for sideswipe collisions.
11) **Truck Routes** are common locations for sideswipe collisions.
12) **Pedestrian Crosswalks** are a risk factor. Pedestrians entering crosswalks in front of traffic can lead to rear end collisions.
13) **Inadequate Signing/Lack of Advance Warning Signs** for crosswalks may reduce driver attentiveness for crossing pedestrians and increase the likelihood of an emergency stop and then rear end collision.
14) **Inadequate signal visibility** is a risk factor because drivers become aware of stop conditions too late leading to Rear End and Angle (T) crashes.
15) **Pedestrian Crossings** more than 35-ft is a risk factor as these crossings put pedestrians in the path of traffic for longer durations. This can lead to emergency stops and then rear end collisions.
16) **Uncontrolled Thru Movement** is a risk factor. This is common at many Stop Sign Controlled intersections throughout the city. Angle (T) Collisions are more likely when only one road at an intersection is Stop Sign Controlled.
17) **4 Leg (or more) Intersections** are the most common locations for Angle (T) collisions.

Evaluation of Serious and Fatality Collisions

The Evaluation of the City Road System is based on current data provided by WSDOT for 2016-2020.

With Risk Factors determined, locations are identified and appropriate countermeasures are selected. These collisions were reviewed and the following risk factors were identified as common at these crashes. Please see Appendix C for Priority Level 1 Risk Factor Evaluation and Appendix D for Priority Level 2 Risk Factor Evaluation.

The table in Appendices C and D contain the results of the Evaluation of Potential Serious Injury and Fatal collisions which occurred on City Roads. The evaluation of these serious injury and fatal collisions allowed the City to determine and apply the Risk Factors to evaluate other locations.

Evaluation of the potential Serious and Fatal Collisions has been limited to engineering related risk factors. Future iterations of the City's Local Road Safety Plan may be a collaborative effort with the Wenatchee Police Department to include further detail on enforcement or education countermeasures and funding sources for those activities as well.

Systemic Safety Evaluation Process

In order to evaluate the City of Wenatchee's road system for risk factors throughout the City; the best approach is to evaluate intersection by intersection along an identified corridor. To streamline this process, the City has identified several key steps which will be utilized in our process.

1) Use Functional Classification to Determine Target Roads
Functional Classification is used to determine which roads are to be assessed. After determining Target Roads, the roads are divided into corridors based on their characteristics; these characteristics may be cross-section changes, speed limit changes or other variations.

2) Evaluate Intersections along a Corridor
Each intersection shall be evaluated along an identified Corridor for the presence of known Risk Factors.

3) Determine Project Locations
From intersection evaluation, locations with the highest number of Risk Factors will be flagged for Potential Project Locations.

4) Select Countermeasures
Select countermeasures based on overall effectiveness and cost/benefit to reduce or eliminate the presence of Risk Factors at the determined Potential Project Locations.

5) Program Projects
Combine Potential Project Locations into Safety Projects based on location/type of work/etc.
The total number of Risk Factors that may be reduced or eliminated will be evaluated and a cost estimate will be completed.

6) Add Safety Projects to Prioritized Project List
Prioritize Projects based on cost/benefit for reduction of Risk Factors and add to the Prioritized Project List.

Countermeasure Evaluation

With serious injury and fatality risk factors determined, the City of Wenatchee reviewed possible low-cost countermeasures to reduce or eliminate identified risk factors. Countermeasures have been evaluated using FHWA's Collision Modification Factors (CMF) Clearinghouse. The CMF Clearinghouse contains safety countermeasures and effectiveness ratings for reducing collisions based on present risks linked to corresponding collision types.

If the Collision Reduction Factor (CRF) is positive it indicates the percent reduction of collisions from the countermeasure. Negative CRFs indicate the countermeasure actually increased the number of collisions. Countermeasures with reported negative CRFs were not considered due to unproven effectiveness.

Target Zero Priority Crash Types for the City of Wenatchee and related countermeasures which were compiled from CMF Clearinghouse are listed below:

Priority Level 1 Countermeasures

Table 7 – Priority Level 1 Countermeasures

CMF Category	Engineering Countermeasure	CRF (%)	Cost	Complexity
Access Management	Provide a Raised Median/Pedestrian Refuge	28.9	High	Varies
Intersection Geometry	Convert Intersection to Roundabout	73	High	High
Intersection Traffic Control	Convert Minor-Road Stop Control to All-Way Stop Control	43	Low	Low
	Modify Signal Phasing (Implement a Leading Pedestrian Interval)	59	Varies	Varies
Highway Lighting	Provide Intersection Illumination	42-82[1]	Medium	Medium
Pedestrians	Install a Pedestrian Hybrid Beacon (PHB or HAWK)	54.7	High	Varies
	Increase Cycle Length for Pedestrian Crossing	50	Low	Low
	Install Rectangular Rapid Flashing Beacon	47.4	High	Varies
	Install High-Visibility Yellow, Continental-Type Crosswalk at Schools	37	Varies	Varies
	Install Advanced Yield or Stop Markings and Signs	25	Low	Low
	Extend Curbs at Intersection with Bulb Outs	*	High	Medium
	Install or Upgrade Signage and Delineation (Include Wayfinding Signage for Bicyclists)	*	Low	Varies
	Install crosswalk on one minor approach	65	Low	Low
Signs	Signing and Marking Improvements at Stop-Controlled Intersections	10	Low	Low
	Signing and Visibility Improvements at Signalized Intersections	10	Low	Low
	Reflective Markings on Signals	15	Low	Low

*Indicates CMF Clearinghouse has no data for the selected countermeasure

1: Range from several studies. 82% CRF for fatality reduction

Priority Level 2 Countermeasures

Table 8 – Priority Level 2 Countermeasures

CMF Category	Engineering Countermeasure	CRF (%)	Cost	Complexity	Collision Type
Access Management	Change driveway Type	44-84	Medium	Medium	Ped @ Driveway, Rear End
	Replace Two-Way Left Turn Lane with Raised Median	21	High	High	Angle (T)
Advanced Technology and ITS	Implement Automated Speed Enforcement Cameras	86	High	High	Angle (T)
Delineation	Increase Pavement Marking Retroreflectivity	Varies	Low	Low	Ped @ Driveway, Fixed Object / Sideswipe
	Install Wider Edge Lines (4 in. to 5 in. or 4 in. to 6 in.)	19-29.5	Low	Low	Ped @ Driveway, Fixed Object / Sideswipe
	Install No Parking Yellow Curb Marking	*	Low	Low	Ped @ Driveway, Rear End, Angle (T)
	Install Supplemental Intersection shaped pavement markings	69-76	Low	Low	Rear End, Angle (T)
	Provide "Stop Ahead" pavement markings	86-97	Low	Low	Rear End, Angle (T)
Intersection Geometry	Convert Intersection to Roundabout	91	High	High	Angle (T)
Intersection Traffic Control	Install a Traffic Signal	67	Low	Low	Angle (T)
	Add signal (additional primary head)	28	High	High	Rear End
	Adjust All-Red Clearance Interval	40	Medium	Varies	Angle (T)
	Change permissive left-turn phasing to protected only or protected/ permissive	38-41	High	High	Rear End
	Install Adaptive Traffic Signal Control	19	Varies	Varies	Angle (T)
	Add yellow retroreflective backing on signal heads	15	Low	Low	Read End, Angle (T)
	Increase Signal Indicator sizes	*	Medium	Low	Rear End, Angle (T)
	Install a Mini-Roundabout or Traffic Circle in Residential neighborhoods	*	Medium	Varies	Angle (T)
Highway Lighting	Install Lighting	54	High	High	Ped @ Driveway, Fixed Object / Sideswipe, Rear End
Pedestrians	Increase cycle length for pedestrian crossing	45	Low	Low	Rear End
Roadside	Remove or Relocate Fixed Objects Outside of Clear Zone	97.6	Varies	Varies	Fixed Object / Sideswipe
	Install Collision Cushions at Fixed Roadside Features	46-69	Medium	Medium	Fixed Object / Sideswipe
	Change Lateral Offset of Utility Poles	Varies	High	High	Fixed Object / Sideswipe
	Change Longitudinal Density of Utility Poles	Varies	High	High	Fixed Object / Sideswipe
Roadway	Install Shoulder Rumble Strips	23.49-35.84	High	High	Fixed Object / Sideswipe
Signs	Install Chevron Signs or Curve Warning Signs	23.6	Low	Low	Fixed Object / Sideswipe

*Indicates CMF Clearinghouse has no data for the selected countermeasure

Prioritized Project List

The list below contains the City of Wenatchee's priority projects with associated cost estimates.

Table 9 – Engineering/Construction Project List

No.	Project Name	Project Description	Project Type	Cost Estimate
1.	9th Street Corridor Improvements	Road Diet from 4 lanes to 3 lanes with bike lanes. Supplemental signal heads on westbound mast arms, retroreflective backplates, leading pedestrian intervals, signing and pavement markings. Based on HSIP funded Corridor Study.	Systemic	$1,186,473
2.	Washington – King – Buchanan Intersection Control	Install new curb bulb-outs and relocate existing crosswalks	Spot	$ 444,638
3.	Fifth and Emerson Pedestrian Crossing	Enhance an existing crosswalk with new curb ramps, signage, and Rectangular Rapid Flashing Beacons	Spot	$243,297
4.	SR 285 Couplet Signal Upgrades	Update signal heads to 12-inch indicators per MUTCD recommendation and add retroreflective backing	Systemic	$793,450
5.	SR 285 (Chelan and Mission) Driveways Curb Marking	Install yellow curb markings at driveways	Systemic	$178,780
6.	Idaho St Safety Improvements	Install new curb bulb-outs, pavement markings, signage, new traffic circle, and illumination	Systemic	$446,323
7.	Washington Park Pedestrian Crossing	Install new curb bulb-outs, ADA ramps, pavement markings, signage and Rectangular Rapid Flashing Beacons	Systemic	$256,755
8.	Crawford Ave. Pedestrian Crossing	Install a new crosswalk with curb bulb-outs, ADA ramps, pavement markings and signage	Systemic	$262,707
9.	Wilson St. Safety Improvements	Install new traffic circles and signage	Systemic	$165,899
10.	Cherry St. and Orondo Ave. Leading Pedestrian Intervals	Further analyze and implement Leading Pedestrian Intervals at 4 Intersections along this corridor.	Systemic	$10,000

Table 10 – Data Collection Project List

Number	Project Description	Project Goal	Cost Estimate
11.	Update City of Wenatchee Average Daily Traffic Counts	Obtain new traffic counts for classified roads within the City to aid in evaluation of the City's road system for future safety projects.	$ 50,000

Priority Project Justifications

9th Street Corridor Improvements Project

A 9th Street Corridor Analysis was completed through an HSIP-funded study in 2020. This study was selected due to multiple Priority Level 1 and Priority Level 2 collisions occurring on 9th Street between Miller Street and the BSNF Railroad Tracks. This project is the result of the study.

Washington – King – Buchanan Intersection Control

This project is a result of a Priority Level 1 – Hit Pedestrian at Intersection Crash. The City has in the short-term since converted this intersection to a 5-way stop. The intent of this project is to install curb bulb-outs and increased channelization and signing in order to shorten pedestrian crossing distances and increase intersection visibility to prevent this type of crash from happening again.

Fifth and Emerson Pedestrian Crossing

This project is a result of multiple Priority Level 1 crashes – Hit Pedestrian at Intersection. The intent of this project is to construct new pedestrian ramps, increase signage, and install a Rectangular Rapid Flashing Beacon.

SR 285 Couplet Signal Upgrades

The SR 285 Couplet is the location for approximately 19.5% of all collisions in the City of Wenatchee. Roughly 29.6% of collisions on the Couplet are Rear End Crashes and 25.4% are Angle (T) Crashes. These Priority Level 2 collisions on the SR 285 Couplet make up approximately 10.7% of all crashes in the City. As a countermeasure, the City would like to upgrade the signal indicator sizes to be all 12-inch, in conformance with MUTCD recommendations as well as provide retroreflective backing to these signals. These countermeasures will increase signal visibility and work to reduce Rear End and Angle (T) crashes.

SR 285 Couplet Driveways Curb Painting

As mentioned above, there is a large presence of Priority Level 2 Crashes on this corridor. In addition to Rear End and Angle (T) crashes, there have been several Hit Pedestrian at Driveway collisions on this segment of SR 285. The city proposes the use of Yellow Curb Markings to prohibit on street parking adjacent to driveways. This measure will increase sight distance for vehicles turning in and out of driveways allowing for less angle, rear end, pedestrian and sideswipe crashes.

Idaho St Safety Improvements

There are several Priority Level 1 Risk Factors present on Idaho Street. The intersections are inadequately signed and the pedestrian crossings are wide. The City proposes several intersection treatments (Traffic Circle, New Signage, Curb Bulb-outs, Pavement Markings, and Illumination) to reduce the risk of Hit Pedestrian at Intersection Collisions.

Washington Park Pedestrian Crossing

Washington St is a two-lane arterial road with pedestrian crossing distances greater than 35-ft at marked midblock crossings that do not have ADA ramps. The City proposes consolidating these crossings into one midblock crossing with curb bulb-outs, pavement markings, and RRFBs. These improvements will shorten the pedestrian travel distances while also increasing visibility for this crossing to a large pedestrian generator, Washington Park.

Crawford Ave Pedestrian Crossing

Crawford Ave is a two-lane arterial road with pedestrian crossing distances greater than 35-ft adjacent to a large pedestrian generator, Lincoln Park. The City proposes constructing a new pedestrian crossing with curb bulb-outs, pavement markings, and signage. These improvements will shorten the pedestrian travel distances while also increasing visibility for this crossing.

Wilson St Safety Improvements

There are several Priority Level 1 Risk Factors present on Wilson Street. The intersections are inadequately signed and the pedestrian crossings are wide. The City proposes to install traffic circles and new signage to reduce the risk of Hit Pedestrian at Intersection Collisions.

Cherry St / Orondo Ave Leading Pedestrian Intervals

There have been Priority Level 1 collisions each of the four signalized intersections along this corridor in the last five years. At these locations there are multiple pedestrian generators leading to a high number of potential vehicle/pedestrian conflicts. The city proposes the implementation of Leading Pedestrian Intervals at these intersections. Due to the low cost and the ability to implement these changes quickly, the City will plan on further analyzing these intersections and implementing the improvements using City funds.

City of Wenatchee Average Daily Traffic Counts

Average Daily Traffic (ADT) is a risk factor for all collision types and can be a great tool in helping to determine the location of further safety improvements. The goal of this project will be to obtain new traffic counts for classified roads within the City to aid in evaluation of the City's road system for future safety projects.

Awarded HSIP Project Status

City Project No.	Project Name	Designer	Project Description	Cost Estimate	Status
1910	9th Street Corridor Analysis	Perteet	Engineering Study for Design of 9th St. Corridor.	$30,000	Study completed, see Appendix E
1911	South Wenatchee Safety Improvements	City of Wenatchee	Install curb bulb outs, ADA ramps, signage, crosswalks and channelization improvements.	$225,000	Construction funding obligated. Construction planned for Summer 2022.
1912	Miller & Montana Pedestrian Crossing Improvements	City of Wenatchee	Install curb bulb outs, ADA ramps, signage and Rectangular Rapid Flashing Beacons	$244,400	Project Completed.

Conclusion

As discussed previously, the percent increase in Fatal and Serious Injury Crashes in Wenatchee is disproportionately large in comparison to other cities in the State. The results of the data analysis motivates the City of Wenatchee to seek low-cost safety features that target risk factors with higher rates of occurrence. City

roads have been identified utilizing specific risk criteria and prioritized for locations with greatest potential for risk factor reduction or elimination.

The City's Local Road Safety Plan will be updated every two years to evaluate the successes of the program, update the status of identified projects and to identify additional risk factors and apply new countermeasures as needed. In addition; criteria used to evaluate locations, such as ADT, should be updated concurrently.

Appendix A

WSDOT COLLISION DATA

2016-2020

Wenatchee

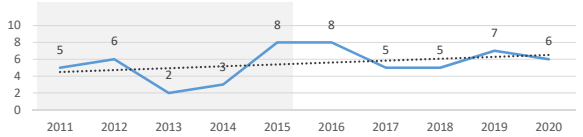
Crash Data Summary for 2016-2020

Note: For cities with populations over 27,500, data includes crashes on state highways managed by cities.

Fatal and Serious Injury Crashes

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2016-20	% Δ 11-15 v 16-20
Wenatchee	**5**	**6**	**2**	**3**	**8**	**8**	**5**	**5**	**7**	**6**	***31***	***29.2%***
Eastside Cities	161	186	153	153	177	188	192	203	187	242	*1,012*	*21.9%*
All Cities	870	998	828	901	959	1,053	1,031	1,068	1,026	1,068	*5,246*	*15.1%*
All Public Roads	2,262	2,289	2,020	2,127	2,264	2,410	2,455	2,433	2,454	2,606	*12,358*	*12.7%*

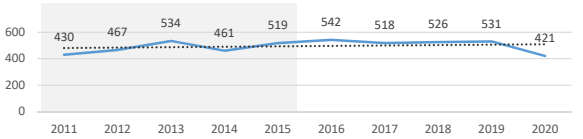
Wenatchee: Fatal and Serious Injury Crashes



All Crashes

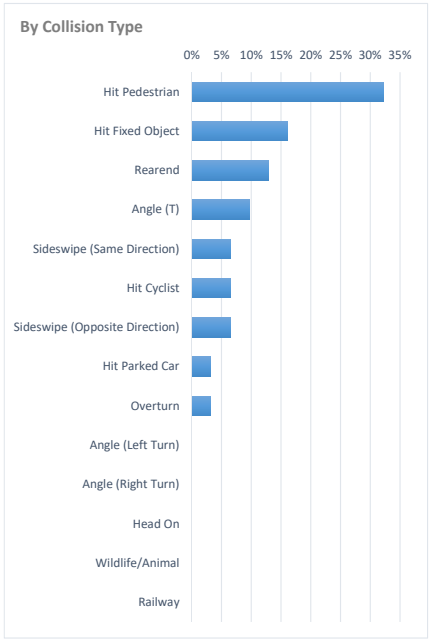
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2016-20	% Δ 11-15 v 16-20
Wenatchee	**430**	**467**	**534**	**461**	**519**	**542**	**518**	**526**	**531**	**421**	***2,538***	***5.3%***
Eastside Cities	10,537	10,647	10,750	11,023	12,221	13,123	12,802	12,630	12,723	10,048	*61,326*	*11.1%*
All Cities	52,241	52,480	52,783	56,240	61,193	62,913	62,087	59,480	54,385	39,982	*278,847*	*1.4%*
All Public Roads	98,945	99,613	99,762	107,674	117,060	122,385	121,053	115,977	111,670	86,269	*557,354*	*6.6%*

