



Technical Memorandum

Date: May 5, 2022

Kittelson Project No: 23021.041

To: Project Management Team

DOT&PF Agreement No: 20455

From: Matt Kittelson, PE and Miranda Barrus, PE

Subject: (Preliminary) Final TM #5: Future Transportation Conditions

Introduction

The future transportation conditions analysis for the Winston Transportation System Plan (TSP) Update assesses how the City's current transportation system is anticipated to perform through the planning horizon year 2045. The assessment assumes no changes will occur to the existing transportation network other than what is currently planned and funded. It also assumes that the transportation system will serve the City's continued economic growth that is consistent with its Comprehensive Plan land use designations as well as regional needs.

This memorandum summarizes the future baseline transportation conditions projected for people walking, rolling, biking, taking transit, and driving within the Winston Urban Growth Boundary (UGB), the TSP Update project study area, illustrated in Figure 1. The information presented will help advise on potential transportation system changes needed to support the TSP's goals and the City's vision. It will also be used as a foundation to:

- Help the City understand the effectiveness of potential projects, policies, and programs; and,
- Help policy makers weigh trade-offs regarding future funding priorities that support continued economic growth in a safe, sustainable, fundable, and diverse manner.

As will be discussed in this memorandum, the future transportation conditions analyses highlight the following primary deficiencies:

- OR 42 / NW Lookingglass Road exceeds its v/c threshold and 95th percentile queue lengths at OR 42 / Main Street (OR 99) exceed striped turn lane storage under future year 2045 traffic conditions; and,
- The safety and multimodal conditions identified in the existing transportation conditions analyses are expected to worsen over time with increasing traffic volumes and if no changes are made to the transportation system.

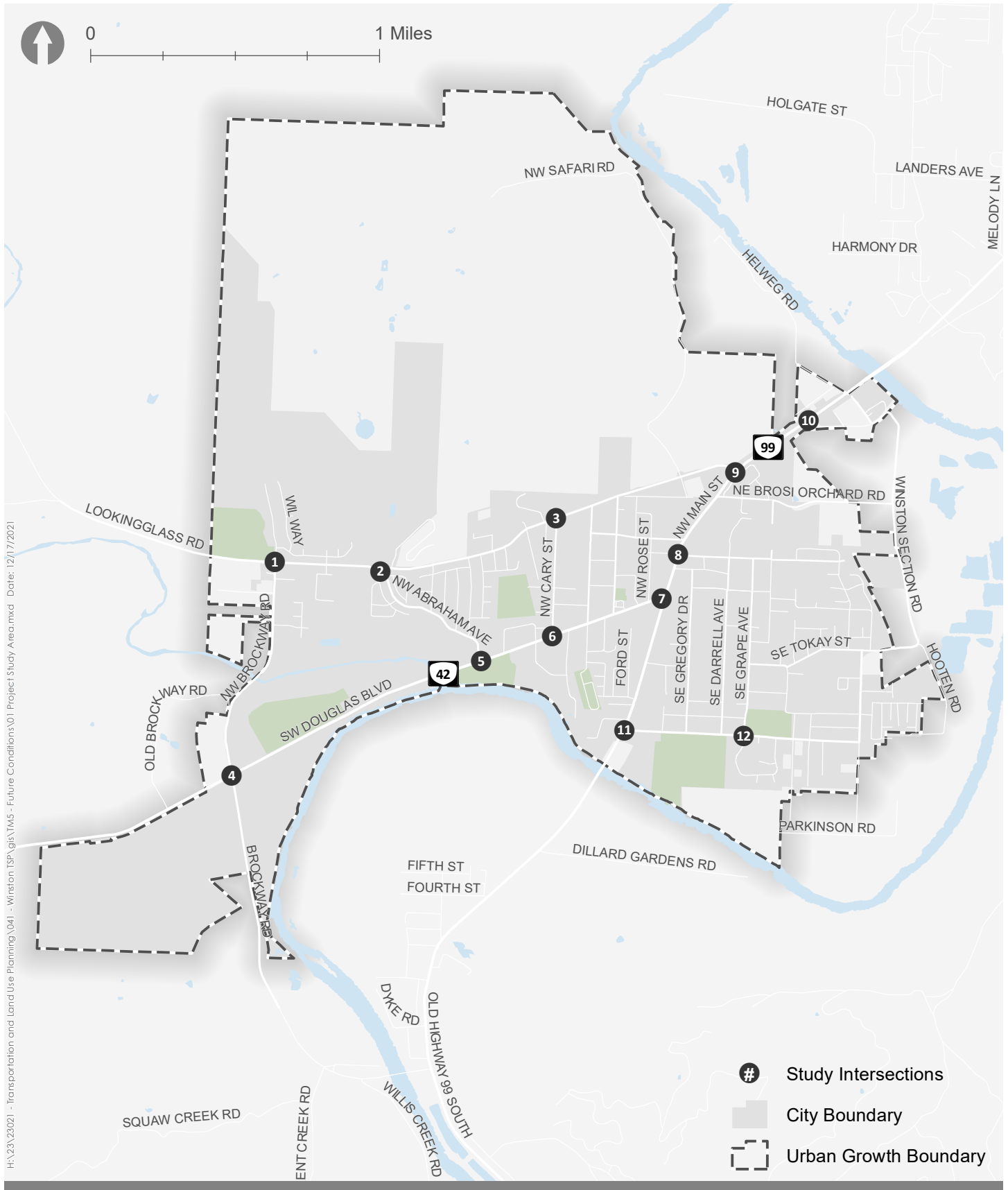


Figure 1
Project Study Area
Winston, Oregon



Future Baseline Traffic Conditions

The future baseline traffic conditions analysis identifies how the study intersections shown in Figure 1 are expected to operate under year 2045 traffic conditions during the weekday PM peak hour. This analysis helps to understand future needs of people driving within the project study area. The following sections summarize how forecast traffic volumes were developed at the study intersections and the resultant traffic operations.

Forecast Traffic Volumes

Forecast traffic volumes were developed for the study intersections based on existing traffic volumes and information provided by the Roseburg travel demand model. This model provides base year 2010 and forecast year 2035 traffic volume projections for study area roadways that reflect anticipated land use changes and planned transportation improvements within the Roseburg-Winston area. Forecast volumes were extrapolated to year 2045 conditions. *More details on forecast traffic volume development processes are provided in Technical Memorandum #3 (Analysis Methodology).*¹

Traffic Operations Analysis

The traffic operations analysis helps to identify study intersections that are expected to exceed applicable volume-to-capacity ratio (v/c) thresholds, shown in Table 1, in the year 2045. As stated above, this analysis helps inform transportation projects, policies, and programs needed to support economic growth through the TSP Update planning horizon.

The traffic operations analysis used Vistro software and its Highway Capacity Manual (HCM) 6th Edition reports to summarize the intersection traffic operations as well as 95th percentile queues. Figure 2 illustrates the current lane configurations and traffic control devices at the study intersections and Figure 3 reflects the forecast traffic volumes and resultant traffic operations. The v/c's are reported for the critical movement at unsignalized intersections and for the overall intersection at signalized intersections. Table 2 summarizes the 95th percentile queues. As shown, OR 42 / NW Lookingglass Road exceeds its v/c threshold and 95th percentile queue lengths at OR 42 / Main Street

¹At the time of this memorandum, the Oregon Department of Transportation's (ODOT's) Transportation Planning Analysis Unit (TPAU) is working to update the forecast model to the year 2045. When the 2045 model year scenario is available, the project team will conduct a sensitivity analysis of future operational needs to confirm or amend the findings of this memorandum.

(OR 99) exceed striped turn lane storage under future year 2045 traffic conditions. Attachment A contains the future baseline traffic operations worksheets.