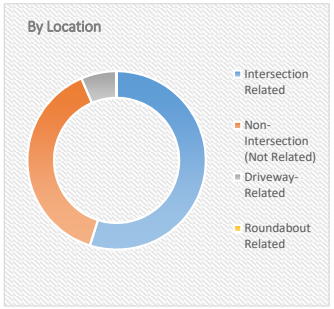
Wenatchee: All Crashes

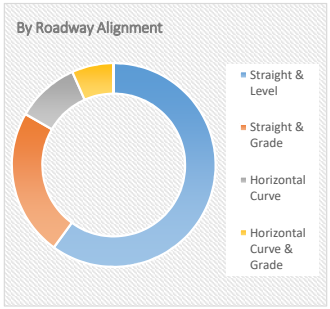


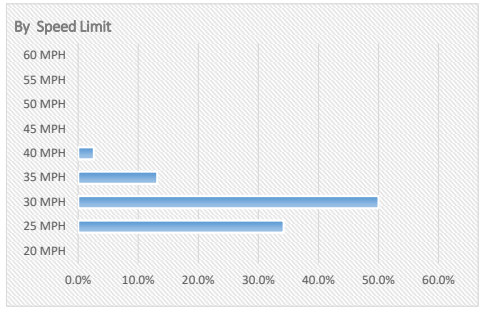
Wenatchee: Collision Factors

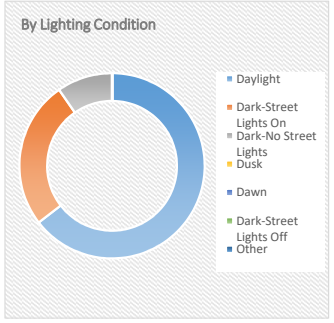
Fatal and Serious Injury Crashes, 2016-2020

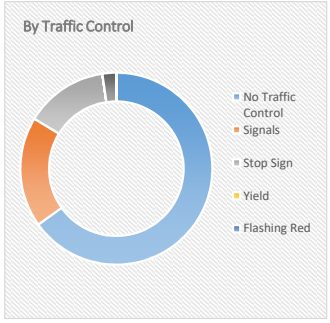


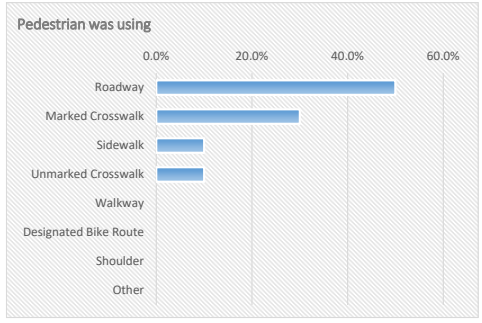












2016-2020 Data
Wenatchee

Wenatchee

Fatal/Serious Injury Crashes Only

	All Roads		All Cities		Eastside Cities														All Roads		All Cities		Eastside Cities													
	2016-2020	%	2016-2020	%	2016-2020	%	2016-2020	%	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2016-2020	%	2016-2020	%	2016-2020	%	2016-2020	%	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
Overall Numbers																																				
Total # of Collisions	12,358	-	5,246	-	1,012	-	31	-	6	7	5	5	8	8	3	2	6	5	557,354	-	278,847	-	61,326	-	2,538	-	421	531	526	518	542	519	461	534	467	430
# of Fatal Collisions	2,586	20.9%	751	14.3%	156	15.4%	4	12.9%	0	0	2	1	1	0	0	1	1	0	2,586	0.5%	751	0.3%	156	0.3%	4	0.2%	0	0	2	1	1	0	0	1	1	0
# of Serious Injury Collisions	9,771	79.1%	4,494	85.7%	856	84.6%	27	87.1%	6	7	3	4	7	8	3	1	5	5	9,771	1.8%	4,494	1.6%	856	1.4%	27	1.1%	6	7	3	4	7	8	3	1	5	5
# of Drug/Alcohol-Related Collisions	2,082	16.8%	757	14.4%	178	17.6%	4	12.9%	0	1	0	1	2	2	1	0	0	0	31,064	5.6%	14,834	5.3%	3,509	5.7%	128	5.0%	23	30	28	29	18	15	19	19	22	26
Total # of Fatalities	2,761	-	786	-	159	-	4	-	0	0	2	1	1	0	0	1	1	0	2,761	-	786	-	159	-	4	-	0	0	2	1	1	0	0	1	1	0
Total # of Injuries	16,645	-	6,843	-	1,313	-	38	-	8	9	4	8	9	8	4	1	5	7	224,374	-	114,666	-	24,440	-	1,061	-	164	207	212	234	244	218	180	244	200	181
By Collision Type																																				
Hit Pedestrian	2,125	17.2%	1,545	29.5%	292	28.9%	10	*32.3%*	3	3	1	1	2	4	0	1	3	2	9,947	1.8%	8,175	2.9%	1,468	2.4%	65	2.6%	13	12	13	15	12	11	7	7	9	8
Hit Fixed Object	3,404	27.5%	881	16.8%	158	15.6%	5	16.1%	1	0	0	1	3	2	1	1	0	1	103,151	18.5%	30,820	11.1%	6,620	10.8%	168	6.6%	32	37	30	35	34	39	29	28	38	33
Rearend	923	7.5%	255	4.9%	43	4.2%	4	12.9%	1	0	0	2	1	0	0	0	1	1	161,032	28.9%	65,619	23.5%	13,526	22.1%	759	29.9%	122	162	174	150	151	189	136	178	166	143
Angle (T)	1,435	11.6%	768	14.6%	201	19.9%	3	9.7%	0	0	1	1	1	1	1	0	0	1	97,319	17.5%	71,916	25.8%	18,524	30.2%	718	28.3%	122	145	153	150	148	127	119	143	119	107
Sideswipe (Same Direction)	266	2.2%	77	1.5%	15	1.5%	2	6.5%	0	1	0	0	1	0	0	0	0	0	49,829	8.9%	21,306	7.6%	3,399	5.5%	177	7.0%	30	34	32	41	40	30	28	25	24	26
Hit Cyclist	660	5.3%	510	9.7%	84	8.3%	2	6.5%	1	0	1	0	0	1	0	0	1	0	6,038	1.1%	5,054	1.8%	813	1.3%	33	1.3%	4	7	12	3	7	4	6	10	4	5
Sideswipe (Opposite Direction)	213	1.7%	54	1.0%	10	1.0%	2	6.5%	0	1	1	0	0	0	0	0	0	0	3,993	0.7%	1,787	0.6%	300	0.5%	11	0.4%	2	2	2	4	1	0	3	0	2	1
Hit Parked Car	209	1.7%	130	2.5%	24	2.4%	1	3.2%	0	1	0	0	0	0	1	0	0	0	30,150	5.4%	25,818	9.3%	6,610	10.8%	247	9.7%	39	54	43	54	57	52	49	39	30	34
Overturn	846	6.8%	167	3.2%	45	4.4%	1	3.2%	0	1	0	0	0	0	0	0	0	0	9,476	1.7%	1,423	0.5%	337	0.5%	11	0.4%	2	3	2	3	1	1	1	6	3	1
Angle (Left Turn)	864	7.0%	473	9.0%	89	8.8%	0	0.0%	0	0	0	0	0	0	0	0	1	0	39,676	7.1%	28,100	10.1%	5,929	9.7%	218	8.6%	37	44	38	39	60	44	54	60	45	42
Angle (Right Turn)	38	0.3%	21	0.4%	1	0.1%	0	0.0%	0	0	0	0	0	0	0	0	0	0	5,933	1.1%	4,286	1.5%	894	1.5%	21	0.8%	5	6	2	2	6	6	9	7	10	10
Head On	649	5.3%	170	3.2%	21	2.1%	0	0.0%	0	0	0	0	0	0	0	0	0	0	3,076	0.6%	1,425	0.5%	260	0.4%	14	0.6%	3	3	2	2	4	1	3	2	1	2
Wildlife/Animal	88	0.7%	5	0.1%	1	0.1%	0	0.0%	0	0	0	0	0	0	0	0	0	0	10,375	1.9%	495	0.2%	122	0.2%	3	0.1%	0	1	0	1	1	0	0	0	0	0
Railway	19	0.2%	11	0.2%	0	0.0%	0	0.0%	0	0	0	0	0	0	0	0	0	0	198	0.0%	153	0.1%	17	0.0%	1	0.0%	0	0	1	0	0	0	1	0	0	0
Other	619	5.0%	179	3.4%	28	2.8%	1	3.2%	0	0	1	0	0	0	0	0	0	0	27,161	4.9%	12,470	4.5%	2,507	4.1%	92	3.6%	10	21	22	19	20	15	16	29	16	18
By Roadway Surface Condition																																				
Dry	9,255	74.9%	3,962	75.5%	866	85.6%	22	71.0%	2	7	3	4	6	6	3	1	5	5	377,213	67.7%	194,401	69.7%	48,130	78.5%	2,067	81.4%	355	433	447	386	446	422	371	492	355	374
Wet	2,563	20.7%	1,169	22.3%	106	10.5%	5	16.1%	3	0	1	0	1	0	0	1	1	0	143,913	25.8%	71,149	25.5%	6,750	11.0%	257	10.1%	46	55	62	49	45	43	54	27	66	25
Snow/Slush	143	1.2%	24	0.5%	12	1.2%	1	3.2%	0	0	1	0	0	0	0	0	0	0	14,053	2.5%	4,547	1.6%	3,054	5.0%	142	5.6%	13	38	11	50	30	23	22	5	29	9
Ice	219	1.8%	42	0.8%	17	1.7%	1	3.2%	0	0	0	0	1	1	0	0	0	0	14,942	2.7%	4,964	1.8%	2,701	4.4%	49	1.9%	5	2	4	23	15	17	10	6	11	22
Standing Water	20	0.2%	3	0.1%	1	0.1%	0	0.0%	0	0	0	0	0	0	0	0	0	0	1,439	0.3%	265	0.1%	23	0.0%	0	0.0%	0	0	0	0	0	1	1	0	1	0
Other	45	0.4%	10	0.2%	3	0.3%	1	3.2%	0	0	0	1	0	1	0	0	0	0	914	0.2%	291	0.1%	121	0.2%	14	0.6%	0	0	2	9	3	8	1	0	3	0
By Light Condition																																				
Daylight	6,706	54.3%	2,832	54.0%	550	54.3%	20	64.5%	1	6	3	5	5	6	2	2	6	3	368,072	66.0%	190,101	68.2%	43,227	70.5%	1,953	77.0%	327	407	423	381	415	405	362	412	351	330
Dark-Street Lights On	2,915	23.6%	1,855	35.4%	349	34.5%	8	25.8%	3	1	1	0	3	2	1	0	0	1	109,769	19.7%	65,654	23.5%	12,809	20.9%	453	17.8%	70	92	82	107	102	89	78	94	83	73
Dark-No Street Lights	1,931	15.6%	234	4.5%	62	6.1%	3	9.7%	2	0	1	0	0	0	0	0	0	0	45,482	8.2%	6,541	2.3%	1,809	2.9%	42	1.7%	8	11	11	9	3	5	8	8	6	5
Dusk	411	3.3%	178	3.4%	32	3.2%	0	0.0%	0	0	0	0	0	0	0	0	0	1	14,979	2.7%	7,825	2.8%	1,652	2.7%	49	1.9%	12	11	2	12	12	9	5	8	13	11
Dawn	221	1.8%	74	1.4%	4	0.4%	0	0.0%	0	0	0	0	0	0	0	0	0	0	10,661	1.9%	3,941	1.4%	694	1.1%	16	0.6%	2	3	3	4	4	5	3	6	4	7
Dark-Street Lights Off	92	0.7%	40	0.8%	10	1.0%	0	0.0%	0	0	0	0	0	0	0	0	0	0	3,094	0.6%	1,397	0.5%	339	0.6%	10	0.4%	1	2	4	1	2	4	2	2	5	2
Other	24	0.2%	8	0.2%	2	0.2%	0	0.0%	0	0	0	0	0	0	0	0	0	0	786	0.1%	398	0.1%	68	0.1%	8	0.3%	0	0	0	8	0	0	2	0	2	0
By Junction Relationship																																				
Intersection Related	3,963	32.1%	2,491	47.5%	511	50.5%	17	54.8%	4	4	2	2	5	7	1	0	2	2	207,030	37.1%	140,545	50.4%	32,654	53.2%	1,286	50.7%	224	257	265	269	271	263	233	307	256	229
Non-Intersection (Not Related)	7,593	61.4%	2,307	44.0%	408	40.3%	12	38.7%	2	2	3	2	3	0	2	2	3	2	295,261	53.0%	98,809	35.4%	19,983	32.6%	893	35.2%	136	199	177	185	196	193	152	150	141	139
Driveway-Related	763	6.2%	426	8.1%	83	8.2%	2	6.5%	0	1	0	1	0	1	0	0	1	1	50,499	9.1%	37,126	13.3%	8,044	13.1%	343	13.5%	55	72	78	63	75	63	75	75	69	61
Roundabout Related	39	0.3%	22	0.4%	10	1.0%	0	0.0%	0	0	0	0	0	0	0	0	0	0	4,564	0.8%	2,367	0.8%	645	1.1%	16	0.6%	6	3	6	1	0	0	1	2	1	1
By Roadway Curvature																																				
Straight & Level	6,524	52.8%	3,139	59.8%	676	66.8%	18	58.1%	3	3	3	5	4	5	3	2	5	4	336,836	60.4%	179,038	64.2%	43,825	71.5%	1,858	73.2%	299	400	404	381	374	294	315	426	366	317
Straight & Grade	1,904	15.4%	895	17.1%	119	11.8%	7	22.6%	2	1	2	0	2	1	0	0	1	1	90,207	16.2%	41,884	15.0%	6,417	10.5%	340	13.4%	47	50	59	66	118	108	81	73	80	87
Horizontal Curve	1,508	12.2%	386	7.4%	75	7.4%	3	9.7%	0	1	0	0	2	1	0	0	0	0	37,465	6.7%	11,977	4.3%	2,394	3.9%	66	2.6%	11	15	16	12	12	10	9	9	6	8
Horizontal Curve & Grade	1,406	11.7%	302	5.8%	33	3.3%	2	6.5%	1	1	0	0	0	0	0	0	0	0	35,640	6.4%	9,126	3.4%	1,206	2.0%	28	1.1%	4	3	3	11	7	5	8	1	7	6
Vertical Curve	392	3.2%	132	2.5%	17	1.7%	0	0.0%	0	0	0	0	0	0	0	0	0	0	12,729	2.3%	5,266	1.9%	822	1.3%	26	1.0%	6	6	4	6	4	11	7	4	4	1
Unknown	16	0.1%	9	0.2%	0	0.0%	0	0.0%	0	0	0	0	0	0	0	0	0	0	718	0.1%	522	0.2%	36	0.1%	0	0.0%	0	0	0	0	0	0	22	21	4	11
Hit Fixed Object Crashes Only - By Fixed Object Hit																																				
Utility Pole	257	8.1%	105	12.9%	20	12.7%	2	50.0%	0	0	0	1	1	0	0	1	0	1	7,320	7.1%	3,019	9.5%	756	11.4%	20	13.0%	3	6	1	3	7	8	3	4	4	8
Curb / Raised Traffic Island	163	5.1%	114	14.0%	26	16.5%	1	25.0%	0	0	0	0	1	0	0	0	0	0	4,249	4.1%	3,014	9.5%	582	8.8%	17	11.0%	3	4	3	3	4	2	3	1	1	0
Guardrail	322	10.2%	34	4.2%	5	3.2%	1	25.0%	1	0	0	0	0	0	0	0	0	0	9,058	8.7%	968	3.0%	121	1.8%	3	1.9%	1	0	0	1	1	0	0	0	0	0
Fence	173	5.5%	60	7.4%	13	8.2%	0	0.0%	0	0	0	0	0	0	0	0	0	0	8,260	8.0%	3,687	11.6%	1,110	16.8%	18	11.7%	4	4	5	2	3	4	5	5	3	5
Tree / Stump (Stationary)	633	20.0%	190	23.3%	17	10.8%	0	0.0%	0	0	0	0	0	1	0	0	0	0	9,757	9.4%	4,282	13.5%	593	9.0%	14	9.1%	2	1	4	2	5	2	5	2	2	1
Traffic Signal Pole	26	0.8%	19	2.3%	1	0.6%	0	0.0%	0	0	0	0	0	0	0	0	0	0	983	0.9%	686	2.2%	172	2.6%	12	7.8%	3	5	0	3	1	2	0	1	2	2
Metal Sign Post	87	2.7%	40	4.9%	13	8.2%	0	0.0%	0	0	0	0	0	0	0	0	0	0	4,367	4.2%	1,990	6.3%	520	7.9%	10	6.5%	3	2	0	4	1	5	2	1	2	0
Retaining Wall	66	2.1%	35	4.3%	4	2.5%	0	0.0%	0	0	0	0	0	0	0	0	0	0	1,723	1.7%	1,099	3.5%	233	3.5%	8	5.2%	3	0	3	1	1	3	4	3	4	2
Building	40	1.3%	29	3.6%	8	5.1%	0	0.0%	0	0	0	0	0	0	1	0	0	0	1,465	1.4%	1,127	3.6%	313	4.7%	6	3.9%	1	0	3	2	0	1	2	1	4	1
Boulder (Stationary)	54	1.7%	8	1.0%	4	2.5%	0	0.0%	0	0	0	0	0	0	0	0	0	0	1,075	1.0%	398	1.3%	125	1.9%	5	3.2%	1	2	0	1	1	0	0	1	2	0
Fire Hydrant	10	0.3%	6	0.7%	0	0.0%	0	0.0%	0	0	0	0	0	0	0	0	0	0	980	0.9%	747	2.4%	194	2.9%	5	3.2%	2	1	2	0	0	1	0	0	3	1
Earth Bank	304	9.6%	32	3.9%	7	4.4%	0	0.0%	0	0	0	0	0	1	0	0	0	0	6,450	6.2%	586	1.8%	114	1.7%	4	2.6%	1	1	1	0	1	1	0	1	0	1

2016-2020 Data
Wenatchee

Wenatchee

	Fatal/Serious Injury Crashes Only																		All Roads		All Cities		Eastside Cities													
	All Roads		All Cities		Eastside Cities																															
	2016-2020	%	2016-2020	%	2016-2020	%	2016-2020	%	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2016-2020	%	2016-2020	%	2016-2020	%	2016-2020	%	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
Wood Sign Post	61	1.9%	12	1.5%	2	1.3%	0	0.0%	0	0	0	0	0	0	0	0	0	0	2,668	2.6%	941	3.0%	180	2.7%	4	2.6%	0	2	0	1	1	1	0	0	1	2
Utility Box	15	0.5%	6	0.7%	0	0.0%	0	0.0%	0	0	0	0	0	0	0	0	0	0	883	0.9%	420	1.3%	105	1.6%	3	1.9%	0	1	0	1	1	2	1	0	0	1
Concrete Barrier	174	5.5%	29	3.6%	4	2.5%	0	0.0%	0	0	0	0	0	0	0	0	0	0	9,514	9.2%	737	2.3%	102	1.5%	3	1.9%	1	0	0	1	1	0	1	0	0	0
Mail Box	62	2.0%	17	2.1%	2	1.3%	0	0.0%	0	0	0	0	0	0	0	0	0	0	2,455	2.4%	943	3.0%	148	2.2%	3	1.9%	0	0	1	2	0	1	0	0	1	0
Roadway Ditch	400	12.6%	30	3.7%	4	2.5%	0	0.0%	0	0	0	0	0	0	0	0	0	0	13,429	13.0%	1,191	3.8%	125	1.9%	3	1.9%	0	1	1	1	0	0	0	0	0	0
Bridge Rail	47	1.5%	9	1.1%	0	0.0%	0	0.0%	0	0	0	0	0	0	0	0	0	0	2,646	2.6%	462	1.5%	50	0.8%	1	0.6%	0	1	0	0	0	0	0	0	0	1
Rock Bank	34	1.1%	2	0.2%	1	0.6%	0	0.0%	0	0	0	0	0	0	0	0	0	0	592	0.6%	56	0.2%	18	0.3%	1	0.6%	0	0	1	0	0	0	0	0	0	0
Crash Cushions - Impact Attenuators	21	0.7%	1	0.1%	0	0.0%	0	0.0%	0	0	0	0	0	0	0	0	0	0	728	0.7%	56	0.2%	10	0.2%	1	0.6%	1	0	0	0	0	0	0	0	0	0
Guide Post	8	0.3%	1	0.1%	0	0.0%	0	0.0%	0	0	0	0	0	0	0	0	0	0	216	0.2%	73	0.2%	18	0.3%	1	0.6%	0	0	0	0	1	0	0	0	0	0
Misc. Debris on Road	16	0.5%	1	0.1%	0	0.0%	0	0.0%	0	0	0	0	0	0	0	0	0	0	908	0.9%	185	0.6%	43	0.6%	0	0.0%	0	0	0	0	0	0	0	2	0	0
Temporary Traffic Sign / Barricade	9	0.3%	5	0.6%	0	0.0%	0	0.0%	0	0	0	0	0	0	0	0	0	0	419	0.4%	144	0.5%	30	0.5%	0	0.0%	0	0	0	0	0	0	0	0	1	0
Culvert	46	1.5%	7	0.9%	1	0.6%	0	0.0%	0	0	0	0	0	0	0	0	0	0	765	0.7%	110	0.3%	10	0.2%	0	0.0%	0	0	0	0	0	0	0	0	0	1
Into River / Lake	10	0.3%	1	0.1%	0	0.0%	0	0.0%	0	0	0	0	0	0	0	0	0	0	293	0.3%	44	0.1%	11	0.2%	0	0.0%	0	0	0	0	0	0	0	0	0	1
Other Objects	52	1.6%	23	2.8%	7	4.4%	0	0.0%	0	0	0	0	0	0	0	0	0	0	2,824	2.7%	1,283	4.0%	360	5.4%	12	7.8%	0	4	4	2	2	1	1	1	4	3
By Contributing Circumstance																																				
Exceeding Safe / Stated Speed	3,129	23.4%	945	19.0%	203	20.5%	10	32.3%	2	3	0	1	4	2	0	0	0	0	90,014	15.2%	22,638	7.9%	4,256	6.8%	125	4.3%	15	31	9	28	42	25	30	9	33	28
Inattention / Distraction	2,417	18.1%	1,016	20.5%	174	17.6%	6	19.4%	0	3	0	2	1	4	1	0	1	1	162,412	27.4%	88,410	30.8%	16,230	26.1%	949	32.9%	0	183	285	244	237	222	219	199	70	41
Failing to Yield	1,240	9.3%	608	12.2%	142	14.3%	4	12.9%	0	1	1	1	1	0	0	0	0	0	89,271	15.1%	56,677	19.7%	13,664	22.0%	484	16.8%	86	90	96	80	132	74	90	121	104	113
Under Influence of Alcohol / Drugs	2,473	18.5%	751	15.1%	166	16.8%	4	12.9%	0	1	0	1	2	2	1	0	0	0	32,271	5.4%	14,676	5.1%	3,568	5.7%	140	4.9%	29	31	27	32	21	17	18	19	20	24
Following Too Close	374	2.8%	101	2.0%	23	2.3%	3	9.7%	1	0	0	2	0	0	0	0	1	1	88,457	14.9%	30,416	10.6%	8,986	14.4%	582	20.2%	107	115	119	102	139	125	95	138	145	136
Over Centerline	455	3.4%	96	1.9%	10	1.0%	2	6.5%	0	0	1	0	1	0	0	0	0	1	4,445	0.7%	1,719	0.6%	367	0.6%	26	0.9%	0	1	6	12	7	4	1	7	13	11
Disregard Stop Sign	179	1.3%	67	1.3%	15	1.5%	1	3.2%	0	0	0	0	1	0	0	0	0	1	6,114	1.0%	4,351	1.5%	1,348	2.2%	36	1.2%	0	8	8	8	12	10	2	12	24	14
Apparently Ill	139	1.0%	61	1.2%	9	0.9%	1	3.2%	0	0	0	1	0	0	0	1	0	0	2,582	0.4%	1,161	0.4%	235	0.4%	11	0.4%	3	3	0	3	2	1	2	1	3	2
Disregard Signal	242	1.8%	174	3.5%	38	3.8%	0	0.0%	0	0	0	0	0	0	0	0	1	0	10,518	1.8%	8,086	2.8%	2,089	3.4%	80	2.8%	0	18	24	19	19	18	17	36	37	26
Improper Turn	149	1.1%	102	2.1%	13	1.3%	0	0.0%	0	0	0	0	0	0	0	0	0	0	11,475	1.9%	8,622	3.0%	1,582	2.5%	63	2.2%	0	0	19	27	17	25	21	21	33	21
Improper Backing	22	0.2%	10	0.2%	1	0.1%	0	0.0%	0	0	0	0	0	0	0	0	0	0	6,598	1.1%	5,157	1.8%	1,618	2.6%	58	2.0%	4	17	13	6	18	19	12	16	13	8
Operating Defective Equipment	306	2.3%	78	1.6%	16	1.6%	0	0.0%	0	0	0	0	0	0	0	0	0	0	11,908	2.0%	3,918	1.4%	945	1.5%	26	0.9%	3	6	3	6	8	13	5	9	16	9
Apparently Asleep	173	1.3%	32	0.6%	8	0.8%	0	0.0%	0	0	0	0	0	0	0	0	0	1	5,720	1.0%	1,392	0.5%	277	0.4%	25	0.9%	0	0	3	10	12	3	5	2	3	4
Improper Passing	301	2.3%	80	1.6%	9	0.9%	0	0.0%	0	0	0	0	0	0	0	0	0	0	6,940	1.2%	2,905	1.0%	431	0.7%	15	0.5%	1	8	3	1	2	2	0	4	2	5
Failing to Yield to Ped / Cyclist	280	2.1%	241	4.9%	43	4.3%	0	0.0%	0	0	0	0	0	1	0	0	2	2	2,609	0.4%	2,277	0.8%	380	0.6%	14	0.5%	0	0	7	4	3	5	3	6	7	8
On Wrong Side of Road	216	1.6%	53	1.1%	12	1.2%	0	0.0%	0	0	0	0	0	0	0	0	0	0	1,786	0.3%	899	0.3%	240	0.4%	13	0.5%	0	0	4	2	7	1	0	0	0	0
Apparently Fatigued	65	0.5%	13	0.3%	3	0.3%	0	0.0%	0	0	0	0	0	0	0	0	0	0	3,085	0.5%	1,000	0.3%	192	0.3%	11	0.4%	0	1	1	7	2	3	3	1	0	1
Improper U-Turn	73	0.5%	33	0.7%	1	0.1%	0	0.0%	0	0	0	0	0	0	0	0	0	0	3,410	0.6%	2,178	0.8%	270	0.4%	9	0.3%	2	1	2	2	2	0	2	2	3	0
Failing to Signal	9	0.1%	3	0.1%	0	0.0%	0	0.0%	0	0	0	0	0	0	0	0	0	0	573	0.1%	280	0.1%	50	0.1%	3	0.1%	0	1	0	0	2	0	1	0	3	1
Disregard Yield Sign	22	0.2%	13	0.3%	0	0.0%	0	0.0%	0	0	0	0	0	0	0	0	0	0	753	0.1%	560	0.2%	89	0.1%	1	0.0%	0	0	0	1	0	0	0	0	0	0
Improper Signal	10	0.1%	3	0.1%	1	0.1%	0	0.0%	0	0	0	0	0	0	0	0	0	0	611	0.1%	275	0.1%	54	0.1%	1	0.0%	0	1	0	0	0	1	0	1	0	0
Improper Parking Location	4	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0	0	0	0	0	0	0	0	0	413	0.1%	282	0.1%	76	0.1%	1	0.0%	0	0	1	0	0	0	1	0	2	0
Other	1,040	7.8%	472	9.5%	100	10.1%	0	0.0%	0	0	0	0	0	1	1	0	0	0	50,610	8.5%	29,356	10.2%	5,229	8.4%	211	7.3%	0	0	62	77	72	63	51	66	42	33
By Motor Vehicle Type																																				
Light Truck/SUV	7,543	40.5%	2,952	38.5%	620	41.7%	19	43.2%	3	3	2	5	6	4	4	1	6	3	450,622	44.9%	228,058	43.7%	56,096	48.8%	2,780	54.3%	465	550	609	568	588	511	459	512	439	409
Passenger Car	7,448	40.0%	3,455	45.1%	607	40.8%	16	36.4%	3	3	2	4	4	5	1	1	1	5	499,309	49.7%	271,405	52.0%	54,667	47.5%	2,173	42.4%	350	482	408	415	518	486	444	511	455	409
Motorcycle	2,391	12.9%	878	11.5%	197	13.3%	5	11.4%	0	2	1	0	2	0	0	0	1	0	10,390	1.0%	4,471	0.9%	950	0.8%	34	0.7%	7	8	7	5	7	5	3	10	11	4
Heavy Truck	845	4.5%	187	2.4%	32	2.2%	3	6.8%	0	2	1	0	0	0	0	0	0	0	35,114	3.5%	12,261	2.3%	2,276	2.0%	97	1.9%	16	18	22	16	25	20	18	18	14	15
Bus	77	0.4%	65	0.8%	5	0.3%	1	2.3%	0	0	1	0	0	0	0	0	1	0	3,563	0.4%	2,637	0.5%	416	0.4%	22	0.4%	1	3	3	9	6	4	7	6	6	7
School Bus	26	0.1%	17	0.2%	4	0.3%	0	0.0%	0	0	0	0	0	0	0	0	0	0	1,764	0.2%	1,098	0.2%	277	0.2%	6	0.1%	0	0	2	0	4	1	0	0	2	1
Other	274	1.5%	113	1.5%	21	1.4%	0	0.0%	0	0	0	0	0	0	0	0	0	0	3,702	0.4%	1,896	0.4%	361	0.3%	11	0.2%	1	1	3	4	2	1	0	3	2	2
By Speed Limit																																				
20 MPH	169	1.1%	121	1.9%	13	1.1%	0	0.0%	0	0	0	0	0	0	0	0	1	3	11,936	1.5%	9,469	2.4%	1,582	1.8%	19	0.5%	4	5	6	1	3	9	8	4	7	5
25 MPH	1,900	12.4%	1,465	23.6%	261	22.0%	13	34.2%	4	2	2	1	4	1	2	1	0	0	127,511	15.9%	106,139	26.5%	23,756	27.0%	1,002	25.7%	167	223	217	191	204	217	220	266	194	188
30 MPH	1,673	10.9%	1,429	23.0%	422	35.6%	19	50.0%	1	5	2	6	5	3	2	1	8	3	111,350	13.9%	97,202	24.2%	30,197	34.3%	2,177	55.7%	311	451	450	454	511	400	407	451	506	413
35 MPH	4,196	27.3%	2,398	38.6%	349	29.4%	5	13.2%	1	0	1	2	1	1	0	0	0	1	228,316	28.5%	150,816	37.6%	26,932	30.6%	604	15.5%	90	86	142	149	137	117	97	111	81	116
40 MPH	1,070	7.0%	440	7.1%	63	5.3%	1	2.6%	0	0	0	0	1	0	0	0	0	0	49,098	6.1%	21,506	5.4%	3,046	3.5%	57	1.5%	14	17	4	2	20	2	8	30	22	5
45 MPH	1,008	6.6%	225	3.6%	40	3.4%	0	0.0%	0	0	0	0	0	0	0	0	0	0	37,034	4.6%	11,225	2.8%	1,467	1.7%	35	0.9%	0	0	4	0	31	2	3	0	0	9
50 MPH	1,778	11.6%	104	1.7%	29	2.4%	0	0.0%	0	0	0	0	0	0	0	0	0	0	39,208	4.9%	2,583	0.6%	638	0.7%	7	0.2%	0	0	0	0	7	0	0	0	0	2
55 MPH	1,278	8.3%	19	0.3%	10	0.8%	0	0.0%	0	0	0	0	0	0	0	0	0	0	30,054	3.7%	765	0.2%	194	0.2%	0	0.0%	0	0	0	0	0	0	0	0	0	0
60 MPH	2,271	14.8%	13	0.2%	0	0.0%	0	0.0%	0	0	0	0	0	0	0	0	0	0	167,326	20.9%	1,306	0.3%	114	0.1%	5	0.1%	0	0	0	0	5	0	0	1	0	1
By Traffic Control																																				
No Traffic Control	13,759	74.8%	4,571	60.7%	928	63.4%	28	65.1%	4	5	6	8	5	6	3	2	6	6	681,993	68.9%	292,945	57.9%	63,733	57.9%	2,935	60.0%	416	596	646	584	693	607	546	553	491	420
Signals	2,907	15.8%	2,121	28.2%	355	24.3%	8	18.6%	3	2	0	0	3	1	0	0	3	1	211,131	21.3%	151,608	29.9%	30,502	27.7%	1,339	27.4%	272	290	223	252	302	304	274	366	303	289
Stop Sign	1,214	6.6%	608	8.1%	151	10.3%	6	14.0%	0	1	1	1	3	1	1	0	0	1	67,279	6.8%	46,221	9.1%	12,527	11.4%	454	9.3%	71	80	96	106	101	83	63	84	69	73
Yield	82	0.4%	42	0.6%	7	0.5%	0	0.0%	0	0	0	0	0	0	0	0	0	0	10,043	1.0%	4,916	1.0%	1,041	0.9%	17	0.3%	0	2	9	4	2	1	1	0	2	0
Flashing Red	32	0.2%	15	0.2%	2	0.1%	0	0.0%	0	0	0	0	0	0	0	0	0	0	1,922	0.2%	1,183	0.2%	362	0.3%	6	0.1%	0	2	4	0	0	1	0	2	0	0
Flashing Amber	56	0.3%	33	0.4%	1	0.1%	0	0.0%	0	0	0	0	0	0	0	0	0	0	2,204	0.2%	1,404	0.3%	304	0.3%	6	0.1%	1	2	1	0	2	0	3	0	1	1
Officer/Flagger	63	0.3%	12	0.2%	2	0.1%	0	0.0%	0	0	0	0	0	0	0	0	0	0	2,510	0.3%	966	0.2%	181	0.2%	5	0.1%	0	0	3	0	2	0	0	0	0	0