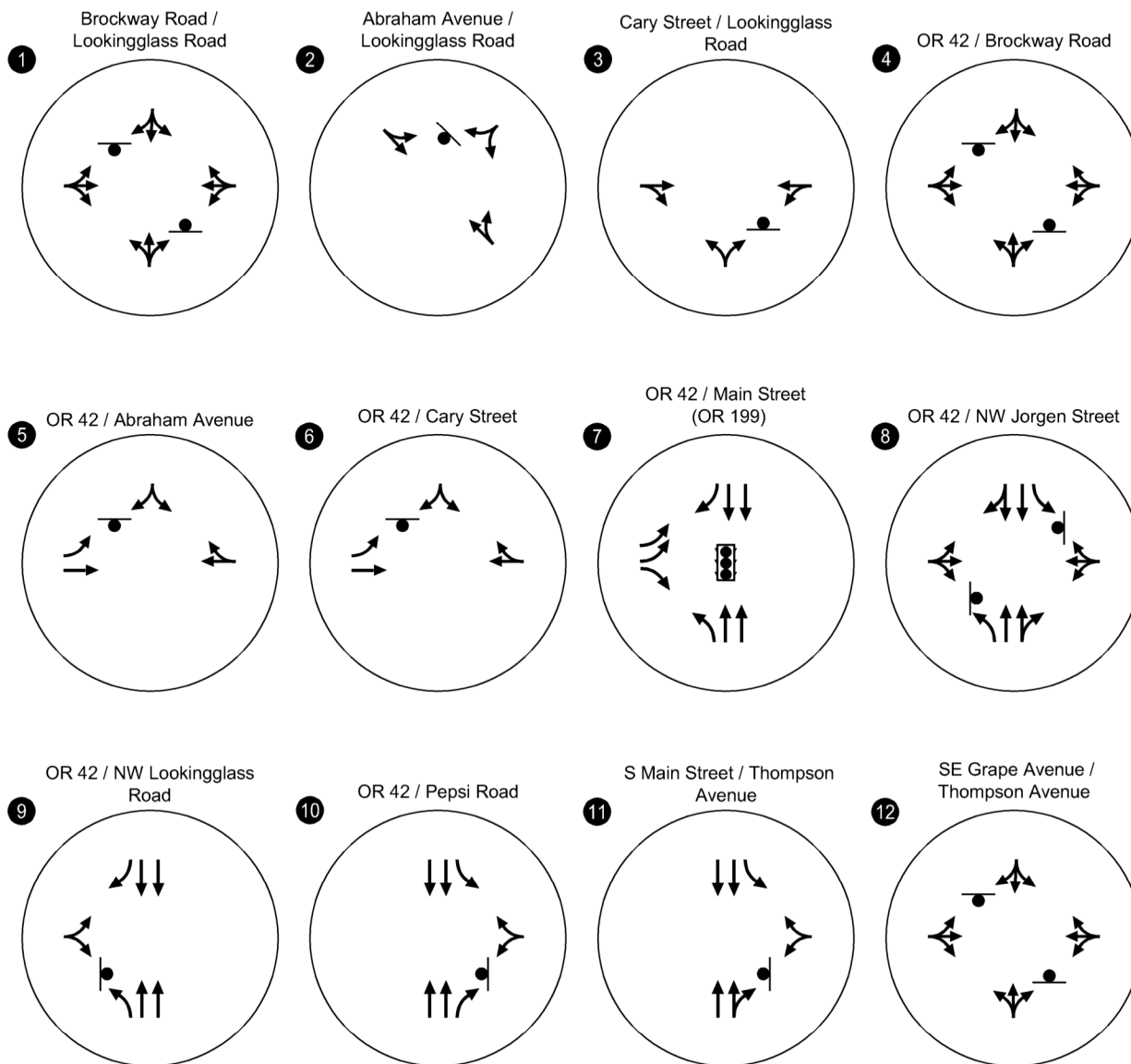
Table 1: Study Intersection V/C Thresholds²

ID	Intersection	V/C Threshold ^{1, 2}
1	Lookingglass Rd / Brockway Rd	0.90 / 1.00
2	Lookingglass Rd / Abraham Ave	
3	Lookingglass Rd / Cary St	
4	OR 42 / Brockway Rd	0.80 / 0.90
5	OR 42 / Abraham Ave	0.85 / 0.95
6	OR 42 / Cary St	0.85 / 0.95
7	OR 42 / Main St (OR 99)	0.85 / 0.95
8	OR 42 / NW Jorgen St	0.85 / 0.95
9	OR 42 NW Lookingglass Rd	0.80 / 0.90
10	OR 42 / Pepsi Rd	0.80 / 0.95
11	S Main St / Thompson Ave	0.85 / 1.00
12	SE Grape Ave / Thompson Ave	1.00

¹Intersections #1-3 and 11: County threshold / City threshold (Note: Brockway Road is a County facility south of Lookingglass Road and is a City facility north of Brockway Road – the appropriate v/c threshold applies).

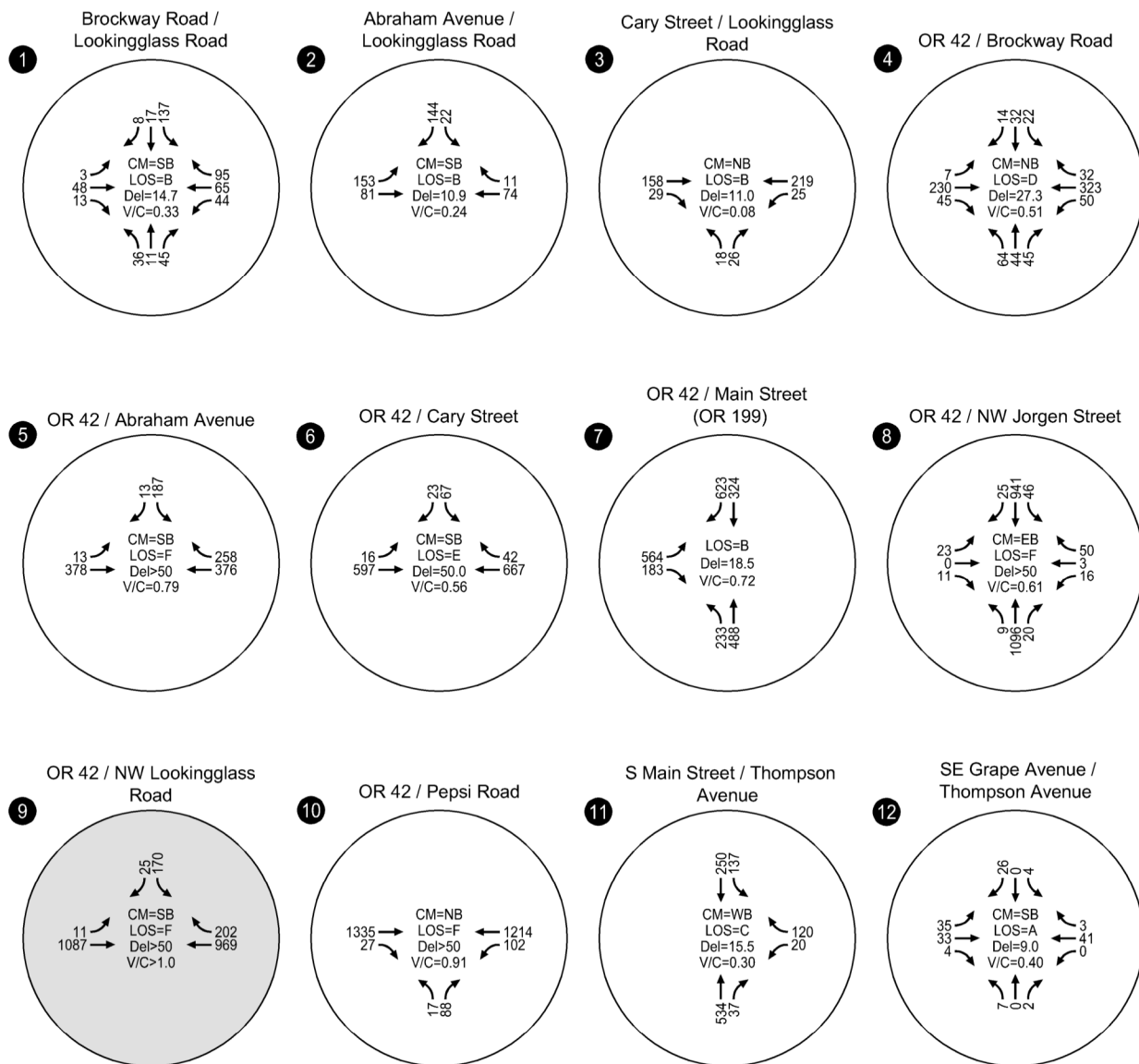
²Intersections #4-10: State Highway threshold / side-street threshold

²Note that Technical Memorandum #3 (Analysis Methodology) shows different v/c thresholds for intersection #1-3 and 11 due to updated information on roadway jurisdiction since developing the analysis methodology.



Existing Lane Configurations and Traffic Control Devices
Winston, OR

Figure
2



CM = CRITICAL MOVEMENT (UNSIGNALIZED)

LOS = LEVEL OF SERVICE (INTERSECTION/SIGNALIZED & CRITICAL MOVEMENT/UNSIGNALIZED)

Del = DELAY (INTERSECTION/SIGNALIZED & CRITICAL MOVEMENT/UNSIGNALIZED)

V/C = VOLUME-TO-CAPACITY RATIO (INTERSECTION/SIGNALIZED & CRITICAL MOVEMENT/UNSIGNALIZED)

Future 2045 Baseline Traffic Conditions
 Weekday PM Peak Hour
 Winston, OR

Figure
 3

Table 2: 95th Percentile Queuing

ID	Intersection	Movement ¹	Storage Length (Feet) ²	95 th Percentile Queue (Feet) ³	Adequate?
1	Brockway Rd / Lookingglass Rd	NBLTR	160	25	Yes
		SBLTR	215	50	Yes
2	Abraham Ave / Lookingglass Rd	SBLR	150	25	Yes
3	Cary St / Lookingglass Rd	NBLR	100	25	Yes
4	OR 42 / Brockway Rd	NBLTR	170	75	Yes
		SBLTR	1,110	25	Yes
5	OR 42 / Abraham Ave	SBLR	490	175	Yes
		EBL	100	25	Yes
6	OR 42 / Cary St	SBLR	90	75	Yes
		EBL	75	25	Yes
7	OR 42 / Main St (OR 99)	NBL	125	225	No
		SBR	220	250	No
		EBL	150	200	No
8	OR 42 / NW Jorgen St	NBL	80	25	Yes
		SBL	80	25	Yes
		EBLTR	25	75	Yes ⁴
		WBLTR	50	75	Yes ⁴
9	OR 42 / NW Lookingglass Rd	SBLR	1,000	425	Yes
		EBL	170	25	Yes
		WBR	190	<25	Yes
10	OR 42 / Pepsi Rd	NBLR	200	150	Yes
		EBR	140	<25	Yes
		WBL	270	25	Yes
11	S Main St / Thompson Ave	WBLR	40	50	Yes ⁴
		SBL	120	25	Yes
12	SE Grape Ave / Thompson Ave	NBLTR	50	25	Yes
		SBLTR	50	25	Yes

¹NB = northbound; SB = southbound; EB = eastbound; WB = westbound; L = left; T = through; R = right; ²Storage lengths reflect striped storage for each turn-lane pocket at the intersections or available storage to the upstream driveway or intersection; ³Vehicle queues were rounded up to the nearest 25 feet; ⁴Lane storage is adequate but queue length blocks upstream driveway or intersection

Future Safety Conditions

The existing transportation conditions presented in *Technical Memorandum #4* revealed the following safety conditions within the project study area based on the most recent five years of available crash data (January 1, 2015 through December 31, 2019):

- 145 crashes were reported within the Winston UGB between 2015 and 2019. Of these, approximately 80 percent took place along OR 42 and Main Street.
- Approximately 56 percent of all reported crashes resulted in injury, including eight serious injury crashes (seven of which occurred on the state highway through the study area).
- Collision types included:
 - Angle (11 percent)
 - Bicycle (1 percent)
 - Fixed-object/other object (14 percent)
 - Miscellaneous/wildlife (2 percent)
 - Non-collision/overtake (1 percent)
 - Pedestrian (2 percent)
 - Rear-end (26 percent)
 - Sideswipe/meeting (3 percent)
 - Sideswipe/overtaking (5 percent)
 - Turning movement (35 percent)
- Five crashes involved people walking or biking (three of which occurred on the state highway between Sherry Street and NW Civil Bend Avenue).
- The OR 42 / Brockway Road study intersection exceeds its applicable 90th percentile crash rate.
 - 9 of 16 crashes (56%) resulted in some level of injury (no fatalities)
 - 9 of 16 crashes (56%) were angle crashes
 - 1 of 16 crashes (6%) involved speeding; no crashes (0%) involved drugs or alcohol
 - 13 of 16 crashes (81%) occurred under clear, daylight conditions on dry roadway surfaces
- The OR 42 / Lookingglass Road study intersection exceeds its critical crash rate and exhibits an excess proportion of turning movement crashes.

Figure B-1 in Attachment B illustrates the location of reported serious injury and pedestrian and bicycle crashes from *Technical Memorandum #4*.

No Safety Priority Index System (SPIS) sites were identified in the project study area from 2019 or 2020 SPIS reports (2016 to 2019 crashes); however, the OR 42 / Brockway Road intersection has been identified as a top five and 10 percent SPIS location in SPIS reports prior to 2019. As a result, ODOT has been engaged with ongoing efforts to identify intersection modifications that would improve the safety performance of this intersection.

The safety conditions summarized above are expected to worsen over time with increasing vehicular, pedestrian, and bicycle volumes and if no changes are made to the transportation system.

Future Multimodal Conditions

The existing transportation conditions presented in *Technical Memorandum #4* revealed the following multimodal conditions within the project study area:

- The highest percentage of people who may be transportation disadvantaged reside north of Lookingglass Road. The highest overall population reside south of Lookingglass Road and west of OR 99/Main Street.
- Many City streets are not built to standard lacking sidewalks, curb and gutter, and/or bike lanes, and in some cases, centerline or edge line striping.
 - In general, most of the major activity centers along OR 42 and Main Street appear accessible by the existing sidewalk network.
 - Similarly, most of these major activity centers seem accessible by bike.
- OR 42 can be a barrier to people walking and biking, especially in areas with higher posted speeds.
- Bus stops in Winston have limited amenities, including signs. Some bus stops along major streets lack walking and biking facilities in their vicinity.
- Streets with Pedestrian Level of Traffic Stress (PLTS) and Bicycle Level of Traffic Stress (BLTS) scores higher than two (2) exist throughout much of the transportation system, meaning walking or biking may be uncomfortable for most users.
- OR 42 between Sherry Street and the eastern UGB limit was identified as a high-risk corridor for pedestrians based on statewide analysis; the length of OR 42 throughout Winston was identified as a high-risk corridor for bicycles.

Figures C-1 through C-4 in Attachment C illustrate the LTS scores and safety risk rankings for people walking and biking along OR 42, from *Technical Memorandum #4*.

These current multimodal conditions are expected to deteriorate with time as vehicular, pedestrian, and bicycle volumes increase and if no changes are made to the transportation system.