2016-2020 Data
Wenatchee

Wenatchee

Fatal/Serious Injury Crashes Only

	All Roads		All Cities		Eastside Cities														All Roads		All Cities		Eastside Cities											
	2016-2020	%	2016-2020	%	2016-2020	%	2016-2020	%	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2016-2020	%	2016-2020	%	2016-2020	%	2016-2020	%	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
RR Signal	27	0.1%	12	0.2%	3	0.2%	0	0.0%	0	0	0	0	0	0	0	0	0	0	695	0.1%	451	0.1%	136	0.1%	3	0.1%	0	0	1	0	2	0	0	0	0	0
Other Traffic Control	229	1.2%	101	1.3%	14	1.0%	1	2.3%	0	1	0	0	0	0	0	0	0	0	10,186	1.0%	5,244	1.0%	1,004	0.9%	116	2.4%	33	28	30	24	1	0	1	12	25	28
Unknown	23	0.1%	16	0.2%	0	0.0%	0	0.0%	0	0	0	0	0	0	0	0	0	0	1,773	0.2%	1,380	0.3%	198	0.2%	7	0.1%	0	6	0	1	0	0	2	4	2	2
By Roadway Type																																				
Two Way - Undivided	11,862	47.3%	4,575	44.2%	960	48.2%	27	45.0%	4	6	2	7	8	6	2	0	7	6	432,449	38.7%	251,200	46.0%	59,632	50.4%	2,265	43.4%	356	510	401	435	563	491	458	595	553	586
Two Way - Divided, no Barrier	6,910	27.6%	3,461	33.4%	521	26.2%	17	28.3%	4	6	4	0	3	2	0	4	0	0	277,460	24.8%	171,620	31.4%	30,161	25.5%	1,679	32.1%	282	312	404	336	345	245	227	205	42	8
One Way	624	2.5%	343	3.3%	126	6.3%	12	20.0%	0	2	2	2	6	0	4	0	4	0	48,407	4.3%	23,640	4.3%	8,446	7.1%	705	13.5%	84	157	155	165	144	173	166	126	182	119
Two Way - Divided, with Barrier	3,948	15.8%	1,093	10.6%	212	10.7%	2	3.3%	0	0	0	2	0	2	0	0	0	0	266,625	23.9%	52,773	9.7%	9,747	8.2%	319	6.1%	48	65	57	67	82	81	59	62	26	17
Center-Two Way Left Turn Lane	638	2.5%	482	4.7%	95	4.8%	2	3.3%	2	0	0	0	0	0	0	0	0	3	30,241	2.7%	23,332	4.3%	5,673	4.8%	102	2.0%	9	16	35	15	27	41	25	36	102	89
Driveway	146	0.6%	108	1.0%	24	1.2%	0	0.0%	0	0	0	0	0	0	0	0	0	2	8,568	0.8%	6,901	1.3%	1,353	1.1%	59	1.1%	12	13	10	4	20	8	14	40	60	64
Alley	38	0.2%	36	0.3%	10	0.5%	0	0.0%	0	0	0	0	0	0	0	0	0	0	2,273	0.2%	2,178	0.4%	676	0.6%	18	0.3%	4	4	2	2	6	12	6	6	4	2
Interchange Ramp	448	1.8%	62	0.6%	4	0.2%	0	0.0%	0	0	0	0	0	0	0	0	0	0	33,587	3.0%	4,195	0.8%	507	0.4%	9	0.2%	0	0	0	0	9	0	0	0	0	2
Reversible Road	49	0.2%	23	0.2%	0	0.0%	0	0.0%	0	0	0	0	0	0	0	0	0	0	1,634	0.1%	738	0.1%	83	0.1%	2	0.0%	0	0	0	2	0	2	0	0	0	0
Other	390	1.6%	162	1.6%	38	1.9%	0	0.0%	0	0	0	0	0	2	0	0	0	0	15,067	1.3%	9,083	1.7%	2,057	1.7%	64	1.2%	12	10	18	12	12	2	5	2	4	4
Unknown	10	0.0%	6	0.1%	0	0.0%	0	0.0%	0	0	0	0	0	2	0	0	0	0	1,083	0.1%	785	0.1%	68	0.1%	1	0.0%	0	0	1	0	0	2	2	17	4	0
By Roadway Surface Type																																				
Blacktop	15,849	86.0%	6,589	87.3%	1,409	96.2%	43	97.7%	6	9	7	9	12	7	4	2	9	8	826,233	83.3%	447,647	88.1%	105,904	96.2%	4,737	96.5%	773	983	958	952	1,071	940	819	925	786	690
Gravel	159	0.9%	20	0.3%	7	0.5%	1	2.3%	1	0	0	0	0	0	0	0	0	0	3,508	0.4%	1,091	0.2%	436	0.4%	7	0.1%	2	1	2	0	2	1	1	2	0	1
Concrete	2,080	11.3%	883	11.7%	37	2.5%	0	0.0%	0	0	0	0	0	0	0	0	0	0	152,742	15.4%	55,279	10.9%	3,015	2.7%	141	2.9%	17	27	49	15	33	50	65	87	97	114
Dirt	98	0.5%	11	0.1%	4	0.3%	0	0.0%	0	0	0	0	0	0	0	0	0	0	1,391	0.1%	440	0.1%	181	0.2%	6	0.1%	0	3	0	1	2	1	1	1	1	0
Brick or Wood Block	10	0.1%	4	0.1%	2	0.1%	0	0.0%	0	0	0	0	0	0	0	0	0	0	979	0.1%	622	0.1%	132	0.1%	5	0.1%	0	0	2	1	2	1	1	2	0	0
Other	208	1.1%	27	0.4%	6	0.4%	0	0.0%	0	0	0	0	0	1	0	0	0	0	5,050	0.5%	1,151	0.2%	367	0.3%	12	0.2%	1	0	8	2	1	4	0	1	4	3
Unknown	18	0.1%	16	0.2%	0	0.0%	0	0.0%	0	0	0	0	0	0	0	0	0	0	2,180	0.2%	1,767	0.3%	45	0.0%	0	0.0%	0	0	0	0	0	0	3	3	5	5
By Contributing Circumstance (Ped Only)																																				
Inattention / Distraction	276	20.3%	189	20.7%	39	22.5%	2	66.7%	0	0	1	0	1	3	0	0	0	0	1,113	26.3%	851	26.5%	170	28.1%	6	28.6%	0	0	2	2	2	5	1	0	0	0
Failing to Yield	400	29.4%	275	30.2%	64	37.0%	1	33.3%	0	0	0	0	1	1	0	0	2	0	1,096	25.9%	835	26.0%	196	32.3%	11	52.4%	2	0	4	3	2	3	1	2	2	1
Exceeding Safe / Stated Speed	4	0.3%	2	0.2%	0	0.0%	0	0.0%	0	0	0	0	0	0	0	0	0	0	13	0.3%	10	0.3%	3	0.5%	1	4.8%	0	0	0	0	1	0	0	0	0	0
Under Influence of Alcohol / Drugs	155	11.4%	83	9.1%	22	12.7%	0	0.0%	0	0	0	0	0	0	0	0	0	0	422	10.0%	282	8.8%	63	10.4%	0	0.0%	0	0	0	0	0	0	0	0	0	1
Failure to Use Crosswalk	177	13.0%	148	16.2%	19	11.0%	0	0.0%	0	0	0	0	0	0	0	0	0	0	550	13.0%	459	14.3%	49	8.1%	0	0.0%	0	0	0	0	0	0	1	1	0	0
Disregard Stop Sign	3	0.2%	3	0.3%	1	0.6%	0	0.0%	0	0	0	0	0	0	0	0	0	0	18	0.4%	15	0.5%	3	0.5%	0	0.0%	0	0	0	0	0	0	1	0	0	0
Other	287	21.1%	169	18.5%	24	13.9%	0	0.0%	0	0	0	0	0	0	0	0	0	0	795	18.8%	582	18.1%	95	15.7%	3	14.3%	0	0	0	2	1	2	0	0	1	0
By Facility Used (Ped Only)																																				
Roadway	1,088	46.6%	685	40.5%	123	38.7%	5	50.0%	1	1	1	0	2	1	0	0	2	0	3,245	29.8%	2,350	26.4%	451	28.2%	21	30.4%	3	2	7	6	3	4	1	1	2	1
Marked Crosswalk	718	30.8%	618	36.5%	103	32.4%	3	30.0%	2	1	0	0	0	2	0	0	1	1	4,946	45.5%	4,355	49.0%	690	43.1%	33	47.8%	7	9	4	9	4	3	4	5	4	6
Sidewalk	114	4.9%	105	6.2%	18	5.7%	1	10.0%	0	1	0	0	0	0	0	0	0	0	753	6.9%	695	7.8%	123	7.7%	7	10.1%	2	1	2	0	2	0	0	0	0	0
Unmarked Crosswalk	142	6.1%	118	7.0%	32	10.1%	1	10.0%	0	0	0	1	0	0	0	0	0	1	879	8.1%	776	8.7%	197	12.3%	4	5.8%	0	2	0	1	1	1	2	0	1	2
Walkway	10	0.4%	8	0.5%	2	0.6%	0	0.0%	0	0	0	0	0	0	0	0	0	0	70	0.6%	62	0.7%	8	0.5%	1	1.4%	1	0	0	0	0	0	0	0	1	0
Designated Bike Route	4	0.2%	2	0.1%	0	0.0%	0	0.0%	0	0	0	0	0	0	0	0	0	0	30	0.3%	25	0.3%	5	0.3%	1	1.4%	0	0	0	0	1	0	0	0	0	0
Shoulder	120	5.1%	44	2.6%	8	2.5%	0	0.0%	0	0	0	0	0	0	0	1	0	0	418	3.8%	204	2.3%	31	1.9%	0	0.0%	0	0	0	0	0	1	0	1	1	0
Other	138	5.9%	111	6.6%	32	10.1%	0	0.0%	0	0	0	0	0	1	0	0	0	0	537	4.9%	420	4.7%	97	6.1%	2	2.9%	0	0	1	0	1	3	1	0	0	0
By Contributing Circumstance (Bike Only)																																				
Failing to Yield	114	27.3%	81	26.5%	20	39.2%	2	100.0%	1	0	1	0	0	0	0	0	1	0	807	25.8%	647	25.5%	155	30.4%	5	27.8%	2	0	2	0	1	0	3	4	2	1
Inattention / Distraction	95	22.7%	71	23.2%	6	11.8%	0	0.0%	0	0	0	0	0	0	0	0	0	0	822	26.3%	661	26.0%	136	26.7%	4	22.2%	0	0	2	1	1	0	1	1	0	0
Disregard Stop Sign	21	5.0%	14	4.6%	4	7.8%	0	0.0%	0	0	0	0	0	0	0	0	0	0	150	4.8%	126	5.0%	32	6.3%	4	22.2%	0	1	0	0	3	0	0	0	0	0
On Wrong Side of Road	13	3.1%	8	2.6%	1	2.0%	0	0.0%	0	0	0	0	0	0	0	0	0	0	171	5.5%	126	5.0%	28	5.5%	1	5.6%	0	0	0	0	1	0	0	0	0	0
Disregard Signal	29	6.9%	27	8.8%	1	2.0%	0	0.0%	0	0	0	0	0	0	0	0	0	0	152	4.9%	134	5.3%	20	3.9%	1	5.6%	0	0	1	0	0	0	0	0	0	1
Exceeding Safe / Stated Speed	24	5.7%	17	5.6%	0	0.0%	0	0.0%	0	0	0	0	0	1	0	0	0	0	158	5.1%	133	5.2%	13	2.5%	1	5.6%	0	0	0	0	1	1	0	0	0	0
Headlight Violation	1	0.2%	1	0.3%	1	2.0%	0	0.0%	0	0	0	0	0	0	0	0	0	0	41	1.3%	37	1.5%	11	2.2%	1	5.6%	0	0	1	0	0	0	0	0	0	0
Under Influence of Alcohol / Drugs	18	4.3%	10	3.3%	3	5.9%	0	0.0%	0	0	0	0	0	0	0	0	1	0	66	2.1%	48	1.9%	17	3.3%	0	0.0%	0	0	0	0	0	0	1	0	1	0
Other	50	12.0%	37	12.1%	10	19.6%	0	0.0%	0	0	0	0	0	0	0	0	0	0	422	13.5%	355	14.0%	52	10.2%	1	5.6%	0	0	1	0	0	0	0	1	0	0
By Facility Used (Bike Only)																																				
Roadway	341	50.7%	260	50.3%	45	52.3%	2	100.0%	1	0	1	0	0	1	0	0	1	0	2,366	38.9%	1,968	38.8%	332	40.2%	11	32.4%	2	2	4	0	3	1	2	7	2	4
Marked Crosswalk	79	11.8%	58	11.2%	13	15.1%	0	0.0%	0	0	0	0	0	0	0	0	0	0	1,048	17.2%	866	17.1%	152	18.4%	7	20.6%	1	1	4	0	1	3	1	2	1	1
Sidewalk	53	7.9%	47	9.1%	13	15.1%	0	0.0%	0	0	0	0	0	0	0	0	0	0	830	13.6%	731	14.4%	170	20.6%	6	17.6%	1	2	1	1	1	0	1	0	1	0
Designated Bike Route	104	15.5%	95	18.4%	5	5.8%	0	0.0%	0	0	0	0	0	0	0	0	0	0	1,024	16.8%	936	18.5%	39	4.7%	4	11.8%	0	1	0	1	2	0	0	0	0	0
Shoulder	63	9.4%	29	5.6%	7	8.1%	0	0.0%	0	0	0	0	0	0	0	0	0	0	416	6.8%	234	4.6%	41	5.0%	2	5.9%	0	1	1	0	0	0	0	0	0	0
Unmarked Crosswalk	17	2.5%	16	3.1%	1	1.2%	0	0.0%	0	0	0	0	0	0	0	0	0	0	197	3.2%	170	3.4%	54	6.5%	1	2.9%	0	0	0	0	1	0	1	1	0	1
Walkway	1	0.1%	1	0.2%	0	0.0%	0	0.0%	0	0	0	0	0	0	0	0	0	0	33	0.5%	30	0.6%	5	0.6%	1	2.9%	0	0	1	0	0	0	0	0	0	0
Other	14	2.1%	11	2.1%	2	2.3%	0	0.0%	0	0	0	0	0	0	0	0	0	0	167	2.7%	138	2.7%	32	3.9%	2	5.9%	0	0	1	1	0	0	1	0	0	0

Under 23 U.S. Code 148 and 23 U.S. Code 409, safety data, reports, surveys, schedules, list complied or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such report,

Appendix B

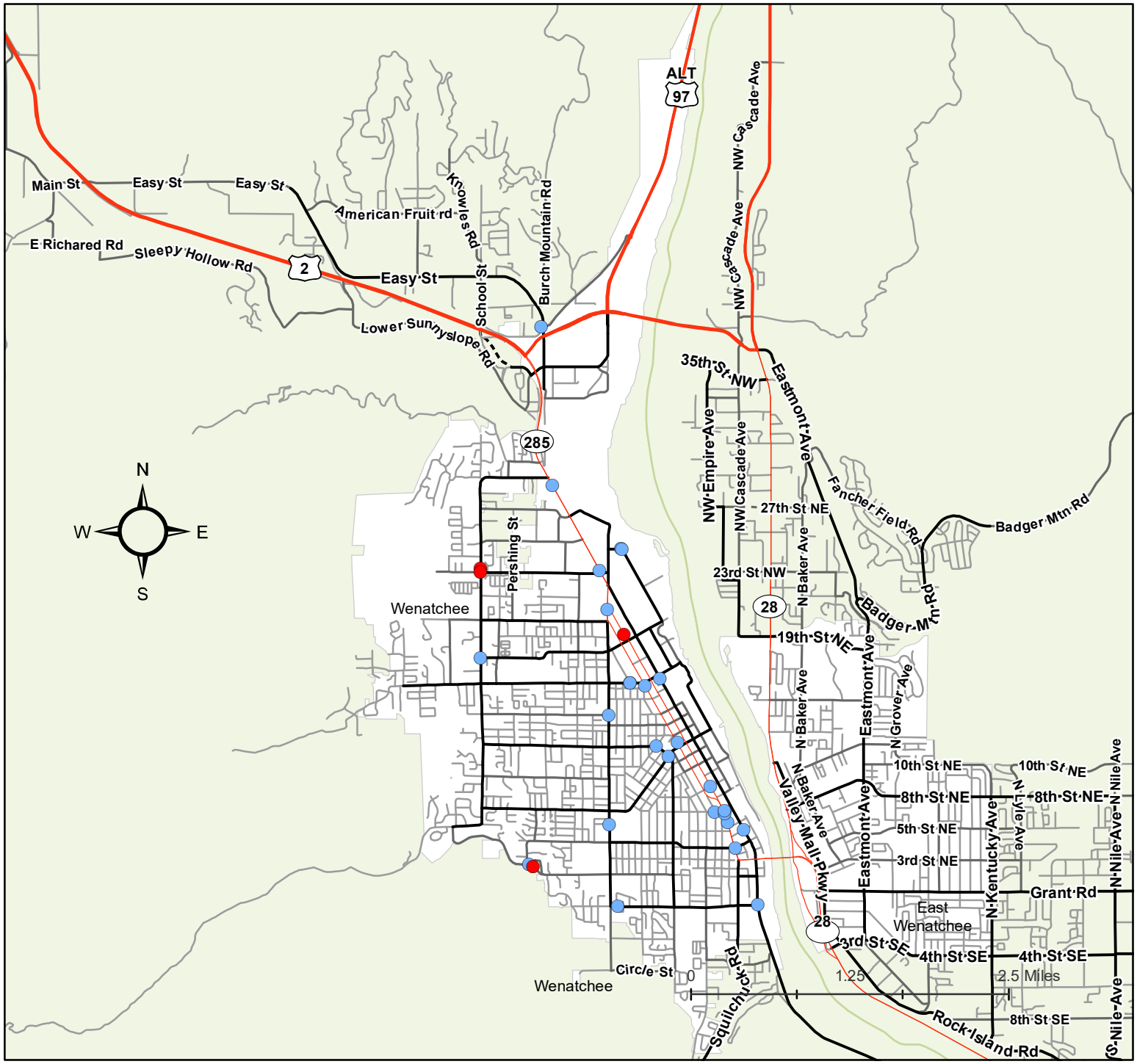
WSDOT COLLISION MAP

2016-2020

2016 - 2020 Fatal and Suspected Serious Injury Crashes

City of Wenatchee

Under 23 U.S. Code § 148 and 23 U.S. Code § 409, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.



Washington State Department of Transportation

WSDOT - Transportation Data, GIS and Modeling Office
Crash Data and Reporting Branch – KM

Legend

- Fatal Injury (4)
- Suspected Serious Injury (26)

- County Line
- County
- City
- Tribal Land
- U.S. Interstate
- U.S. Highway
- State Route
- Local Roads

Appendix C

PRIORITY LEVEL 1

Risk Factor Evaluation

City of Wenatchee

Priority Level 1 - Hit Pedestrian at Intersection

Risk Factors Assessment

Location	Serious Injury/ Fatal crash?	30+ MPH?	Intersection Related?	Stop Controlled?	X-walk?	Lack of Pedestrian Signs	X-ing distance > 35ft?	Driveway presence w/in 100ft?	On-street parking?	Commercial Land Use?	Arterial?	Pedestrian generator?
5th St at N Emerson Ave*	Y	Y	Y	Y	Y		Y	Y		Y	Y	Y
At Wenatchee High School driveway			Y	Y	Y	Y		Y				Y
Cashmere St at Ferry St		Y	Y	Y	Y	Y	Y	Y	Y			
Cashmere St at Lewis St			Y	Y		Y		Y	Y			
Chelan Ave at 3rd St		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Chelan Ave at 5th St*		Y	Y		Y	Y	Y	Y	Y	Y	Y	Y
Chelan Ave at 9th St*		Y	Y		Y	Y	Y	Y	Y	Y	Y	Y
Chelan Ave at Orondo Ave		Y	Y		Y	Y	Y	Y	Y	Y	Y	Y
Chelan Ave at Yakima St*		Y	Y		Y	Y	Y	Y	Y	Y	Y	Y
Cherry St at S Miller St*			Y		Y	Y	Y	Y			Y	Y
Easy St at Ohme Garden Rd		Y	Y	Y		Y		Y		Y	Y	Y
Elliott Ave S at John St			Y	Y		Y	Y	Y	Y			Y
Euclid Ave at Gunn Rd		Y	Y	Y		Y		Y			Y	Y
Helper Dr at Maple St		Y	Y	Y		Y		Y				Y
Maple St at Princeton Ave N		Y	Y	Y	Y		Y	Y			Y	Y
Marr St at S Chelan Ave			Y	Y		Y	Y	Y	Y			Y
Methow St at Lewis St			Y	Y		Y		Y	Y			
Miller St at 3rd St*		Y	Y	Y	Y		Y	Y			Y	Y
Miller St at Bryan Ter		Y	Y	Y	Y	Y	Y	Y				Y
Miller St at Orchard Ave	Y		Y	Y	Y		y	Y			Y	Y
Mission St at 2nd St		Y	Y		Y	Y	Y	Y	Y	Y	Y	
Mission St at 9th St*		Y	Y		Y	Y	Y	Y	Y	Y	Y	Y
Mission St at Bridge St		Y	Y	Y	Y	Y		Y		Y	Y	
Mission St at Crawford Ave			Y		Y	Y	Y	Y			Y	Y
Mission St at Ferry St*		Y	Y		Y	Y	Y	Y		Y	Y	Y
Mission St at Lewis St			Y	Y	Y	Y	Y	Y		Y		Y
Mission St at Orondo Ave		Y	Y		Y		Y	Y	Y	Y	Y	
Monroe St at Russell St			Y	Y		Y		Y				Y
Peachey St at Cascade St			Y	Y		Y		Y	Y			Y
Peachey St at S Chelan Ave	Y		Y	Y	Y	Y	Y	Y	Y			Y
Poplar Ave at Concord Pl			Y	Y		Y	Y	Y	Y			Y
Russell St at Kittitas St			Y	Y		Y	Y	Y			Y	
Spokane St at Highland Dr			Y	Y		Y		Y	Y			
Spokane St at S Wenatchee Ave		Y	Y		Y	Y	Y	Y	Y	Y	Y	Y
Washington St at King St	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Wenatchee Ave at 1st St			Y		Y	Y	Y	Y	Y	Y	Y	Y
Wenatchee Ave at 9th St*		Y	Y		Y	Y	Y	Y		Y	Y	Y
Wenatchee Ave at Crawford Ave	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

City of Wenatchee

Priority Level 1 - Hit Pedestrian at Intersection

Risk Factors Assessment

Location	Serious Injury/ Fatal crash?	30+ MPH?	Intersection Related?	Stop Controlled?	X-walk?	Lack of Pedestrian Signs	X-ing distance > 35ft?	Driveway presence w/in 100ft?	On-street parking?	Commercial Land Use?	Arterial?	Pedestrian generator?
Wenatchee Ave at Ferry St		Y	Y		Y	Y	Y	Y		Y	Y	Y
Wenatchee Ave at Maiden Ln		Y	Y		Y	Y	Y	Y		Y	Y	Y
Wenatchee Ave at Maple St*		Y	Y		Y	Y	Y	Y		Y	Y	Y
Wenatchee Ave at Marr St		Y	Y	Y	Y	Y	Y	Y			Y	Y
Wenatchee Ave at McKittrick St		Y	Y	Y	Y	Y		Y		Y	Y	
Wenatchee Ave at N Miller St		Y	Y			Y		Y		Y	Y	Y
Wenatchee Ave at Oronda Ave			Y		Y	Y	Y	Y	Y	Y	Y	Y
Wenatchee Ave at Thurston			Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Wenatchee Ave at Yakima			Y		Y	Y	Y	Y	Y	Y		Y
Western Ave at Springwater St		Y	Y	Y		Y	Y	Y	Y		Y	Y

* Multiple Priority Level 1 Crashes at this location

Appendix D

PRIORITY LEVEL 2

Risk Factor Evaluation

City of Wenatchee

Priority Level 2 - Hit Pedestrian at Driveway

Risk Factors Assessment

Location	Primary Collision	Serious Injury/ Fatal crash?	30+ MPH?	Commercial Land Use?	Arterial?	At Driveway	Left or right turn lanes?	>3 Lanes?	TWLTL?	On-street parking?	Pedestrian generator present?
5th St (136 ft E of N Miller St)	Pedalcyclist strikes moving vehicle turning right		Y	Y	Y	Y	Y				Y
Chelan Ave (just North of Spokane St)	Vehicle entering traffic (EB) strikes pedalcyclist		Y	Y	Y	Y				Y	
Helper Dr at Maple St	Vehicle turning right (EB) hits pedestrian		Y			Y			Y		Y
Highland Dr (0.09 miles S of Peachey St)	Vehicle going straight (NB) hits pedalcyclist					Y				Y	
Lars Ln, 376 ft SE of Shady Ln	Vehicle backing hits pedestrian					Y				Y	
Miller St (at Taco Bell North entrance)	Vehicle turning right (SB) hits Pedalcyclist		Y	Y	Y	Y	Y	Y	Y		
Miller St at 4th St	Vehicle turning right (SB) hits Pedalcyclist		Y		Y	Y	Y		Y		Y
Miller St, 309 ft S of 7th St	Vehicle hits pedestrian (SB) - all other actions		Y	Y	Y	Y		Y	Y		Y
Miller St, at Albertson's driveway*	Vehicle turning left (SB) hits pedestrian		Y	Y	Y	Y	Y	Y			Y
Mission St (near McDonalds)	Pedalcyclist strikes moving vehicle turning left (WB)		Y	Y	Y	Y				Y	
Olympus Dr, 184 ft S of Rainier St	Vehicle backing hits pedestrian					Y				Y	
Wenatchee Ave (near Washington Trust Bank)	Pedalcyclist strikes moving vehicle entering traffic (EB)		Y	Y	Y	Y	Y	Y	Y		
Wenatchee Ave (near Wendy's/Starbucks)*	Vehicle entering traffic (WB) strikes pedalcyclist	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Wenatchee Ave, 0.15 miles SE of US-2 Bus W	Vehicle turning right (SB) hits pedestrian		Y	Y	Y	Y		Y		Y	Y
Wenatchee Ave, 111 ft NW of 7th St	Vehicle going straight (WB) hits pedestrian		Y	Y	Y	Y		Y	Y		Y
Wenatchee Ave, 270 ft NW of E 9th St	Vehicle turning right (NB) hits pedestrian		Y	Y	Y	Y		Y	Y		Y
Wenatchee Ave, near Circle K	Vehicle turning right (NB) hits pedestrian	Y	Y	Y	Y	Y		Y			Y

* Multiple Priority Level 2 - Hit Pedestrian Crashes at this location

City of Wenatchee

Priority Level 2 - Hit Fixed Object / Sideswipe

Risk Factors Assessment

Location	Primary Collision	Serious Injury/ Fatal crash?	30+ MPH?	Commercial Land Use?	Arterial?	Roadway on Curve	Fixed Objects Adjacent to Roadway?	Truck Route
Wenatchee Ave, 200 ft NW of 4th Street	Vehicle heading NB hit fixed object (street light pole or base)	Yes		Y	Y		Y	Y
Mission St, near Subway	Vehicle heading NB, Person fell from vehicle	Yes	Y	Y	Y		Y	Y
Mission St at Miller St	Same direction (NB) - one stopped - sideswipe	Yes	Y	Y	Y	Y	Y	Y
Chelan Ave, near Memorial Park	From same direction (SB) - both going straight - both moving - sideswipe	Yes	Y	Y	Y		Y	Y
Melody Ln., 75 ft W of Easy St	Vehicle Overturned (turning too fast- SB)	Yes		Y		Y		
Western Ave , 155 ft north of Maple St	Vehicle heading NB -Hit fixed object (utility pole, then fence)	Yes	Y		Y		Y	Y
Pearview Cir at Crawford Ave	Motorcycle (NB) hit parked vehicle	Yes						
Skyline Dr, 0.13 miles NW of Red Apple Rd*	From opposite direction (EB) - both going straight - sideswipe - then guardrial	Yes				Y	Y	
Walla Walla Ave, 0.1 miles E of N Miller St*	Motorcycle turning (NB) too fast hit curb	Yes		Y	Y	Y		Y

* Multiple Priority Level 2 - Hit Fixed Object / Sideswipe at this location

City of Wenatchee

Priority Level 2 - Rear End

Risk Factors Assessment

Location	Primary Collision	Serious Injury/ Fatal crash?	30+ MPH?	Pedestrian crosswalk?	Arterial?	Lack of Pedstrian Signs	X-ing distance > 50ft?	Pedestrian generator present?
Mission St at Peachey St*	Both going straight (NB) - both moving - rear end	Y	Y	Y	Y	Y	Y	Yes
Western Ave at 9th St	From same direction (SB) - both going straight - one stopped - rear end	Y	Y	Y	Y		Y	Yes
Miller at Montana St	From same direction (NB) - both going straight - one stopped - rear end	Y	Y	Y	Y	Y	Y	Yes

Appendix E

Ninth Street Corridor Analysis

PERTEET

123 OHME GARDEN ROAD, SUITE 8
WENATCHEE, WA 98801
800.615.9900

CORRIDOR STUDY

9th Street

Submitted to
City of Wenatchee

October 2020

perteet.com

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF TABLES

LIST OF FIGURES

EXECUTIVE SUMMARY

9th Street is a minor arterial in Wenatchee that terminates at N Western Avenue to the west and Walla Walla Avenue to the east. In between, 9th Street abuts Wenatchee Valley College and the Confluence Health Wenatchee Valley Hospital campus.

The City of Wenatchee (City) hired Perteet Inc. (Perteet) to evaluate the existing corridor configuration and performance of 9th Street between N Miller Street and the BNSF railroad tracks. The City's goal for this corridor study was to evaluate roadway cross section options to enhance both pedestrian and bicyclist safety and provide an efficient corridor for local business access and freight movements.

In general, 9th Street in the study area is a four-lane roadway with two travel lanes per direction. The total curb-to-curb roadway width varies throughout the corridor. West of N Mission Street, the roadway width is 44 feet, with all travel lanes widths at 11 feet. Between N Mission Street and N Wenatchee Avenue, the total width is 40 feet with 10-foot wide travel lanes. East of N Wenatchee Avenue, the roadway width is 46 feet with 11-foot wide inside lanes and 12-foot wide outside lanes. There are no exclusive left-turn lanes in the corridor; left-turn movements are made from shared lanes with through traffic at all intersections within the study limits.

Though all four existing signalized intersections perform at level of service A or B, there are crash patterns that could be improved by revisions to the corridor cross section and/or signalization.

We evaluated four different alternative configurations for the 9th Street corridor within our study limits:

A. Three-Lane, Permissive Left-Turn Phasing: Reduce the number of travel lanes from four to three, with the center lane operating as a left-turn lane at intersections and a two-way left-turn lane (TWLTL) at select segment locations. Maintain existing curb lines and sidewalks. Use available pavement from the vehicle lane reduction to install directional bike lanes on either side of 9th Street. Maintain permissive left-turn phasing for the 9th Street left-turn movements.
B. Three-Lane, Protected-Permissive Left-Turn Phasing: Same lane configuration as Alternative A with protected-permissive left-turn phasing instead of permissive left-turn phasing for 9th Street left-turn movements.
C. Four-Lane, Protected-Permissive Left-Turn Phasing: Maintain existing lane configurations in the corridor. Maintain existing curb lines and sidewalks. Modify signal phasing to provide protected-permissive left-turn phasing for the 9th Street left-turn movements at N Chelan Avenue and at N Miller Street (other locations must have permissive phasing to avoid a left-turn trap[1]).
D. Four-Lane, Split Phasing: Same lane configuration as Alternative C with split phasing for the eastbound and westbound 9th Street approaches.

Our Preferred Alternative combines elements of Alternative A and B through the corridor. This combination will result in a consistent roadway cross-section through the study limits, with varying left-turn treatments at intersections:

- Protected-permissive left-turn phasing for 9th Street traffic at N Miller Street and at N Wenatchee Avenue and

[1] A left-turn trap (or "yellow trap") occurs when one left-turn lane with permissive turns changes to a yellow indication while the opposing through traffic remains under a green indication. In this situation, the left-turning vehicle may assume that the opposing direction has also received a yellow indication and proceed through the intersection, resulting in a crash.

- Permissive left-turn phasing for 9th Street traffic at N Chelan Avenue and at N Mission Street.

The Preferred Alternative necessitates signal head changes, mast-arm pole replacements, and revised intersection detection.

To fit within the existing curb lines, the Preferred Alternative will have varying lane widths through the corridor, which are shown in Table 1.

Table 1. Typical lane widths by corridor segment.

Segment	Through Lane Width (feet)	Center Lane Width (feet)	Bike Lane Width (feet)	Total Width (feet)
N Miller Street to N Emerson Avenue	11	11	5.5	44
N Emerson Avenue to N Chelan Avenue	11	11	5.5	44
N Chelan Avenue to N Mission Street	11	11	5.5	44
N Mission Street to N Wenatchee Avenue	10	10	5	40
N Wenatchee Avenue to BNSF Railroad	11	11	6.5	46

In addition to the features noted above, we recommend the following design elements to improve safety and corridor operations:

- Supplemental signal heads for westbound movements and retroreflective backplates on all vehicle signal heads for enhanced visibility
- Leading pedestrian intervals at N Chelan Avenue and at N Mission Street
- Bicycle and intersection signing

We developed a planning-level opinion of cost for the Preferred Alternative assuming the following major construction elements:

- Removal of existing channelization
- Installation of new channelization
- Installation of new signing
- Replacement of vehicle detection systems
- Replacement of select signal mast arms and poles
- Relocation of signal heads
- Installation of new left-turn signal heads at N Miller Street and at N Wenatchee Avenue, which necessitates mast-arm pole/foundation replacements. This work would trigger intersection-wide ADA pushbutton upgrades and sidewalk/curb ramp reconstruction.
- Installation of westbound supplemental signal heads on pole shafts

We estimate the completed Preferred Alternative with all recommended elements will cost $859,000 (2023 $). This cost includes construction, design and construction engineering, mobilization, traffic control, survey, environmental permits and mitigation, 20% contingency, and 5% annual inflation. Project costs could be reduced if proposed signal equipment has already been procured, construction occurs prior to 2023, or optional project elements are delayed or removed from the scope.

The intersection upgrades at 9th Street and N Miller Street and at 9th Street and N Wenatchee Avenue account for over half of the anticipated project cost. Removing the protected-permissive signal phases for westbound and eastbound turn movements at those intersections would reduce the overall project cost to $381,000 (2023 $).

The Preferred Alternative was presented to City of Wenatchee's Council in July 2020. Following that, the Preferred Alternative was shared with the public via an online outreach tool called a "storymap." This outreach effort illustrated the proposed project channelization and allowed for users to provide comments on the proposed elements. The outreach effort and all comments received are included in Appendix H.

1.0 INTRODUCTION

9th Street is a minor arterial in Wenatchee that terminates at N Western Avenue to the west and Walla Walla Avenue to the east. In between, 9th Street abuts Wenatchee Valley College and the Confluence Health Wenatchee Valley Hospital campus.

The City of Wenatchee (City) hired Perteet Inc. (Perteet) to evaluate the existing corridor configuration and performance of 9th Street between N Miller Street and the BNSF railroad tracks. The City's intent for this corridor study was to evaluate roadway cross section options to enhance both pedestrian and bicyclist safety and provide an efficient corridor for local business access and freight movements.

1.1 Study Area

The study limits span 9th Street between N Miller Street and the BNSF mainline railroad tracks, which are west of N Piere Street. See Figure 1-1. The total length of the study area is approximately 0.35 miles.

We evaluated traffic operations at the four existing traffic signals within the study area:

1. N Miller Street at 9th Street
2. N Chelan Avenue (SR 285 southbound couplet) at 9th Street
3. N Mission Street (SR 285 northbound couplet) at 9th Street
4. N Wenatchee Avenue at 9th Street

Additionally, we reviewed the unsignalized intersection of 9th Street at N Emerson Avenue as part of our safety analysis.

1.2 Existing Conditions

9th Street has one typical cross section through the study area, with deviations from that section at either end of the study area limits.

1.2.1 Existing Cross Section

In general, 9th Street is a four-lane roadway with two travel lanes per direction. The total curb-to-curb roadway width varies throughout the corridor. West of N Mission Street, the roadway width is 44 feet, with all travel lanes widths at 11 feet. Between N Mission Street and N Wenatchee Avenue, the total width is 40 feet with 10-foot wide travel lanes. East of N Wenatchee Avenue, the roadway width is 46 feet with 11-foot wide inside lanes and 12-foot wide outside lanes. This four-lane section begins approximately 175 feet west of N Chelan Avenue and ends approximately 170 feet east of N Wenatchee Avenue. Between these limits, 9th Street does not have any dedicated turn lanes at intersections or driveways; the four-lane section is preserved without any interruptions.

At the intersection with N Miller Street, 9th Street has exclusive right-turn, through, and left-turn approach lanes on the west side of the intersection. A large island separates the right-turn lane from the rest of the approach lanes. On the departure side of the intersection for eastbound traffic, there is a single travel lane, though pavement width for that lane measures at 20 feet. Westbound movements at the intersection are via two travel lanes, consistent with the other four-lane sections of the corridor, and those two lanes merge into one westbound lane west of N Miller Street. See Figure 1-2.

Figure 1-1. Study area.

Figure 1-2. Lane configurations on 9th Street at N Miller Street and at N Emerson Avenue.

Figure 1-2 also shows the intersection of 9th Street at N Emerson Avenue. At that location, 9th Street has two travel lanes in the westbound direction and the single wide eastbound lane. A parking lane on the south side of 9th Street starts approximately 60 feet east of N Emerson Avenue. The parking lane is marked for approximately 105 feet.

Between N Wenatchee Avenue and the BNSF railroad, 9th Street transitions from a four-lane to a two-lane roadway, as shown in Figure 1-3.

Figure 1-3. Lane configurations on 9th Street near BNSF railroad.

Throughout the study area there is continuous sidewalk on both sides of 9th Street, with the exception of the easternmost 280 feet on the south side of 9th Street near the railroad, where sidewalk is not in place today. There is also no existing pedestrian crossing on the south side of 9th Street across the BNSF railroad. See Figure 1-4. Note that the City is developing a design to revise the railroad crossing with pedestrian facilities.

Figure 1-4. BNSF railroad crossing (facing west).

There are no existing bike facilities along 9th Street in the study limits. The City's GIS notes a bike lane on N Emerson Avenue north and south of 9th Street. However, this bicycle facility is not channelized along N Emerson, though it is signed as a bike route.

1.2.2 Access and Additional Modal Networks

Figures 1-5 and 1-6 display the study area and the driveways, transit stops, and freight routes in the vicinity.

Transit through the area is operated by Link Transit, which runs northbound-southbound routes on N Miller Street, N Chelan Avenue, N Mission Street, and N Wenatchee Avenue across 9th Street. Additionally, Route 7 runs eastbound on 9th Street from the N Mission Street to the west study limits with one stop on the north side of 9th Street west of N Chelan Avenue.

We assume emergency vehicles use 9th Street and all of the cross streets within our study limits except for N Emerson Avenue as standard routes, as all of those roads are classified as arterials. Outside of an emergency situation on N Emerson Avenue, we assume this street is not used as a regular emergency route due to the parking on either side of the street and the two-lane configuration.

Figure 1-5. Driveway access points and bus stops.

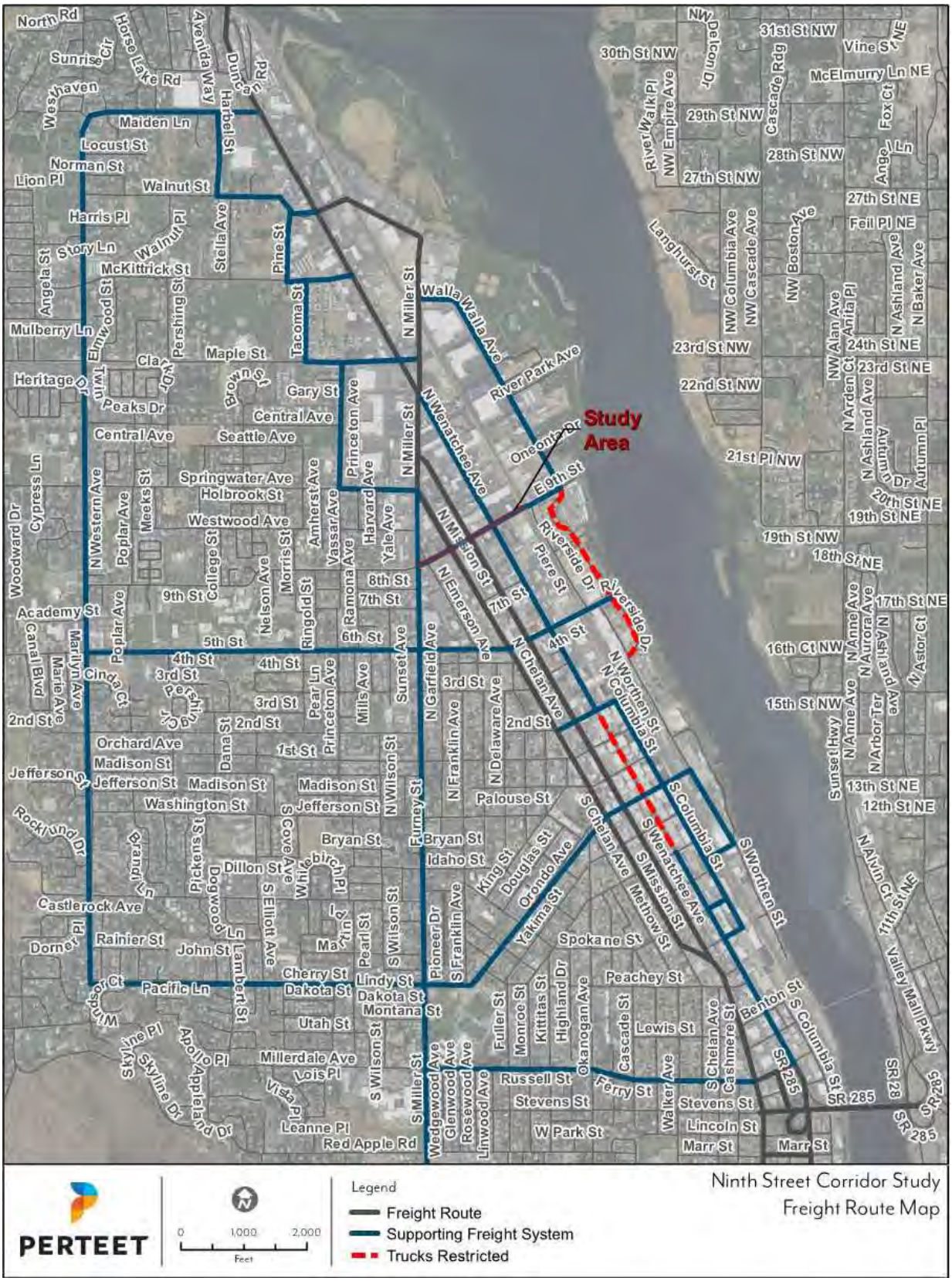


Figure 1-6. Freight route network.

1.2.3 Grades

Roadway grades within the project limits are shallow, nearly level. 9th Street throughout the study area slopes to the east at approximately 2% grade. The five cross streets all have grades less than 2%, generally sloping to the south across 9th Street.

1.2.4 Speed Data

We collected travel speed data on 9th Street between N Emerson Avenue and N Chelan Avenue on February 20, 2020. Weather conditions on February 20 were clear and dry. Key metrics from that data are shown in Table 1-1. The full data is provided in Appendix E.

Table 1-1. Existing speed data summary.