The ongoing Umpqua Public Transportation District (UPTD) Transit Plan team has developed the following draft recommendations to modify the existing transit service within Winston:

- Greyline (connects Winston to Roseburg with a loop in Winston):
 - Near-term funding (1-2 years) will increase frequency to 30-minute headways and extend current route along OR 99 (Main Street) to Dillard (with an emphasis on serving workforce)
 - Mid-term plans (5-15 years) to expand service to 7 days per week
- Route 99 (connects Roseburg to Canyonville with stops in Winston):
 - Mid-term plans (5-15 years) to expand service to 7 days per week
- Roseburg Express (connects Roseburg to Coos Bay with a stop in Winston):
 - Mid-term plans (5-15 years) to add 2 trips per day, 2 days a week
 - Unconstrained plans (no timeline) to add 2 trips per day, 4 days a week

The TSP project team will continue to coordinate with the UPTD process to identify infrastructure needs within Winston that would improve access to transit. Initial recommendations from the UPTD plan identify the need to evaluate a new downtown transit hub in Winston, bus-on-shoulder stop locations, and high priority locations where infrastructure is needed to support transit stop facilities.

Solutions Development & Evaluation Framework

The existing and future transportation needs identified in *Technical Memorandum #4* and in this document will be reviewed through the solutions development and evaluation planned for Summer 2022. In addition to the technical information presented to-date, the solutions development and evaluation will be further informed by the feedback received from the Project Management Team (PMT) and Project Advisory Committee (PAC) and during the first Open House held in September 2021.

The solutions development and evaluation will identify potential projects, policies, and programs to address identified needs. These potential solutions will be evaluated by a preliminary screening that considers the following key questions:

1. Does the project, policy, or program address an identified transportation need, deficiency, or opportunity?
2. Is the project, policy, or program within or applicable to the City's UGB?
3. Is the project, policy, or program technically feasible to construct and/or implement?
4. Could the project, policy, or program be reasonably funded within the next 20 years?

If the answer to any question is 'no,' the idea will not be further considered.

The remaining ideas will be measured by City staff and the PMT against the goals, objectives, and evaluation criteria established in *Technical Memorandum #2 (Community Transportation Framework)*. These goals, objectives, and evaluation criteria are intended to differentiate projects, policies, and programs.

The evaluation results will be presented in tabular format with a rating provided for how each project, policy, or program addresses the criteria. The ratings include the following:

- The concept addresses the criterion and/or makes substantial improvements in the criterion category. (●)
- The concept partially addresses the criterion and/or makes some improvements in the criterion category. (◐)
- The concept does not support the intent of and/or negatively impacts the criterion category. (○)
- The criterion does not apply to the concept or the concept has no influence on the criterion. (⊗)

The results of the more detailed analyses against the evaluation criteria will be presented to the PAC for review. Outcomes of this evaluation will help inform a 20-year project list that could address the identified transportation needs, meet the TSP goals, and comply with criteria contained in Oregon Revised Statute (ORS) 660-012-0035.

Attachment A: Future Baseline Traffic Operations Worksheets

Intersection Level Of Service Report

Intersection 1: Brockway Rd / Lookingglass Road

Control Type:	Two-way stop	Delay (sec / veh):	14.9
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.295

Intersection Setup

Name	Brockway Road			Brockway Road			Lookingglass Road			Lookingglass Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			30.00			45.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Brockway Road			Brockway Road			Lookingglass Road			Lookingglass Road		
Base Volume Input [veh/h]	36	11	45	137	17	8	3	48	13	44	65	95
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	5.00	15.00	0.00	5.00	4.00	0.00	33.00	0.00	13.00	0.00	7.00	6.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	1	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	36	11	46	137	17	8	3	48	13	44	65	95
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	11	3	14	40	5	2	1	14	4	13	19	28
Total Analysis Volume [veh/h]	42	13	54	161	20	9	4	56	15	52	76	112
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0


Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.02	0.05	0.29	0.03	0.01	0.00	0.00	0.00	0.03	0.00	0.00
d_M, Delay for Movement [s/veh]	12.05	12.78	9.46	14.86	14.56	12.17	7.96	0.00	0.00	7.42	0.00	0.00
Movement LOS	B	B	A	B	B	B	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.53	0.53	0.53	1.49	1.49	1.49	0.01	0.01	0.01	0.10	0.10	0.10
95th-Percentile Queue Length [ft/ln]	13.20	13.20	13.20	37.35	37.35	37.35	0.25	0.25	0.25	2.62	2.62	2.62
d_A, Approach Delay [s/veh]	10.85			14.70			0.42			1.61		
Approach LOS	B			B			A			A		
d_I, Intersection Delay [s/veh]	7.16											
Intersection LOS	B											

Intersection Level Of Service Report
Intersection 2: Abraham Avenue / Lookingglass Road

Control Type:	Two-way stop	Delay (sec / veh):	15.0
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.062

Intersection Setup

Name	Lookingglass Road		Lookingglass Road		Abraham Avenue	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	35.00		30.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	Lookingglass Road		Lookingglass Road		Abraham Avenue	
Base Volume Input [veh/h]	22	144	153	81	74	11
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	2.00	4.00	2.00	5.00	9.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	1	0	0
Total Hourly Volume [veh/h]	22	144	153	82	74	11
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	42	45	24	22	3
Total Analysis Volume [veh/h]	26	169	180	96	87	13
Pedestrian Volume [ped/h]	14		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0


Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.06	0.18	0.12	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	15.00	10.29	7.85	0.00	0.00	0.00
Movement LOS	B	B	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.95	0.95	0.43	0.43	0.00	0.00
95th-Percentile Queue Length [ft/ln]	23.76	23.76	10.66	10.66	0.00	0.00
d_A, Approach Delay [s/veh]	10.92		5.12		0.00	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	6.20					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 3: Cary Street / Lookingglass Road

Control Type:	Two-way stop	Delay (sec / veh):	12.8
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.043

Intersection Setup

Name	Cary Street		Lookingglass Road		Lookingglass Road	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	Cary Street		Lookingglass Road		Lookingglass Road	
Base Volume Input [veh/h]	18	26	158	29	25	219
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	7.00	0.00	0.00	14.00	4.00	1.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	18	26	158	29	25	219
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	8	46	9	7	64
Total Analysis Volume [veh/h]	21	31	186	34	29	258
Pedestrian Volume [ped/h]	1		1		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results





V/C, Movement V/C Ratio	0.04	0.04	0.00	0.00	0.02	0.00
d_M, Delay for Movement [s/veh]	12.77	9.75	0.00	0.00	7.76	0.00
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.26	0.26	0.00	0.00	0.07	0.07
95th-Percentile Queue Length [ft/ln]	6.45	6.45	0.00	0.00	1.66	1.66
d_A, Approach Delay [s/veh]	10.97		0.00		0.78	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	1.42					
Intersection LOS	B					

Intersection Level Of Service Report

Intersection 4: OR 42 / Brockway Road

Control Type:	Two-way stop	Delay (sec / veh):	31.2
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.290

Intersection Setup

Name	Brockway Road			Brockway Road			OR 42			OR 42		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	1	0	0	0	0	0	1	0	0	0
Exit Pocket Length [ft]	0.00	0.00	150.00	0.00	0.00	0.00	0.00	0.00	200.00	0.00	0.00	0.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Brockway Road			Brockway Road			OR 42			OR 42		
Base Volume Input [veh/h]	64	44	45	22	32	14	7	230	45	50	323	32
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	25.00	8.00	0.00	10.00	7.00	0.00	0.00	7.00	22.00	3.00	5.00	8.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	64	44	45	22	32	14	7	230	45	50	323	32
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	12	12	6	9	4	2	63	12	14	88	9
Total Analysis Volume [veh/h]	70	48	49	24	35	15	8	250	49	54	351	35
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results




V/C, Movement V/C Ratio	0.29	0.16	0.06	0.11	0.12	0.02	0.01	0.00	0.00	0.04	0.00	0.00
d_M, Delay for Movement [s/veh]	31.15	28.30	20.90	24.95	21.05	14.18	8.06	0.00	0.00	7.99	0.00	0.00
Movement LOS	D	D	C	C	C	B	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	2.79	2.79	2.79	0.95	0.95	0.95	0.02	0.02	0.02	0.13	0.13	0.13
95th-Percentile Queue Length [ft/ln]	69.77	69.77	69.77	23.82	23.82	23.82	0.51	0.51	0.51	3.37	3.37	3.37
d_A, Approach Delay [s/veh]	27.33			20.92			0.21			0.98		
Approach LOS	D			C			A			A		
d_I, Intersection Delay [s/veh]	6.69											
Intersection LOS	D											

Intersection Level Of Service Report

Intersection 5: OR 42 / Abraham Avenue

Control Type:	Two-way stop	Delay (sec / veh):	53.9
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.760

Intersection Setup

Name	Abraham Avenue		OR 42		OR 42	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00		30.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	Abraham Avenue		OR 42		OR 42	
Base Volume Input [veh/h]	187	13	13	378	376	258
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.00	0.00	0.00	7.00	5.00	3.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	1	0	0	0	0	0
Total Hourly Volume [veh/h]	188	13	13	378	376	258
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	51	3	3	102	101	69
Total Analysis Volume [veh/h]	202	14	14	406	404	277
Pedestrian Volume [ped/h]	13		0		2	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results



V/C, Movement V/C Ratio	0.76	0.03	0.02	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	53.89	47.16	9.07	0.00	0.00	0.00
Movement LOS	F	E	A	A	A	A
95th-Percentile Queue Length [veh/ln]	6.06	6.06	0.05	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	151.39	151.39	1.19	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	53.45		0.30		0.00	
Approach LOS	F		A		A	
d_I, Intersection Delay [s/veh]	8.86					
Intersection LOS	F					

Intersection Level Of Service Report

Intersection 6: OR 42 / Cary Street

Control Type:	Two-way stop	Delay (sec / veh):	54.0
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.502

Intersection Setup

Name	Cary Street		OR 42		OR 42	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	Cary Street		OR 42		OR 42	
Base Volume Input [veh/h]	67	23	16	597	667	42
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	7.00	0.00	12.00	6.00	5.00	4.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	1	0	1	1	0	0
Total Hourly Volume [veh/h]	68	23	17	598	667	42
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	18	6	5	159	177	11
Total Analysis Volume [veh/h]	72	24	18	636	710	45
Pedestrian Volume [ped/h]	9		1		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0




Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.50	0.06	0.02	0.01	0.01	0.00
d_M, Delay for Movement [s/veh]	53.96	37.54	9.61	0.00	0.00	0.00
Movement LOS	F	E	A	A	A	A
95th-Percentile Queue Length [veh/ln]	2.92	2.92	0.07	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	72.91	72.91	1.73	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	49.86		0.26		0.00	
Approach LOS	E		A		A	
d_I, Intersection Delay [s/veh]	3.30					
Intersection LOS	F					

Intersection Level Of Service Report
Intersection 7: OR 42 / Main Street (OR 99)

Control Type:	Signalized	Delay (sec / veh):	18.5
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.717

Intersection Setup

Name	N Main St / OR 42		S Main St		OR 42	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	1	0
Entry Pocket Length [ft]	125.00	100.00	100.00	225.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	1
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	500.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		No		Yes	

Volumes

Name	N Main St / OR 42		S Main St		OR 42	
Base Volume Input [veh/h]	233	488	324	623	564	183
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.00	7.00	6.00	5.00	10.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	233	488	324	623	564	183
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	61	128	85	164	148	48
Total Analysis Volume [veh/h]	245	514	341	656	594	193
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume [ped/h]	5		0		4	
v_di, Inbound Pedestrian Volume [ped/h]	4		0		5	
v_co, Outbound Pedestrian Volume [ped/h]	0		0		0	
v_ci, Inbound Pedestrian Volume [ped/h]	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	1		2		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Overlap	Permissive	Unsignalized
Signal Group	1	6	2	8	8	0
Auxiliary Signal Groups				2,8		
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	4	10	10	8	8	0
Maximum Green [s]	25	40	40	30	30	0
Amber [s]	3.5	3.8	3.8	3.8	3.8	0.0
All red [s]	2.0	2.0	2.0	1.3	1.3	0.0
Split [s]	0	0	0	0	0	0
Vehicle Extension [s]	2.5	6.1	6.1	2.5	2.5	0.0
Walk [s]	0	0	7	7	7	0
Pedestrian Clearance [s]	0	0	18	18	18	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No	No		No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	3.5	3.8	3.8	3.1	3.1	0.0
Minimum Recall	No	No	Yes	Yes	Yes	
Maximum Recall	No	No	No	No	No	
Pedestrian Recall	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L
C, Cycle Length [s]	80	80	80	80	80
L, Total Lost Time per Cycle [s]	5.50	5.80	5.80	5.10	5.10
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	3.50	3.80	3.80	0.00	3.10
g_i, Effective Green Time [s]	14	41	22	55	27
g / C, Green / Cycle	0.18	0.52	0.28	0.69	0.34
(v / s)_i Volume / Saturation Flow Rate	0.15	0.16	0.11	0.46	0.20
s, saturation flow rate [veh/h]	1614	3148	3174	1420	2981
c, Capacity [veh/h]	285	1639	873	980	1022
d1, Uniform Delay [s]	31.90	10.96	23.52	7.08	21.54
k, delay calibration	0.08	0.42	0.42	0.47	0.08
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.63	0.42	1.10	3.44	0.39
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.86	0.31	0.39	0.67	0.58
d, Delay for Lane Group [s/veh]	37.52	11.38	24.61	10.52	21.93
Lane Group LOS	D	B	C	B	C
Critical Lane Group	Yes	No	No	Yes	Yes
50th-Percentile Queue Length [veh/ln]	4.88	2.47	2.65	5.75	4.38
50th-Percentile Queue Length [ft/ln]	121.96	61.72	66.19	143.71	109.57
95th-Percentile Queue Length [veh/ln]	8.50	4.44	4.77	9.68	7.82
95th-Percentile Queue Length [ft/ln]	212.52	111.10	119.13	242.01	195.41

Movement, Approach, & Intersection Results

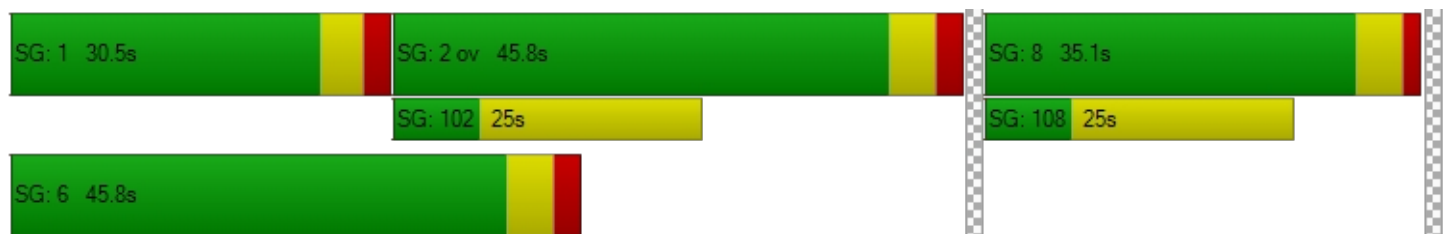
d_M, Delay for Movement [s/veh]	37.52	11.38	24.61	10.52	21.93	0.00
Movement LOS	D	B	C	B	C	
d_A, Approach Delay [s/veh]	19.82		15.34		21.93	
Approach LOS	B		B		C	
d_I, Intersection Delay [s/veh]	18.45					
Intersection LOS	B					
Intersection V/C	0.717					