Metric	Eastbound (mph)	Westbound (mph)
Average travel speed	22	24
85th percentile travel speed	27	28
95th percentile travel speed	30	32

1.2.5 Traffic Signal Details

The existing four traffic signals have signal heads mounted on mast arms. 9th Street left-turn movements have permissive signal indications at all intersections within the study area. Cross-street left-turn movements have protected-permissive phasing at N Miller Street and protected phasing at N Wenatchee Avenue. Cross-street left-turn movements at N Chelan Avenue and at N Mission Street are permissive, as they are concurrent with pedestrian walk indications on either side.

The N Chelan Avenue and N Mission Street corridors are both coordinated signal systems through the Wenatchee core. 9th Street is the north boundary intersection for the coordinated systems.

The eastbound right-turn movement at N Chelan Avenue is signed with a "NO TURN ON RED" sign, which was installed in the summer of 2019.

Pedestrian pushbuttons are in place for all signalized crosswalks. Loop detection for vehicles is installed at the intersections of 9th Street at N Miller Street, at N Chelan Avenue, and at N Mission Street. Video detection is in place for all approaches at the intersection of 9th Street and N Wenatchee Avenue.

1.3 Study Alternatives

We evaluated four different alternative configurations for the 9th Street corridor within our study limits:

A. Three-Lane, Permissive Left-Turn Phasing: Reduce the number of travel lanes from four to three, with the center lane operating as a left-turn lane at intersections and a two-way left-turn lane (TWLTL) at select segment locations. Maintain existing curb lines and sidewalks. Use available pavement from the vehicle lane reduction to install directional bike lanes on either side of 9th Street. Maintain permissive left-turn phasing for the 9th Street left-turn movements.

B. Three-Lane, Protected-Permissive Left-Turn Phasing: Same lane configuration as Alternative A with protected-permissive left-turn phasing instead of permissive left-turn phasing for 9th Street left-turn movements.
C. Four-Lane, Protected-Permissive Left-Turn Phasing: Maintain existing lane configurations in the corridor. Maintain existing curb lines and sidewalks. Modify signal phasing to provide protected-permissive left-turn phasing for the 9th Street left-turn movements at N Chelan Avenue and at N Miller Street (other locations must have permissive phasing to avoid a left-turn trap[2]).
D. Four-Lane, Split Phasing: Same lane configuration as Alternative C with split phasing for the eastbound and westbound 9th Street approaches.

Under each alternative, the road retains the transition to two lanes prior to the BNSF railroad. Alternatives A and B include a revision to the lane configuration on 9th Street west of N Miller Street. Currently, the westbound outside departure lane merges into the inside through lane. Under Alternatives A and B, the outside lane merge is not required because of the single westbound through lane at the intersection.

1.4 Methodology Overview

Perteet analyzed multiple aspects of each alternative. The following paragraphs summarize the processes that we used for the study. The applicable chapters in this report expand on the analysis that we performed.

1.4.1 Safety Analysis

We reviewed crash records compiled by Washington State Department of Transportation (WSDOT) for the project area. For crashes along 9th Street at N Miller Street, N Emerson Street, and N Wenatchee Avenue, we worked with data spanning January 2015 through November 2019. At the intersections of 9th Street at N Chelan Avenue and at N Mission Street, we relied on data from January 2014 through December 2018.We used these records, in combination with traffic volumes data, to calculate historical crash rates for each of the five intersections within our project area in terms of crashes per million entering vehicles. That data helped us to identify which intersections had higher and lower performance records.

Additionally, we studied the datasets to understand and identify crash patterns at each site. Then, we evaluated potential countermeasures to reduce the risk of future crashes and researched data on the safety enhancements associated with our design alternatives.

1.4.2 Traffic Operations Analysis

We collected traffic volume data at our four signalized study intersections in February 2020 in the AM and PM peak hours. We used that data to model intersection operations, including control delays, levels of service, and queue lengths under existing conditions. We used the procedures in the *Highway Capacity Manual 6* for our analyses.

We then tested the traffic operations of our four design alternatives using the same model. This analysis revealed the operational effects of our candidate lane and signal phasing configurations for 2020 traffic demands. To

[2] A left-turn trap (or "yellow trap") occurs when one left-turn lane with permissive turns changes to a yellow indication while the opposing through traffic remains under a green indication. In this situation, the left-turning vehicle may assume that the opposing direction has also received a yellow indication and proceed through the intersection, resulting in a crash.

understand if future traffic growth would impact the recommendations, we evaluated operations in 2040 as well using an estimated traffic growth rate for the study area.

We also examined the bicycle and pedestrian facilities in the corridor using a concept called level of traffic stress, which provides insight into how comfortable the facilities are for different users.

1.4.3 Preferred-Alternative Concept Development

Using the safety and traffic operations analysis results, Perteet collaborated with City staff to develop the preferred concept detailed in this report. After that discussion, we produced a planning-level concept design for the Preferred Alternative. Our design layout is based off aerial imagery and GIS edge-of-pavement data; the study area was not surveyed for this concept-development effort.

Appendix A shows our preferred concept design.

1.4.4 Preferred-Alternative Opinion of Cost Development

We developed a planning-level opinion of cost for the Preferred Alternative based on the preliminary layout we produced.

The opinion of cost includes construction costs for roadway delineation, signing, and traffic signal modification as well as environmental, design engineering, and construction management costs. Perteet applied a 20% contingency the opinion of cost to reflect uncertainties in the scope of the projects. Additionally, we used a 5% annual inflation rate to reflect costs in a potential 2023 construction start year.

Appendix B shows our planning-level opinion of cost for the Preferred Alternative.

2.0 SAFETY ANALYSIS

Perteet reviewed crash records compiled by WSDOT for the project area spanning January 2015 through December 2019. We used these records, in combination with traffic volumes data, to calculate historical crash rates for each of the five intersections within our project area in terms of crashes per million entering vehicles. That data helped us to identify which intersections had higher and lower performance records.

Additionally, we studied the datasets to understand and identify crash patterns at each site. Then, we evaluated potential countermeasures to reduce the risk of future crashes and researched data on the safety enhancements associated with our design alternatives.

2.1 Existing Crash Data Review

Table 2-1 summarizes our evaluations of the existing intersection crash data in terms of number of overall crashes, number of injury and fatal crashes, overall crash rate (presented in terms of crashes per million entering vehicles at the intersection), and the predominant crash pattern at each location.

Table 2-1. Existing intersection crash data summary.

Intersection	Number of Crashes	Number of Injury Crashes / Total Injuries [1]	Overall Crash Rate [2]	Significant Crash-type Pattern
N Miller Street	25	8 / 12	0.63	Left-turn
N Emerson Avenue	9	2 / 3	1.41	Angle
N Chelan Avenue	19	9 / 18	0.49	Angle
N Mission Street	26	6 / 9	0.62	Angle
N Wenatchee Avenue	22	8 / 12	0.67	Angle

Notes: [1] Includes "suspected" and "possible" injury classifications.
[2] Per million entering vehicles.

Additional details on the data in Table 2-1 are provided in the following sections.

2.1.1 Intersection Number of Crashes

The number of crashes listed for each intersection includes all reported crash events at the intersection that were reported to police or sheriffs. All the crashes listed within the crash history and within the study area involved at least one vehicle; there were no pedestrian-bicycle or bicycle-bicycle crashes in the records.

Each record lists the maximum injury documented, ranging from no injury to fatality. There were no fatalities within the study limits during the time periods we studied.

2.1.2 Intersection Crash Rate

The crash rate provides the crash frequency at a location, normalized based on traffic volumes. To perform this calculation, we used the following data at each intersection:

- Number of crashes in the dataset
- Duration of the dataset (in years)

- Annual traffic volumes, all intersection approaches combined

We estimated annual traffic volumes by totaling the counted intersection PM peak hour volumes, dividing by 8.9%, and then multiplying by 365. We used an 8.9% conversion factor because the daily traffic counts that we collected had approximately 8.9% of the total daily traffic occur during the PM peak hour. (See Appendix E.)

As Table 2-1 shows, the maximum crash rate we found was at the intersection of N Emerson Avenue and 9th Street; this rate was more than double the next highest rate at N Wenatchee Avenue and 9th Street. The couplet intersections at N Chelan Avenue and at N Mission Street had the lowest crash rates of the study intersections.

2.1.3 Intersection Crash Patterns

The crash patterns noted in Table 2-1 stood out to us during our review as crash types that deserved further analysis (see Section 2.2). Additional crash types were observed at each intersection, however, they were not as frequent as the type that is noted in the table. See Appendix C for details on all crash types at each location.

N Miller Street and 9th Street

The intersection of N Miller Street and 9th Street had the highest number of left-turn collisions (12) in the corridor. The majority (8) of the left-turn collisions occurred between vehicles traveling in opposite directions on 9th Street with one turning left. 9th Street does not have a protected left-turn movement on either approach. The eastbound approach has a dedicated left-turn lane, while the westbound approach is a shared through and left-turn lane. Of the 12 collisions, "failure to grant right of way" was a contributing factor in 8 of them.

N Emerson Avenue and 9th Street

The intersection of N Emerson Avenue and 9th Street had 4 crashes in 2019 and had the fourth-most angle collisions (6) in the corridor over the duration of the dataset. All the angle collisions involved northbound vehicles on N Emerson Avenue crossing the intersection and the majority (5) collided with westbound vehicles on 9th Street. In order to cross the intersection, northbound vehicles must cross three lanes of travel. The main contributing circumstances in the angle collisions were inattention and failure to grant right of way.

N Chelan Avenue and 9th Street

The intersection of N Chelan Avenue and 9th Street had 7 crashes in both 2018 and 2019 and the third-most angle collisions (7) in the corridor. The majority (5) of the angle collisions had "disregard stop and go light" as a contributing circumstance. These crashes did not have an apparent direction or time-of-day pattern. We also found that there were 6 crash records involving drivers traveling in the same direction, either in a sideswipe or rear-end event, however, only two of these crashes involved vehicles on 9th Street.

There were two separate crashes between an eastbound right-turning vehicle and a pedestrian in the south crosswalk at the N Chelan Avenue and 9th Street intersection in 2019.

N Mission Street and 9th Street

The intersection of N Mission St and 9th Street had 8 crashes in 2019, 6 crashes in both 2016 and 2017, and the most angle collisions (17) in the corridor in the duration of the data set. The majority (12) of the angle collisions involved westbound vehicles being struck by northbound vehicles, though there was not a clear time-of-day pattern among these records. Also, a majority (8) of the angle collisions had "disregard stop and go light" as a contributing circumstance in addition to four records listing "inattention."

There were two separate crashes between a northbound left-turning vehicle and a pedestrian in the west crosswalk at the N Mission Street and 9th Street intersection between 2016 and 2017.

N Wenatchee Avenue and 9th Street

The intersection of N Wenatchee Avenue and 9th Street had the second-most angle collisions (8) in the corridor. The majority (7) of the angle collisions had either "disregard stop and go light" or "inattention" as a contributing circumstance, the other angle collision had "none" listed. The majority involved a westbound vehicle, and a majority of those were within a typical potential sunset timeframe.

There were two separate crashes involving a pedestrian at this intersection in 2019. One crash involved an eastbound left-turn movement with a pedestrian in the north crosswalk. The other involved a southbound right-turn movement and a pedestrian in the west crosswalk.

2.1.4 Segment Crashes

The majority of the crashes in the study limits occurred at intersections or were intersection-related. However, there were some segment crashes that we found. These crashes are summarized in Table 2-2.

Table 2-2. Existing segment crash data summary.

Segment [1]	Number of Crashes	Number of Injury Crashes / Total Injuries [2]	Significant Crash-type Pattern
N Miller Street to N Emerson Avenue	0	0 / 0	n/a
N Emerson Avenue to N Chelan Avenue	0	0 / 0	n/a
N Chelan Avenue to N Mission Street	4	0 / 0	n/a
N Mission Street to N Wenatchee Avenue	0	0 / 0	n/a
N Wenatchee Avenue to BNSF Railroad	2	0 / 0	n/a

Notes: [1] Based on records between January 2015 and December 2019.
[2] Includes "suspected" and "possible" injury classifications.

We did not identify any significant crash patterns on any of the segments. Most of the project segments did not have any crash records in the dataset we reviewed. Across all segments, there were zero injury or fatal crashes.

2.2 Countermeasures and Anticipated Safety Performance

2.2.1 Review of Countermeasures

We identified potential countermeasure strategies to address the crash patterns detailed in Table 2-1 and Section 2.1.3. These strategies are listed per intersection in Table 2-3.

See Section 4.2 for our recommended countermeasures with the Preferred Alternative concept.

Table 2-3. Potential countermeasures by location.

Intersection	Countermeasures
N Miller Street	• Channelize east intersection leg with a left-turn only lane. • Add left-turn signal phasing.
N Emerson Avenue	• Vegetation trimming/clearing to improve sight distance. • Parking zone removal/enforcement to improve sight distance. • Install a median on 9th Street at N Emerson Avenue to prohibit the northbound through movement and eastbound left-turn movement. (The intersection would operate as right-in/right-out.) (This action would have significant access implications.)
N Chelan Avenue	• Add supplemental signal heads to mitigate glare issues. (Most critical for westbound signal heads.) • Retroreflective backing to increase visibility of signal heads. • Leading pedestrian intervals or protected left-turn signalization.
N Mission Street	• Add supplemental signal heads to mitigate glare issues. (Most critical for westbound signal heads.) • Retroreflective backing to increase visibility of signal heads • Leading pedestrian intervals or protected left-turn signalization.
N Wenatchee Avenue	• Add supplemental signal heads to mitigate glare issues. (Most critical for westbound signal heads.) • Retroreflective backing to increase visibility of signal heads. • Leading pedestrian intervals or protected left-turn signalization.

2.2.2 Safety Performance for Design Alternatives

Each of the proposed roadway design alternatives would affect safety performance in the corridor. To generally quantify the impacts associated with each alternative, we used available crash reduction factor data available on the Crash Modification Factor Clearinghouse online. Data from that site is reputable and used by publications such as the *Highway Safety Manual*.

Crash reduction factors are expressed as a percentage of change from a baseline condition for a proposed roadway modification. Modifications can include geometric, control, traffic volume, or other types of changes. In this case, we reviewed crash reduction factors for the lane configurations and left-turn signal phasing components of our four corridor alternatives; we did not assess factors related to the countermeasures we documented in Table 2-3. Our crash reduction factor research is summarized in Table 2-4. The online clearinghouse did not contain any results for crash reduction factors associated with installing protected-permissive phasing on the inside lanes of a four-lane roadway section.

Table 2-4. Crash reduction factors for each corridor alternative.

Alternative	Crash Reduction Factor
A. Three-Lane, Permissive Left-Turn Phasing	37-47%
B. Three-Lane, Protected-Permissive Left-Turn Phasing	41-50%
C. Four-Lane, Protected-Permissive Left-Turn Phasing	*No studies available*
D. Four-Lane, Split Phasing	39-56%

3.0 TRAFFIC ANALYSIS

The goals for our traffic analysis were to understand how well the existing intersections on 9th Street operate and to quantify the impacts of the proposed alternatives on each study intersection in 2020 and 2040.

3.1 Performance Metrics

We focused on automobile, pedestrian, and bicycle metrics during our analysis. These are described below.

3.1.1 Automobile Metrics

Control Delay and Level of Service

Level of service (LOS) is the primary way to define operations for intersections. The computational methods for calculating LOS are included in the *Highway Capacity Manual* (HCM), published by the Transportation Research Board. The HCM defines LOS for various intersection types. For this corridor, we relied only on signalized intersection LOS.

Perteet evaluated the study intersections through a traffic model developed in Synchro 10, which applies HCM methodology for intersection operations. In the HCM, level of service is a function of average control delay experienced by vehicles at the intersection. Table 3-1 summarizes the LOS criteria at traffic signals.

Table 3-1. Signalized intersection level of service criteria.

Level of Service	Average Control Delay (seconds/vehicle)
A	≤ 10
B	10-20
C	20-35
D	35-55
E	55-80
F	> 80

The City of Wenatchee performance metric target for intersection level of service is established in Table 2-2 of the Chelan-Douglas Transportation Council (CDTC) Regional Transportation Plan, *Transportation 2040*, which is LOS E or better for urban corridors such as 9th Street.

Queue Length

The Synchro model we developed returns queue results per lane group on each approach. Queue lengths are also calculated based on the HCM procedures, and the outputs from the HCM are reported in terms of number of vehicles per lane. We translated this data using a conversion factor of 25 feet per average vehicle, which accounts for the separation between queued vehicles in addition to vehicle lengths.

We focused on 95th percentile queue lengths when we evaluated turn lane lengths. These are near-maximum queues that we anticipate will form based on the traffic volumes and signal phasing, and this is the standard metric for turn lane sizing.

Unless otherwise noted, the calculations in this section were done according to the HCM 6 methodology. Alternative C cannot be processed by the HCM 6 because it includes a protected left-turn phase from a shared

lane. For Alternative C control delay and LOS calculations, we used HCM 2000 to evaluate this alternative. For Alternative C queue calculations, we used Synchro's queue-length methodology, as the HCM 2000 reports from Synchro do not report queueing data.

3.1.2 Non-Motorized Metrics

We used the bicycle level of traffic stress (BLTS) evaluation to assess the performance of the bicycle facilities through our 9th Street study area. BLTS evaluate bicycle facilities and projects how comfortable each class of user would be on the facility. This scale divides bicycle facilities into four groups based on how comfortable a bicyclist would be using one. BLTS 1 facilities are the least stressful and range from low-speed, low-volume residential streets to separated shared-used trails, whereas BLTS 4 facilities, including multi-lane roadways with no bike lanes, are the most stressful. Other variables, such as adjacent vehicle travel speed, number of vehicle lanes, and bicycle lane width, all influence a facility's BLTS score.

The City does not have an adopted bicycle metric performance targets for 9th Street or other arterials at this time.

We used the pedestrian level of traffic stress (PLTS) evaluation to assess the performance of the pedestrian facilities through our 9th Street study area. This metric is a companion metric to BLTS, and many of the variables that impact one affect the other. Similar to BLTS, PLTS ranges from PLTS 1 to PLTS 4, with PLTS 1 facilities having the least-stressful experience and the PLTS 4 being most stressful.

The City does not have an adopted pedestrian metric performance targets for 9th Street or other arterials at this time.

3.2 Automobile Analysis

Perteet used the signal timing plans that the City provided for all four study intersections. We retained these signal timings in the existing conditions and Alternative A analyses. The remaining analysis required phasing changes for left-turn movements, so we modified the timing plans. At the intersection of 9th Street at N Miller Street and at N Wenatchee Avenue, because the cross streets are not in a coordinated signal, we added the left-turn phases for 9th Street to increase the intersection cycle lengths. However, at the coordinated signals at N Chelan Avenue and at N Mission Street, we doubled the signal cycle length and SR 285 split length to remain at a regular multiple with respect to the rest of the coordinated signals.

3.2.1 Control Delay and LOS

Tables 3-2 and 3-3 provide the control delay and LOS in tabular form for each study intersection.

Table 3-2. Study intersection delays (seconds per vehicle) and LOS in the AM peak hour.

Intersection	Existing		Alt. A		Alt. B		Alt. C		Alt. D	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
N Miller Street	11.8	B	12.9	B	17.2	B	11.8	B	21.6	C
N Chelan Avenue	12.4	B	13.3	B	25.8	C	29.2[1]	C	35.9	D
N Mission Street	8.9	A	8.9	A	15.7	B	19.4[1]	B	15.5	B
N Wenatchee Avenue	9.9	A	10.1	B	1.4	B	9.9	A	16.5	B

Notes: [1] Calculated using HCM 2000 methodology.

Table 3-3. Study intersection performance in the PM peak hour.

Intersection	Existing		Alt. A		Alt. B		Alt. C		Alt. D	
	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
N Miller Street	13.0	B	13.9	B	17.9	B	13.0	B	21.7	C
N Chelan Avenue	12.8	B	13.9	B	26.6	C	30.1[1]	C	42.1	D
N Mission Street	12.6	B	15.4	B	27.3	C	20.8[1]	C	27.8	C
N Wenatchee Avenue	12.3	B	13.5	B	17.6	B	12.3	B	24.2	C

Notes: [1] Calculated using HCM 2000 methodology.

All four intersections operate with LOS A or LOS B performance in the AM and PM peak hours under the current corridor configuration. Of the design alternatives, Alternative A most closely matches that performance, with only N Wenatchee Avenue degrading to LOS B in the AM peak hour. The remaining alternatives result in at least one LOS C or lower grade during either peak hour at certain intersections.

All alternatives satisfy the Wenatchee level of service requirements of LOS E or better. The Synchro outputs are provided in Appendix G.

3.2.2 Queues

Tables 3-4 and 3-5 present the queue lengths for each movement. Highlighted cells indicate which movements/alternatives would cause backups into adjacent intersections.

Table 3-4. Study intersection 95th percentile queue lengths (feet per lane) in the AM peak hour.

Intersection	Existing	Alt. A	Alt. B	Alt. C	Alt. D
N Miller Street					
Eastbound left	18	20	20	18	35
Eastbound through	65	63	85	65	143
Westbound left	55	13	13	55	118
Westbound through	48	100	140	48	103
N Chelan Avenue					
Eastbound through	95	180	430	104[1]	253
Westbound left	83	48	125	207[1]	350
Westbound through	83	110	238	207[1]	303
N Mission Street					
Eastbound left	55	18	38	42[1]	93
Eastbound through	45	63	120	42[1]	80
Westbound through	53	100	218	77[1]	88
N Wenatchee Avenue					
Eastbound left	18	5	8	18	50
Eastbound through	15	28	40	15	45
Westbound left	13	5	5	13	35
Westbound through	10	18	28	10	33

Notes: [1] Calculated using Synchro's 95th percentile queue calculation methodology.

Table 3-5. Study intersection 95th percentile queue lengths (feet per lane) in the PM peak hour.

Intersection	Existing	Alt. A	Alt. B	Alt. C	Alt. D
N Miller Street					
Eastbound left	10	13	13	10	23
Eastbound through	35	35	50	35	90
Westbound left	85	43	48	85	175
Westbound through	75	133	178	75	150
N Chelan Avenue					
Eastbound through	90	190	453	91[1]	240
Westbound left	103	55	120	172[1]	473
Westbound through	95	150	270	172[1]	393
N Mission Street					
Eastbound left	68	38	78	161[1]	205
Eastbound through	65	58	113	161[1]	180
Westbound through	143	260	568	208[1]	278
N Wenatchee Avenue					
Eastbound left	38	18	18	38	110
Eastbound through	33	63	100	33	95
Westbound left	50	28	30	50	140
Westbound through	45	80	120	45	123

Notes: [1] Calculated using Synchro's 95th percentile queue calculation methodology.

Note that the values under the four-lane roadway sections in Tables 3-4 and 3-5 show the inside-lane queue lengths under the "left" rows and the outside-lane queue lengths under the "through" rows where the intersection street supports two-way traffic.

Queue lengths are generally minimized in the existing conditions compared to the alternatives, since the existing configuration provides four travel lanes with shorter cycle lengths. Alternative A, which retains the existing cycle lengths, generally has shorter left-turn queue lengths than the existing condition because movements are isolated into dedicated turn lanes.

The shortest segment between intersections in the study limits is between N Miller Street and N Emerson Avenue. The distance between these intersections is approximately 70 feet. The westbound through-movement queue lengths at N Miller Street under all alternatives exceed the available storage space between intersections, so traffic will be required to keep queue east of N Emerson Avenue. Under Alternatives A and B, the 95th percentile westbound left-turn queue length fits within the available storage space without spilling into N Emerson Avenue.

The only other movements that have 95th percentile queue lengths that exceed available storage space between intersections are the westbound movements at N Chelan Avenue and at N Wenatchee Avenue. The distance between N Chelan Avenue and N Mission Street is approximately 260 feet. Under Alternative B, the PM peak hour westbound through movement here would have a 95th percentile queue length of 270 feet. And under Alternative D, the queue lengths in both westbound lanes would exceed 300 feet in the AM peak hour and 390 feet in the PM peak hour. The westbound through movement between N Mission Street and N Wenatchee Avenue exceeds available storage space only in the Alternative B PM peak hour analysis.

All other lanes and movements have sufficient queue storage space without reaching adjacent intersections based on 2020 traffic demands.

2040 queueing for Preferred Alternative

While Tables 3-2 and 3-3 depict that Alternative A and B (which combine to form the Preferred Alternative; see Chapter 4) generally provide sufficiently short queue lengths in 2020, the proposed action to reduce the number of through travel lanes could result in different operations under future traffic conditions. Based on other work within the region, we assume that traffic volumes will generally grow at a rate of 1.5% per year.

The analysis of 2040 conditions showed that signal timing modifications will be required with the Preferred Alternative to limit queuing on 9th Street between intersections. Table 3-6 presents the 2040 queues for the Preferred Alternative in each peak hour under two signal timing schemes: existing and modified. As with the prior tables, values exceeding available storage length are highlighted.

Table 3-6. Study intersection 95th percentile 2040 Preferred Alternative queue lengths (feet per lane).

Intersection	2040 AM Ex. Timings	2040 PM Ex. Timings	2040 AM Mod. Timings	2040 PM Mod. Timings
N Miller Street				
Eastbound left	33	20	33	20
Eastbound through	143	83	143	83
Westbound left	23	75	23	75
Westbound through	228	288	228	288
N Chelan Avenue				
Eastbound through	233	248	188	175
Westbound left	80	93	88	88
Westbound through	133	168	215	258
N Mission Street				
Eastbound left	20	63	13	55
Eastbound through	75	55	43	95
Westbound through	130	333	60	258
N Wenatchee Avenue				
Eastbound left	10	30	10	30
Eastbound through	43	108	43	108
Westbound left	8	50	8	50
Westbound through	28	138	28	138

The modified signal timing scheme removes the 9th Street intersections at N Chelan Avenue and at N Mission Street from coordination. This allows more time to go to the 9th Street movements, which limits queues on the short blocks. Level of service for each intersection still meets standards under this modified signal timing scheme. (Note that the removal of 9th Street from the N Chelan Avenue coordination is optional; queues will not exceed available storage space.)

This modified signal timing plan does not need to implemented immediately. We recommend the City monitor queueing and traffic volume growth over time and implement the timing change only when required.

3.3 Non-Motorized Analysis

Table 3-7 documents the BLTS and PLTS for each alternative for the overall corridor, with one excluded area: the currently missing sidewalk zone on the south side of 9th Street west of the BNSF railroad. Without sidewalk, this zone automatically rates as PLTS 4 under all scenarios. We assume that corridor users are familiar with this missing sidewalk segment and route their trips to the north side of 9th Street if it is necessary to cross the railroad tracks. As noted previously, a separate City project will install sidewalks in this missing zone.

Table 3-7. Non-motorized level of traffic stress corridor evaluations.

Alternative	BLTS	PLTS
Existing	3	4
A. Three-Lane, Permissive Left-Turn Phasing	2	2
B. Three-Lane, Protected-Permissive Left-Turn Phasing	2	2
C. Four-Lane, Protected-Permissive Left-Turn Phasing	3	4
D. Four-Lane, Split Phasing	3	4

The BLTS score was primarily based on the lane geometrics. The signal phasing alternatives do not impact the BLTS since it is not considered a factor in the development of the BLTS score. The primary difference, which resulted in the decrease of stress to a BLTS 2, was due to the presence of a bike lane in Alternatives A and B.

The existing PLTS was rated as a PLTS 4 due to the lack of any buffer space between moving traffic and pedestrians on a sidewalk. Once a bike lane or striped shoulder is added, the pedestrian stress level is reduced to PLTS 2. The phasing at the signals under the different alternatives does not impact these results. Though signal elements can have an impact on PTLS, in this case the section parameters dictate the rating.

4.0 ALTERNATIVE DESIGNS

4.1 Comparison of Alternatives

While the existing four-lane roadway configuration on 9th Street provides low control delays for traffic, the configuration introduces traffic stress on bicycles and pedestrians, which could be restricting access to the corridor for some users. Alternatives C and D, which retain the existing cross section, do not improve the corridor significantly for non-motorized users. While some safety improvements would likely result at the crosswalks along 9th Street, the experiences for pedestrians and bicyclists between intersections would be unchanged under these alternatives.

The installation of a bike lane, providing a space for bicycle trips and a buffer between pedestrians and vehicle traffic, would improve the level of traffic stress for both modes under Alternative A or B. Of the two, Alternative A would have more efficient traffic operations with shorter queues, though the anticipated safety benefits of Alternative B are slightly stronger. Still, many of the proposed countermeasures outlined in Table 2-3 are compatible with either alternative to improve safety beyond the lane configuration changes.

The alternatives do not vary in terms of pedestrian facilities, as all four options would retain the existing sidewalks.

4.2 Preferred Alternative

We developed our Preferred Alternative design concept based on the safety and traffic analysis results. We opted to combine elements of Alternative A and B throughout the project limits to provide a consistent roadway configuration with three travel lanes and direction bike lanes, with varying signal treatments at each intersection.

Specifically, the Preferred Alternative includes protected-permitted left-turn phasing at the intersections of 9th Street at N Miller Street and at N Wenatchee Avenue and permissive phasing at the couplet intersections of 9th Street at N Chelan Avenue and at N Mission Street.

We have identified other design elements to include within the project limits to address various elements of the analysis. These items are listed in Section 4.2.2.

4.2.1 Typical Configuration

The typical roadway configuration for the Preferred Alternative has one travel lane per direction with a center left-turn or two-way left-turn lane. The space between the travel lanes and the existing curb line, which will not be shifted with the project, will be used for a directional bike lane on each side of 9th Street.

As discussed in Chapter 1, the existing roadway width varies between 40 feet, 44 feet, and 46 feet through the study limits. Figure 4-1 shows how that space will be reallocated under the Preferred Alternative.

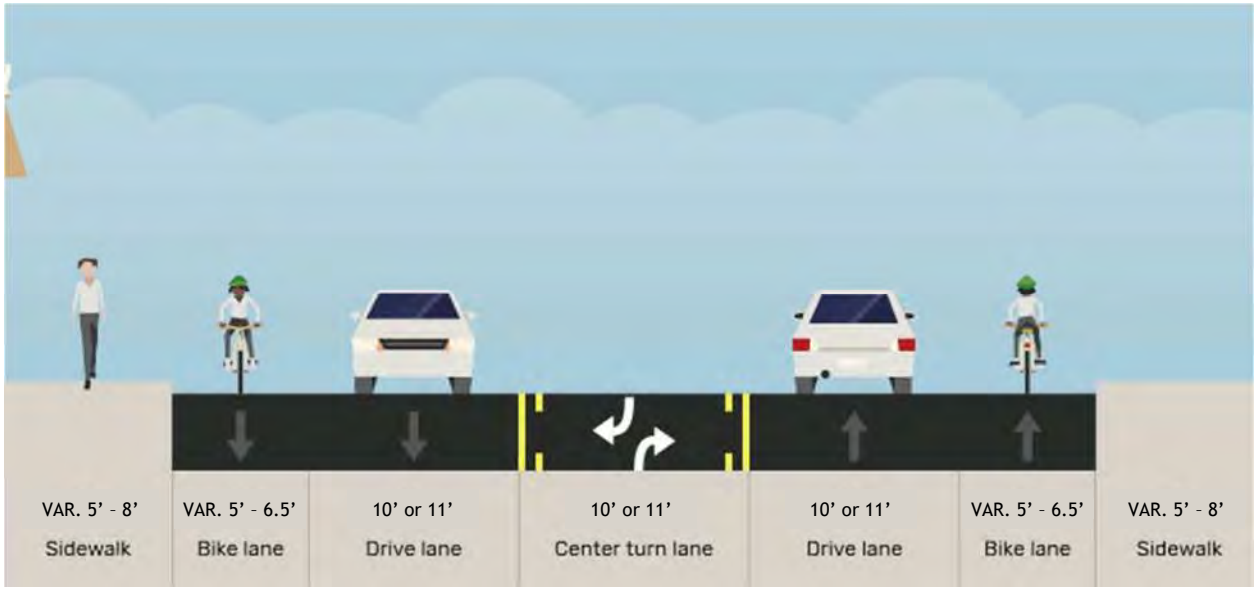


Figure 4-1. Preferred Alternative typical section.

Figure 4-1 does not show the gutter width, which is 1 foot and will extend into each bike lane. The material and grade differences at the gutter are not desirable for bicycle use. In a curbed roadway condition, 5-foot or wider lanes—including gutter width—provide sufficient width per the American Association of State Highway and Transportation Officials *Bike Guide*.

We recommend 11-foot wide travel lanes where possible in this urban corridor to accommodate freight vehicles on the route. However, where the road narrows between N Mission Street and N Wenatchee Avenue, we propose to retain the existing 10-foot wide lanes and install 5-foot wide bike lanes. Where the corridor is widest between N Wenatchee Avenue and the taper prior to the railroad tracks, the bike lanes can expand to fill the additional space. Table 4-1 summaries the proposed widths for the Preferred Alternative.

Table 4-1. Typical lane widths by corridor segment.

Segment	Through Lane Width (feet)	Center Lane Width (feet)	Bike Lane Width (feet)	Total Width (feet)
N Miller Street to N Emerson Avenue	11	11	5.5	44
N Emerson Avenue to N Chelan Avenue	11	11	5.5	44
N Chelan Avenue to N Mission Street	11	11	5.5	44
N Mission Street to N Wenatchee Avenue	10	10	5	40
N Wenatchee Avenue to BNSF Railroad	11	11	6.5	46

This proposed configuration will retain sufficient space for emergency vehicles to use the corridor. Vehicles blocking the path of an emergency vehicle can temporarily park in the bicycle lanes to open up a clear lane.

4.2.2 Additional Design Features

The Preferred Alternative requires additional items to fully function, which generally relate to the traffic signals and roadway channelization. We have also identified items that we recommend to enhance the corridor and improve safety.

Required Elements

The proposed three-lane configuration shown in Figure 4-1 must taper down to the existing roadway configurations beyond the project limits. This reconfiguration will require removal of existing and installation of new channelization markings. Our proposed transition treatments are shown in our concept exhibit, which is Appendix A to this report.

At the four traffic signals within the study limits, the existing signal heads will need to be shifted to the right in order to avoid a red/yellow/green ball indication over the proposed left-turn lane. This is consistent with the *Manual on Uniform Traffic Control Devices* (MUTCD) and design best practices. At the intersections of 9th Street at N Miller Street and at N Wenatchee Avenue, additional signal heads will be required for the protected-permissive left-turn phasing for 9th Street.

Though some of the east and west mast arms at N Miller Street and at N Wenatchee Avenue appear to be sufficiently long for these changes, we did not evaluate the structural capacity of the existing mast arms, pole, or foundations. We assume that adding these signal heads will trigger pole replacements to provide sufficient structural support for the added wind load. Replacing these poles will trigger ADA pushbutton upgrades at the intersections, which will then require sidewalk and curb ramp replacements to facilitate installation of the new pushbutton posts.

We do not anticipate any need to replace signal poles at the intersections of 9th Street at N Chelan Avenue or at N Mission Street, since the signal head shifts at those locations will decrease wind loads on the poles. Figure 4-2 shows how the existing mast arm lengths at N Chelan Avenue will satisfy the Preferred Alternative lane locations.

Figure 4-2. Conceptual view of 9th Street channelization near N Chelan Avenue (facing west).

Vehicle detection changes and modifications will be required at three of the four signalized intersections. At all of the signals within the project limits except for at N Wenatchee Avenue, vehicles are detected by loops in the

pavement. At N Wenatchee Avenue, video detection is used on all approaches. The proposed lane shifts to the three-lane section will require either revised loop detection or a change to video detection for the eastbound and westbound approaches at N Miller Street, N Chelan Avenue, and N Mission Street.

Recommended Treatments

We recommend installing bike lane or route signing along 9th Street to provide wayfinding for riders. This will supplement required bike lane channelization markings.

We recommend incorporating the following elements in the 9th Street corridor to improve safety in the corridor:

- Supplemental signal heads on all westbound mast arm pole shafts for westbound through movements on 9th Street for increased signal visibility during sunsets;
- Retroreflective backplates on all signal heads within the study area for increased signal visibility;
- Leading pedestrian intervals for all east-west crosswalks on 9th Street at the intersections of N Chelan Avenue and N Mission Street, as these intersections do not have protected-permissive phasing for the eastbound and westbound left-turn movements under the Preferred Alternative; and
- DO NOT BLOCK INTERSECTION signing and pavement markings for westbound traffic at the intersection of N Emerson Avenue and 9th Street.

4.2.3 Opinion of Cost

We developed a planning-level opinion of cost for the Preferred Alternative. The opinion of cost includes roadway construction, environmental, engineering, and construction management costs. We made the following notes and assumptions when developing the cost estimate:

- Right-of-way acquisition and easements are not required.
- Pavement, sidewalk, and curb ramps will not be replaced with the project, except as noted below.
- Utility systems will not be impacted by the project.
- All the required and recommended features detailed in Sections 4.2.1 and 4.2.2 are included.
- Existing loop detection systems on 9th Street are replaced with video detection.
- Existing signal control cabinets do not need to be replaced to accommodate the phasing, left-turn signal heads, or detection changes associated with the project.
- East and west mast arm poles and foundations at N Miller Street and at N Wenatchee Avenue are replaced to install protected-permissive signal heads. This triggers intersection-wide pedestrian pushbutton upgrades for ADA compliance, which requires curb ramp rebuilds at all corners to install.
- Existing conduits can be used for all signal modifications; trenching across intersections is not required.
- Environmental costs, including permitting in final design, construction compliance, and temporary water pollution and erosion control.
- 10% of construction subtotal for mobilization.
- 12% of construction subtotal, including mobilization, for construction engineering.
- 20% of construction subtotal, including mobilization, for construction contingency to cover additional project costs to be identified during final design.
- 15% of construction total for final design.
- 5% annual inflation between 2020 (cost index) and an assumed construction year of 2023.

Table 4-2 summarizes the cost elements. The opinion of cost itemized breakdown is included in Appendix B.

Table 4-2. Opinion of Cost Summary.