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	29.60	0.00	29.60
I_p,int, Pedestrian LOS Score for Intersection	2.508	0.000	2.577
Crosswalk LOS	B	F	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1004	1004	753
d_b, Bicycle Delay [s]	9.89	9.89	15.49
I_b,int, Bicycle LOS Score for Intersection	2.186	2.382	1.560
Bicycle LOS	B	B	A

Sequence

Ring 1	1	2	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-







Intersection Level Of Service Report

Intersection 8: OR 42 / NW Jorgen Street

Control Type:	Two-way stop	Delay (sec / veh):	157.7
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.589

Intersection Setup

Name	N Main St / OR 42			N Main St / OR 42			NW Jorgen St			NW Jorgen St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	250.00	100.00	100.00	200.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	N Main St / OR 42			N Main St / OR 42			NW Jorgen St			NW Jorgen St		
Base Volume Input [veh/h]	9	1096	20	46	941	25	23	0	11	16	3	50
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	5.00	0.00	0.00	4.00	11.00	0.00	0.00	0.00	0.00	0.00	3.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	9	1096	20	46	941	25	23	0	11	16	3	50
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	295	5	12	253	7	6	0	3	4	1	13
Total Analysis Volume [veh/h]	10	1178	22	49	1012	27	25	0	12	17	3	54
Pedestrian Volume [ped/h]	0			0			8			1		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results




V/C, Movement V/C Ratio	0.01	0.01	0.00	0.08	0.01	0.00	0.59	0.00	0.02	0.38	0.09	0.12
d_M, Delay for Movement [s/veh]	10.48	0.00	0.00	11.68	0.00	0.00	157.68	183.71	80.16	119.85	151.29	48.25
Movement LOS	B	A	A	B	A	A	F	F	F	F	F	E
95th-Percentile Queue Length [veh/ln]	0.05	0.00	0.00	0.27	0.00	0.00	2.54	2.54	2.54	2.97	2.97	2.97
95th-Percentile Queue Length [ft/ln]	1.14	0.00	0.00	6.80	0.00	0.00	63.51	63.51	63.51	74.23	74.23	74.23
d_A, Approach Delay [s/veh]	0.09			0.53			132.54			68.88		
Approach LOS	A			A			F			F		
d_I, Intersection Delay [s/veh]	4.43											
Intersection LOS	F											

Intersection Level Of Service Report

Intersection 9: OR 42 / NW Lookingglass Road

Control Type:	Two-way stop	Delay (sec / veh):	532.4
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.898

Intersection Setup

Name	Lookingglass Road		OR 42		OR 42	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1
Entry Pocket Length [ft]	100.00	100.00	175.00	100.00	100.00	200.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	Lookingglass Road		OR 42		OR 42	
Base Volume Input [veh/h]	170	25	11	1087	969	202
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.00	0.00	0.00	8.00	6.00	1.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	170	25	11	1087	969	202
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	44	7	3	283	252	53
Total Analysis Volume [veh/h]	177	26	11	1132	1009	210
Pedestrian Volume [ped/h]	1		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results




V/C, Movement V/C Ratio	1.90	0.05	0.02	0.01	0.01	0.00
d_M, Delay for Movement [s/veh]	532.39	500.75	11.35	0.00	0.00	0.00
Movement LOS	F	F	B	A	A	A
95th-Percentile Queue Length [veh/ln]	16.87	16.87	0.06	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	421.64	421.64	1.45	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	528.34		0.11		0.00	
Approach LOS	F		A		A	
d_I, Intersection Delay [s/veh]	41.86					
Intersection LOS	F					

Intersection Level Of Service Report
Intersection 10: OR 42 / Pepsi Road

Control Type: Two-way stop
 Analysis Method: HCM 6th Edition
 Analysis Period: 15 minutes

Delay (sec / veh): 227.3
 Level Of Service: F
 Volume to Capacity (v/c): 0.657

Intersection Setup

Name	Pepsi Road		OR 42		OR 42	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	1	0
Entry Pocket Length [ft]	100.00	100.00	100.00	150.00	275.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00		55.00		55.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	Pepsi Road		OR 42		OR 42	
Base Volume Input [veh/h]	17	88	1335	27	102	1214
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	5.00	5.00	0.00	1.00	4.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	1	0	0	1	1
Total Hourly Volume [veh/h]	17	89	1335	27	103	1215
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	23	351	7	27	320
Total Analysis Volume [veh/h]	18	94	1405	28	108	1279
Pedestrian Volume [ped/h]	1		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0


Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.66	0.25	0.01	0.00	0.23	0.01
d_M, Delay for Movement [s/veh]	227.30	105.54	0.00	0.00	14.82	0.00
Movement LOS	F	F	A	A	B	A
95th-Percentile Queue Length [veh/ln]	5.82	5.82	0.00	0.00	0.87	0.00
95th-Percentile Queue Length [ft/ln]	145.52	145.52	0.00	0.00	21.71	0.00
d_A, Approach Delay [s/veh]	125.11		0.00		1.15	
Approach LOS	F		A		A	
d_I, Intersection Delay [s/veh]	5.32					
Intersection LOS	F					

Intersection Level Of Service Report**Intersection 11: S Main Street / Thompson Avenue**

Control Type:	Two-way stop	Delay (sec / veh):	26.9
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.114

Intersection Setup

Name	S Main Street		S Main Street		Thompson Avenue	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	125.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name	S Main Street		S Main Street		Thompson Avenue	
Base Volume Input [veh/h]	534	37	137	250	20	120
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.00	3.00	4.00	5.00	0.00	5.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	1	0	0
Total Hourly Volume [veh/h]	534	37	137	251	20	120
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	145	10	37	68	5	33
Total Analysis Volume [veh/h]	580	40	149	273	22	130
Pedestrian Volume [ped/h]	0		0		4	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0





Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.16	0.00	0.11	0.19
d_M, Delay for Movement [s/veh]	0.00	0.00	9.57	0.00	26.93	13.59
Movement LOS	A	A	A	A	D	B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.56	0.00	1.30	1.30
95th-Percentile Queue Length [ft/ln]	0.00	0.00	14.12	0.00	32.43	32.43
d_A, Approach Delay [s/veh]	0.00		3.38		15.52	
Approach LOS	A		A		C	
d_I, Intersection Delay [s/veh]	3.17					
Intersection LOS	D					

Intersection Level Of Service Report
Intersection 12: SE Grape Avenue / Thompson Avenue

Control Type:	Two-way stop	Delay (sec / veh):	10.6
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.008

Intersection Setup

Name	SE Grape Avenue			Parkway Dr			Thompson Avenue			Thompson Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	SE Grape Avenue			Parkway Dr			Thompson Avenue			Thompson Avenue		
Base Volume Input [veh/h]	7	0	2	4	0	26	35	33	4	0	41	3
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	50.00	0.00	0.00	0.00	0.00	0.00	0.00	4.00	0.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	7	0	2	4	0	26	35	33	4	0	41	3
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	0	1	1	0	8	10	10	1	0	12	1
Total Analysis Volume [veh/h]	8	0	2	5	0	31	41	39	5	0	48	4
Pedestrian Volume [ped/h]	4			4			0			3		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.01	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	10.00	10.28	8.59	10.56	10.37	8.70	7.38	0.00	0.00	7.30	0.00	0.00
Movement LOS	A	B	A	B	B	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.04	0.04	0.04	0.12	0.12	0.12	0.08	0.08	0.08	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.98	0.98	0.98	2.96	2.96	2.96	2.03	2.03	2.03	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	9.72			8.96			3.56			0.00		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	3.95											
Intersection LOS	B											