Cost Element	Estimated Cost
Right-of-way	$ 0
Construction	$ 561,000
Construction engineering and compliance	$ 80,000
Preliminary engineering and permitting	$ 101,000
Inflation to 2023	$ 117,000
Total	**$ 859,000**

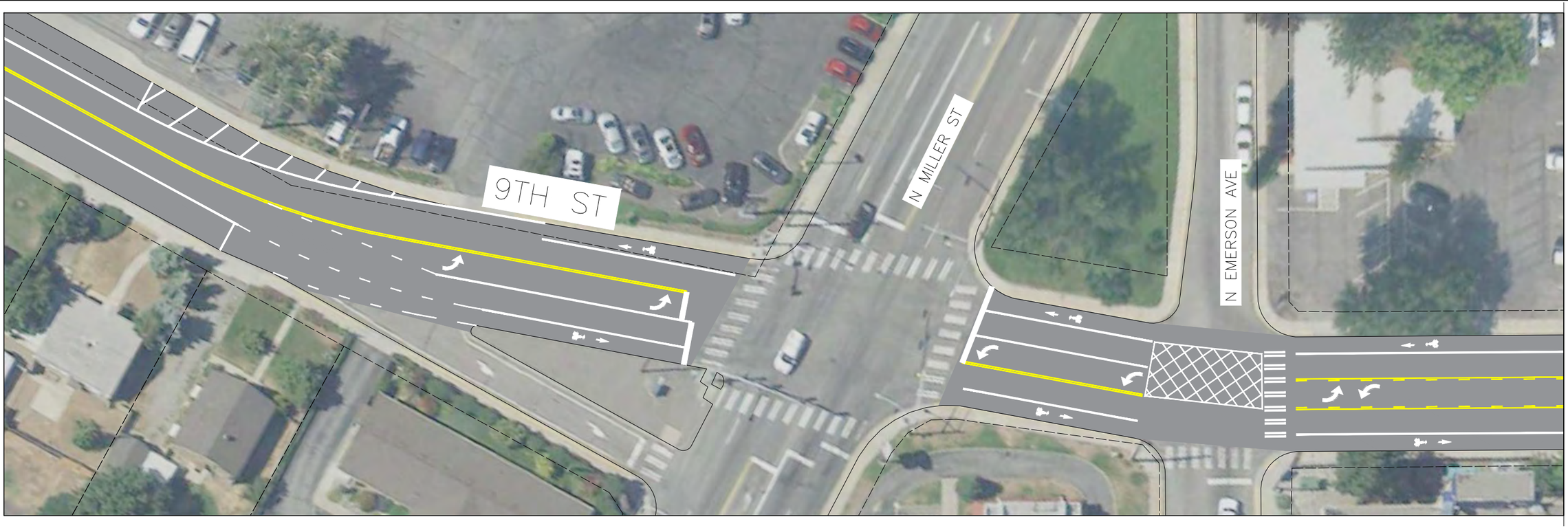
4.2.4 Phasing and Cost Considerations

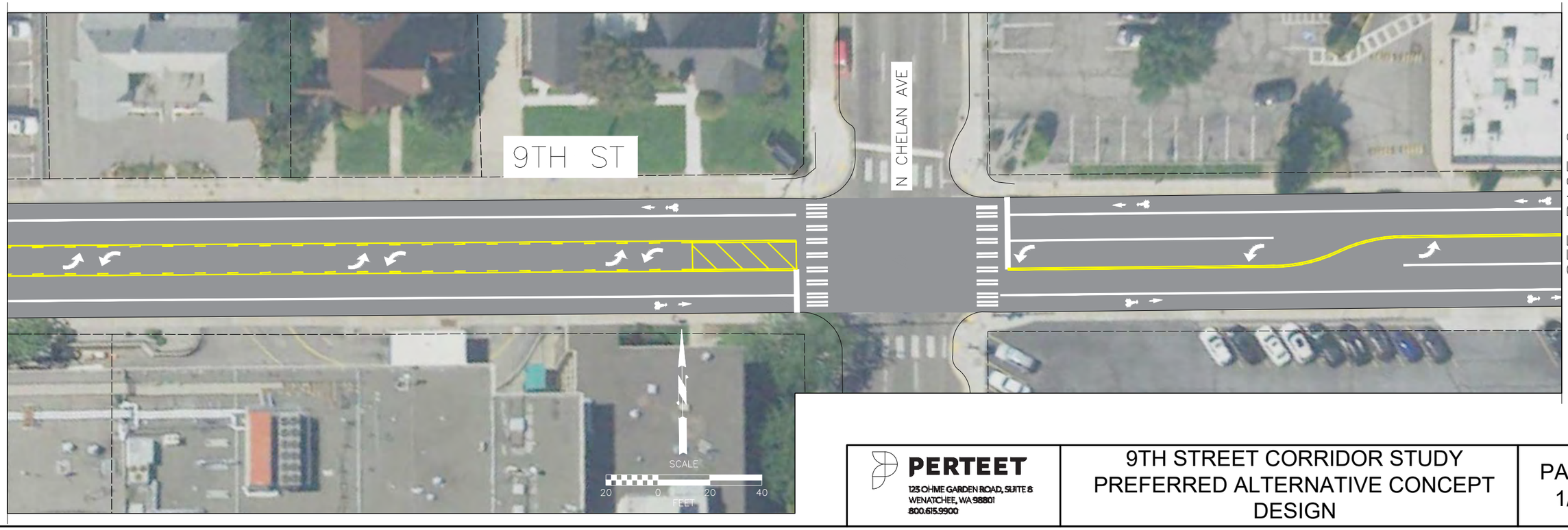
Overall project cost can be reduced if signal equipment, including traffic signal heads, video detection cameras, and mast arms have already been procured by City of Wenatchee and can be used on this project. Additionally, constructing the project earlier will reduce anticipated inflation, which we estimate will lead to 5% annual increases in total project cost.

To reduce near-term project costs without compromising the core goals of the Preferred Alternative, the protected-permissive left-turn phasing at the intersections of 9th Street at N Miller Street and N Wenatchee Avenue could be deferred to a future effort. If that occurred and existing signal heads were retained and shifted on existing mast arm poles, the total project cost shown in Table 4-2 would be reduced to $381,000 (2023 $). This reduce cost still accounts for the new recommended supplemental signal heads and retroreflective backings on all signal heads to enhance signal visibility and reduce crash likelihood.

APPENDIX A

Preferred Alternative Concept Designs





PERTEET
125 OHME GARDEN ROAD, SUITE 8
WENATCHEE, WA 98801
800.615.9900

9TH STREET CORRIDOR STUDY
PREFERRED ALTERNATIVE CONCEPT DESIGN

PAGE 1/2

SEE PAGE 1

N MISSION ST

9TH ST

N WENATCHEE AVE

SEE BELOW

SEE ABOVE

9TH ST

BNSF RAILROAD

DESIGN IS COMPATIBLE WITH PROPOSED CROSSING-IMPROVEMENTS PROJECT. MODIFY CHANNELIZATION AS NEEDED.

SCALE
20 0 20 40
FEET

PERTEET
123 OHME GARDEN ROAD, SUITE 8
WENATCHEE, WA 98801
800.615.9900

9TH STREET CORRIDOR STUDY
PREFERRED ALTERNATIVE CONCEPT DESIGN

APPENDIX B

Preferred Alternative Planning-Level Opinion of Cost

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

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description:	Ninth Street Corridor Study	Client:	City of Wenatchee
Corridor Section:	N Miller Street - BNSF Railroad	Date:	April 2020
Location:	Wenatchee, WA	Date of Cost Index:	2020
		Calculated By/Entered By:	B. Powell
		Checked By:	M. Hendrix

Preferred Alternative

		ITEM	UNIT	ESTIMATED UNIT COST	QTY	COST
I.		**RIGHT OF WAY**				
		RIGHT OF WAY (urban developed)	SF	$45	-	$0
		RIGHT OF WAY (urban undeveloped)	SF	$20	-	$0
		RELOCATIONS: BUSINESSES	EA	$150,000	-	$0
		RELOCATIONS: RESIDENCES	EA	$110,000	-	$0
		CONDEMNATION PROCEDURE	EA	$100,000	-	$0
		ADMINISTRATION (TITLES, APPRAISALS, ETC.)	EA	$15,000	-	$0
		RIGHT OF WAY TOTAL				**$0**
II.		**CONSTRUCTION**				
1		**PREPARATION/GRADING/DRAINAGE**				
	1.1	**PREPARATION**				
		CLEAR & GRUB, DEMO	ACRE	$5,000	-	$0
		REMOVING EXISTING PAVEMENT	SY	$25	-	$0
		REMOVE PAVEMENT MARKINGS	LF	$2	6,400	$12,800
	1.2	**EARTHWORK**				
		ROADWAY EXCAVATION INCL, HAUL	CY	$80	40	$3,200
		STRUCTURE EX. CL. A INCL. HAUL	CY	$25	-	$0
		BORROW INCL. HAUL	TON	$16	-	$0
		EMBANKMENT COMPACTION	CY	$2	-	$0
	1.3	**STORMWATER MITIGATION**				
		DETENTION AND TREATMENT	SF	$6	-	$0
	1.4	**STORM SEWER**				
		CATCH BASIN TYPE 1	EA	$1,000	-	$0
		CATCH BASIN TYPE 2	EA	$2,200	-	$0
		PLAIN CONC. STORM SEWER PIPE 12 IN. DIAM.	LF	$35	-	$0
		PLAIN CONC. STORM SEWER PIPE 18 IN. DIAM.	LF	$45	-	$0
		STRUCTURE EXCAVATION CL. B	CY	$15	-	$0
2		**STRUCTURE**				
		CONCRETE BRIDGES	SF	$150	-	$0
		CONCRETE BRIDGES WIDENING	SF	$200	-	$0
		PEDESTRIAN BRIDGES	SF	$250	-	$0
		STEEL BRIDGES	SF	$100	-	$0
		BRIDGE ABUTMENT RETROFIT	SF	$150	-	$0
		RETAINING WALLS (Cast in Place)	SF	$65	-	$0
		RETAINING WALLS (Soil Nail with Cast in Place Facing)	SF	$150	-	$0
		BRIDGE REMOVAL	SF	$20	-	$0
		NOISE WALLS	SF	$25	-	$0

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

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description:	Ninth Street Corridor Study		Client: City of Wenatchee		
Corridor Section:	N Miller Street - BNSF Railroad		Date: April 2020		
Location:	Wenatchee, WA		Date of Cost Index: 2020		
3	**SURFACING**				
	PORTLAND CEMENT CONCRETE	SF	$10	-	$0
	HOT MIX ASPHALT	TON	$150	-	$0
	CRUSHED SURFACING	TON	$75	30	$2,250
4	**ROADSIDE DEVELOPMENT**				
	FENCING	LF	$15	-	$0
	SEEDING, MULCHING & FERTILIZING	ACRE	$1,200	-	$0
	WETLAND MITIGATION	LS	$0	1	$0
	TEMP. WATER POLLUTION & EROSION CONTROL (6%)	LS	$5,000	1	$5,000
	LANDSCAPING	LS	$0	1	$0
5	**TRAFFIC**				
	GUARD RAIL	LF	$18	-	$0
	CONCRETE BARRIER	LF	$50	-	$0
	SIGNAL SYSTEMS	LS	$220,000	1	$220,000
	ILLUMINATION	LS	$0	1	$0
	SIGNING	LS	$10,000	1	$10,000
	CHANNELIZATION	LF	$4	8,500	$34,000
	CURBS	LF	$25	-	$0
	CURB RAMP	EA	$2,500	16	$40,000
	SIDEWALKS	SY	$60	110	$6,600
	TRAFFIC CONTROL (20%)	LS	$65,800	1	$65,800
5.1	**OTHER ITEMS**				
	SURVEYING (2%)	LS	$6,600	1	$6,600
	SPECIAL ITEMS	EST	$0	1	$0
	UTILITY RELOCATIONS	EST	$0	1	$0
6	**MISCELLANEOUS (20%)**	LS	$81,300	1	$81,300
7	**CONSTRUCTION SUBTOTAL (ITEMS 1 THRU 6)**				**$487,550**
8	**MOBILIZATION (15%)**				
	15% OF ITEM 7	EST	$73,200	1	$73,200
9	**SUBTOTAL (ITEMS 7 & 8)**				**$560,750**
10	**SALES TAX**				
	N/A	EST	$0	1	$0
11	**AGREEMENTS (Utilities, WSP, etc.)**				
	N/A	EST	$0	1	$0
12	**SUBTOTAL (ITEMS 9 THRU 11)**				**$560,750**
13	**CONSTRUCTION**				
	ENGINEERING (12% OF ITEM 12)	EST	$68,000	1	$68,000
	ENVIRONMENTAL COMPLIANCE (2% OF ITEM 12)	EST	$12,000	1	$12,000

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

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description:	Ninth Street Corridor Study		Client: City of Wenatchee		
Corridor Section:	N Miller Street - BNSF Railroad		Date: April 2020		
Location:	Wenatchee, WA		Date of Cost Index: 2020		
14	**CONSTRUCTION TOTAL (ITEMS 12 & 13)**				**$640,750**
III.	**PRELIMINARY WORK**				
	PRELIMINARY ENGINEERING (15% OF ITEM 14)	EST	$96,113	1	$96,113
	ROW PERMITS	EST	$5,000	1	$5,000
IV.	**TOTAL ESTIMATED COST**				
	(ITEMS I, 14 & III)				**$742,000**
V.	**FUTURE ESTIMATED COST**				

	Inflation	Const. Year	Cost Index	Future Cost
FUTURE COST BASED ON INFLATION RATE	5.00%	2023	2020	**$859,000**

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.

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

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description:	Ninth Street Corridor Study	Client:	City of Wenatchee
Corridor Section:	N Miller Street - BNSF Railroad	Date:	April 2020
Location:	Wenatchee, WA	Date of Cost Index:	2020
		Calculated By/Entered By:	B. Powell
		Checked By:	M. Hendrix

Preferred Alternative without Protected-Permissive Phasing at N Miller Street, N Wenatchee Avenue

		ITEM	UNIT	ESTIMATED UNIT COST	QTY	COST
I.		**RIGHT OF WAY**				
		RIGHT OF WAY (urban developed)	SF	$45	-	$0
		RIGHT OF WAY (urban undeveloped)	SF	$20	-	$0
		RELOCATIONS: BUSINESSES	EA	$150,000	-	$0
		RELOCATIONS: RESIDENCES	EA	$110,000	-	$0
		CONDEMNATION PROCEDURE	EA	$100,000	-	$0
		ADMINISTRATION (TITLES, APPRAISALS, ETC.)	EA	$15,000	-	$0
		RIGHT OF WAY TOTAL				**$0**
II.		**CONSTRUCTION**				
1		**PREPARATION/GRADING/DRAINAGE**				
	1.1	**PREPARATION**				
		CLEAR & GRUB, DEMO	ACRE	$5,000	-	$0
		REMOVING EXISTING PAVEMENT	SY	$25	-	$0
		REMOVE PAVEMENT MARKINGS	LF	$2	6,400	$12,800
	1.2	**EARTHWORK**				
		ROADWAY EXCAVATION INCL, HAUL	CY	$80	-	$0
		STRUCTURE EX. CL. A INCL. HAUL	CY	$25	-	$0
		BORROW INCL. HAUL	TON	$16	-	$0
		EMBANKMENT COMPACTION	CY	$2	-	$0
	1.3	**STORMWATER MITIGATION**				
		DETENTION AND TREATMENT	SF	$6	-	$0
	1.4	**STORM SEWER**				
		CATCH BASIN TYPE 1	EA	$1,000	-	$0
		CATCH BASIN TYPE 2	EA	$2,200	-	$0
		PLAIN CONC. STORM SEWER PIPE 12 IN. DIAM.	LF	$35	-	$0
		PLAIN CONC. STORM SEWER PIPE 18 IN. DIAM.	LF	$45	-	$0
		STRUCTURE EXCAVATION CL. B	CY	$15	-	$0
2		**STRUCTURE**				
		CONCRETE BRIDGES	SF	$150	-	$0
		CONCRETE BRIDGES WIDENING	SF	$200	-	$0
		PEDESTRIAN BRIDGES	SF	$250	-	$0
		STEEL BRIDGES	SF	$100	-	$0
		BRIDGE ABUTMENT RETROFIT	SF	$150	-	$0
		RETAINING WALLS (Cast in Place)	SF	$65	-	$0
		RETAINING WALLS (Soil Nail with Cast in Place Facing)	SF	$150	-	$0
		BRIDGE REMOVAL	SF	$20	-	$0
		NOISE WALLS	SF	$25	-	$0

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

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description:	Ninth Street Corridor Study		Client: City of Wenatchee		
Corridor Section:	N Miller Street - BNSF Railroad		Date: April 2020		
Location:	Wenatchee, WA		Date of Cost Index: 2020		
3	**SURFACING**				
	PORTLAND CEMENT CONCRETE	SF	$10	-	$0
	HOT MIX ASPHALT	TON	$300	-	$0
	CRUSHED SURFACING	TON	$100	-	$0
4	**ROADSIDE DEVELOPMENT**				
	FENCING	LF	$15	-	$0
	SEEDING, MULCHING & FERTILIZING	ACRE	$1,200	-	$0
	WETLAND MITIGATION	LS	$0	1	$0
	TEMP. WATER POLLUTION & EROSION CONTROL (6%)	LS	$5,000	1	$5,000
	LANDSCAPING	LS	$0	1	$0
5	**TRAFFIC**				
	GUARD RAIL	LF	$18	-	$0
	CONCRETE BARRIER	LF	$50	-	$0
	SIGNAL SYSTEMS	LS	$90,000	1	$90,000
	ILLUMINATION	LS	$0	1	$0
	SIGNING	LS	$10,000	1	$10,000
	CHANNELIZATION	LF	$4	8,500	$34,000
	CURBS	LF	$25	-	$0
	CURB RAMP	EA	$2,500	-	$0
	SIDEWALKS	SY	$60	-	$0
	TRAFFIC CONTROL (20%)	LS	$29,400	1	$29,400
5.1	**OTHER ITEMS**				
	SURVEYING (N/A)	LS	$0	1	$0
	SPECIAL ITEMS	EST	$0	1	$0
	UTILITY RELOCATIONS	EST	$0	1	$0
6	**MISCELLANEOUS (20%)**	LS	$36,300	1	$36,300
7	**CONSTRUCTION SUBTOTAL (ITEMS 1 THRU 6)**				**$217,500**
8	**MOBILIZATION (15%)**				
	15% OF ITEM 7	EST	$32,700	1	$32,700
9	**SUBTOTAL (ITEMS 7 & 8)**				**$250,200**
10	**SALES TAX**				
	N/A	EST	$0	1	$0
11	**AGREEMENTS (Utilities, WSP, etc.)**				
	N/A	EST	$0	1	$0
12	**SUBTOTAL (ITEMS 9 THRU 11)**				**$250,200**
13	**CONSTRUCTION**				
	ENGINEERING (12% OF ITEM 12)	EST	$31,000	1	$31,000
	ENVIRONMENTAL COMPLIANCE (N/A)	EST	$0	1	$0

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

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description:	Ninth Street Corridor Study		Client: City of Wenatchee		
Corridor Section:	N Miller Street - BNSF Railroad		Date: April 2020		
Location:	Wenatchee, WA		Date of Cost Index: 2020		
14	**CONSTRUCTION TOTAL (ITEMS 12 & 13)**				**$281,200**
III.	**PRELIMINARY WORK**				
	PRELIMINARY ENGINEERING (15% OF ITEM 14)	EST	$42,180	1	$42,180
	ROW PERMITS	EST	$5,000	1	$5,000
IV.	**TOTAL ESTIMATED COST**				
	(ITEMS I, 14 & III)				**$329,000**
V.	**FUTURE ESTIMATED COST**				

	Inflation	Const. Year	Cost Index	Future Cost
FUTURE COST BASED ON INFLATION RATE	5.00%	2023	2020	**$381,000**

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 C

Study-Area Crash History

REMAINING APPENDICES AVAILABLE UPON REQUEST