Attachment B – Serious Injury and Pedestrian and Bicycle Crashes Map

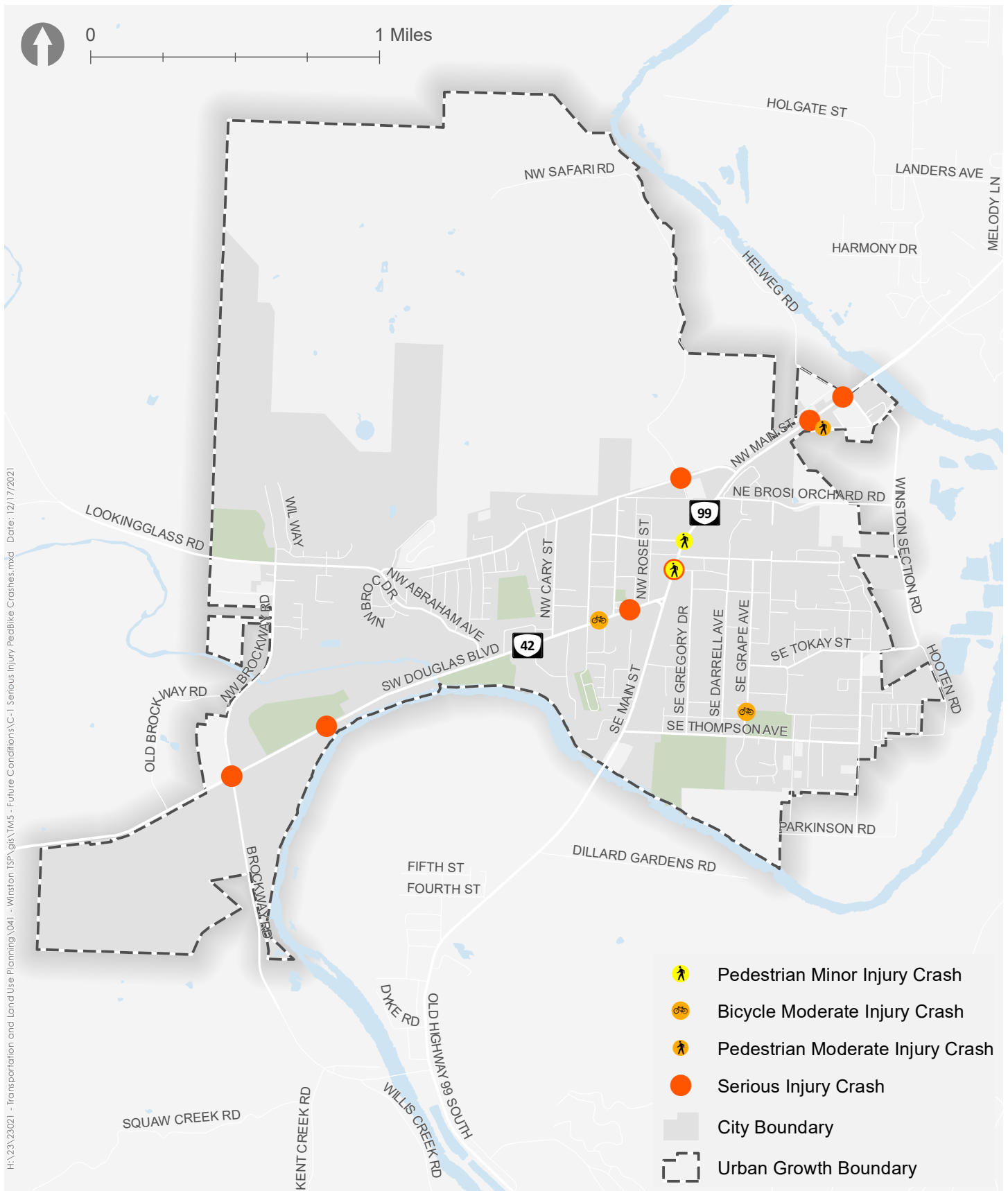


Figure B-1

Serious Injury and Pedestrian and Bicycle Crashes (2015-2019) Winston, Oregon

Attachment C – Pedestrian and Bicycle LTS and Safety Risk Maps

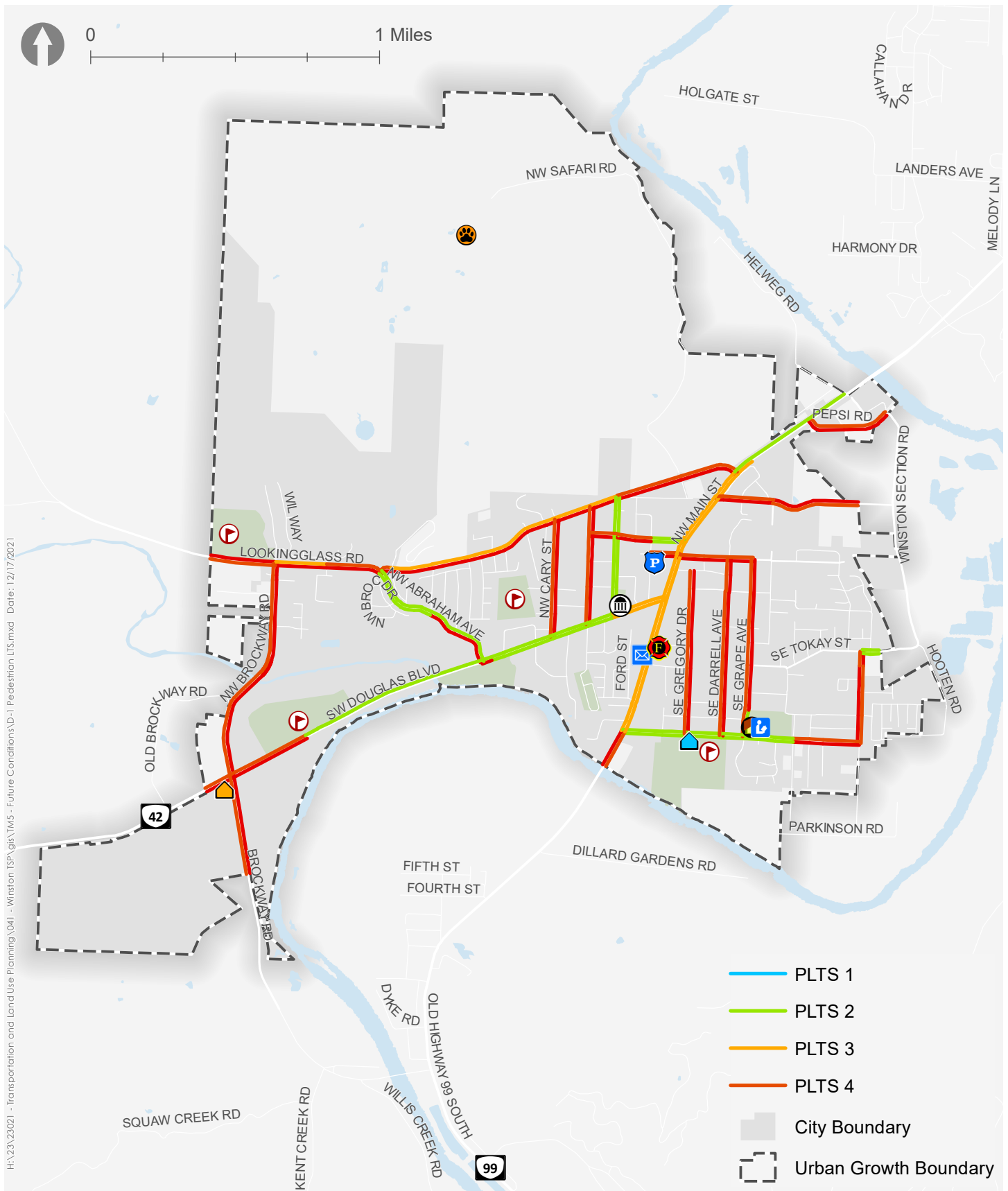


Figure C-1

Pedestrian Level of Traffic Stress Winston, Oregon

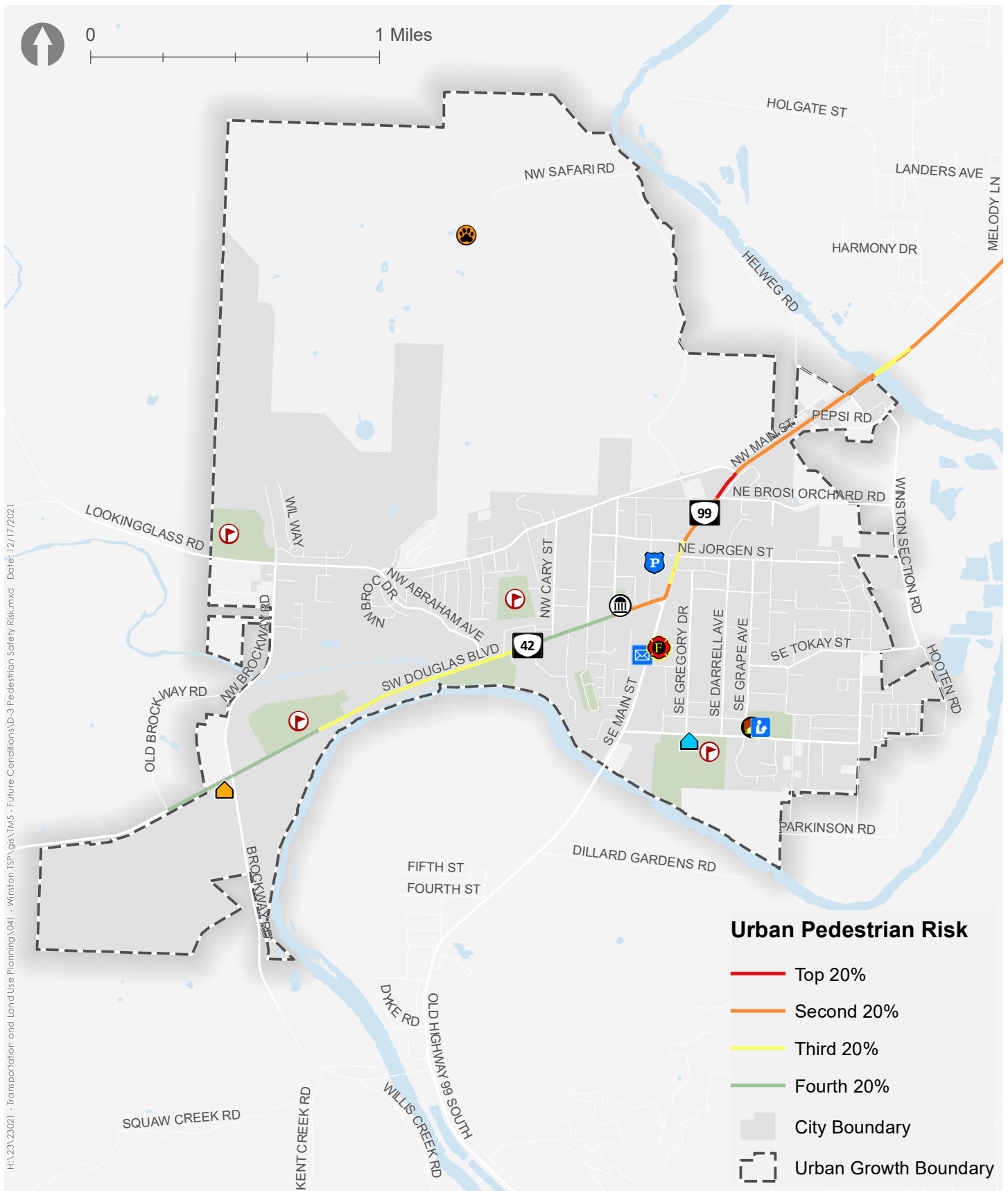
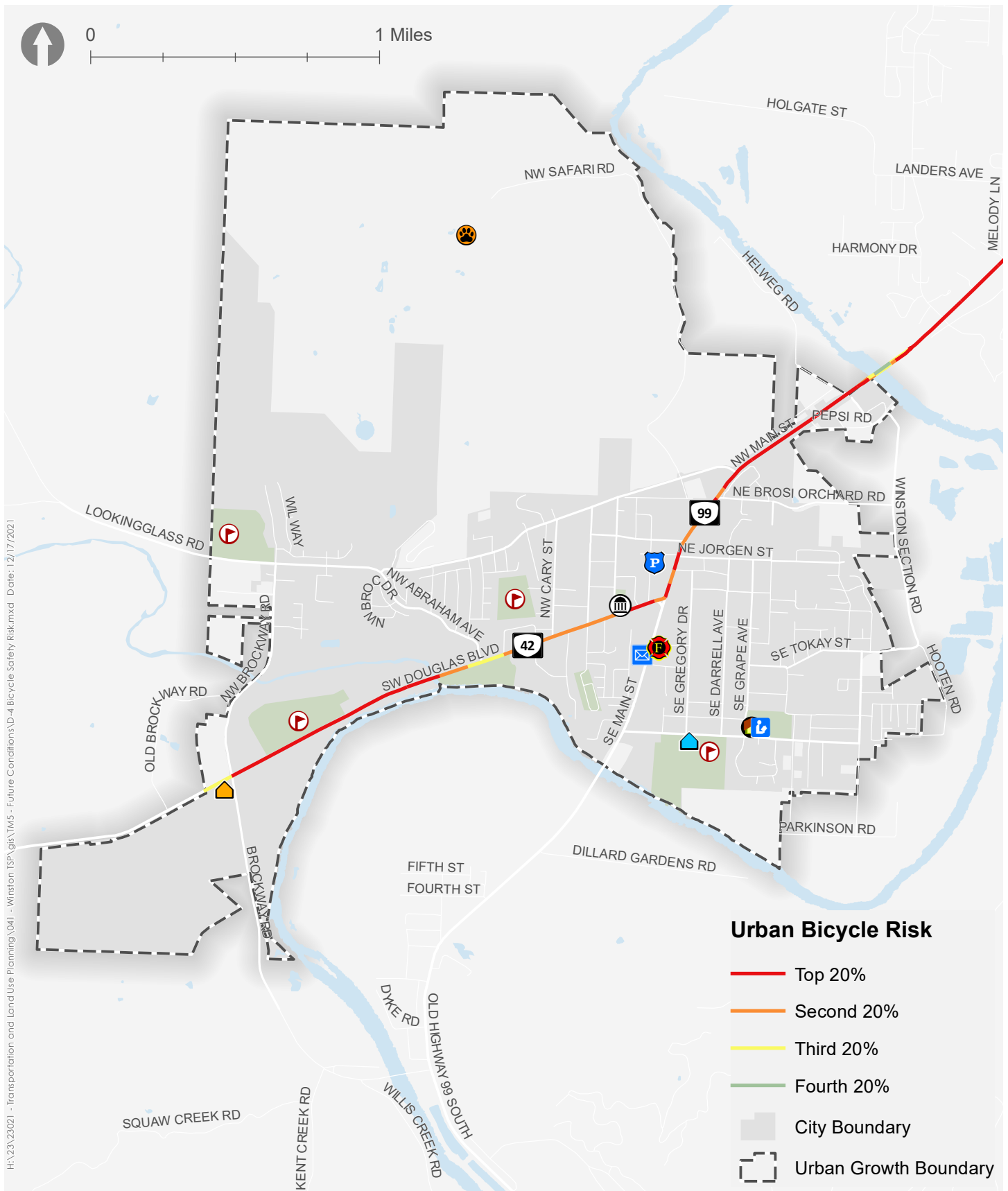


Figure C-3

Pedestrian Safety Risk Winston, Oregon



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Figure C-4

Bicycle Safety Risk Winston, Oregon