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MEMORANDUM

Date: January 7, 2021 Project #: 23641.0

To: Virginia Elandt, Oregon Department of Transportation
Karl Macnair, City of Medford

From: Matt Hughart, AICP, Matt Bell, and Miranda Barrus, Kittelson & Associates, Inc.

Project: I-5 Exit 30 Interchange Area Management Plan (IAMP)

Subject: Final Tech Memo #5: Future Full-Build Conditions

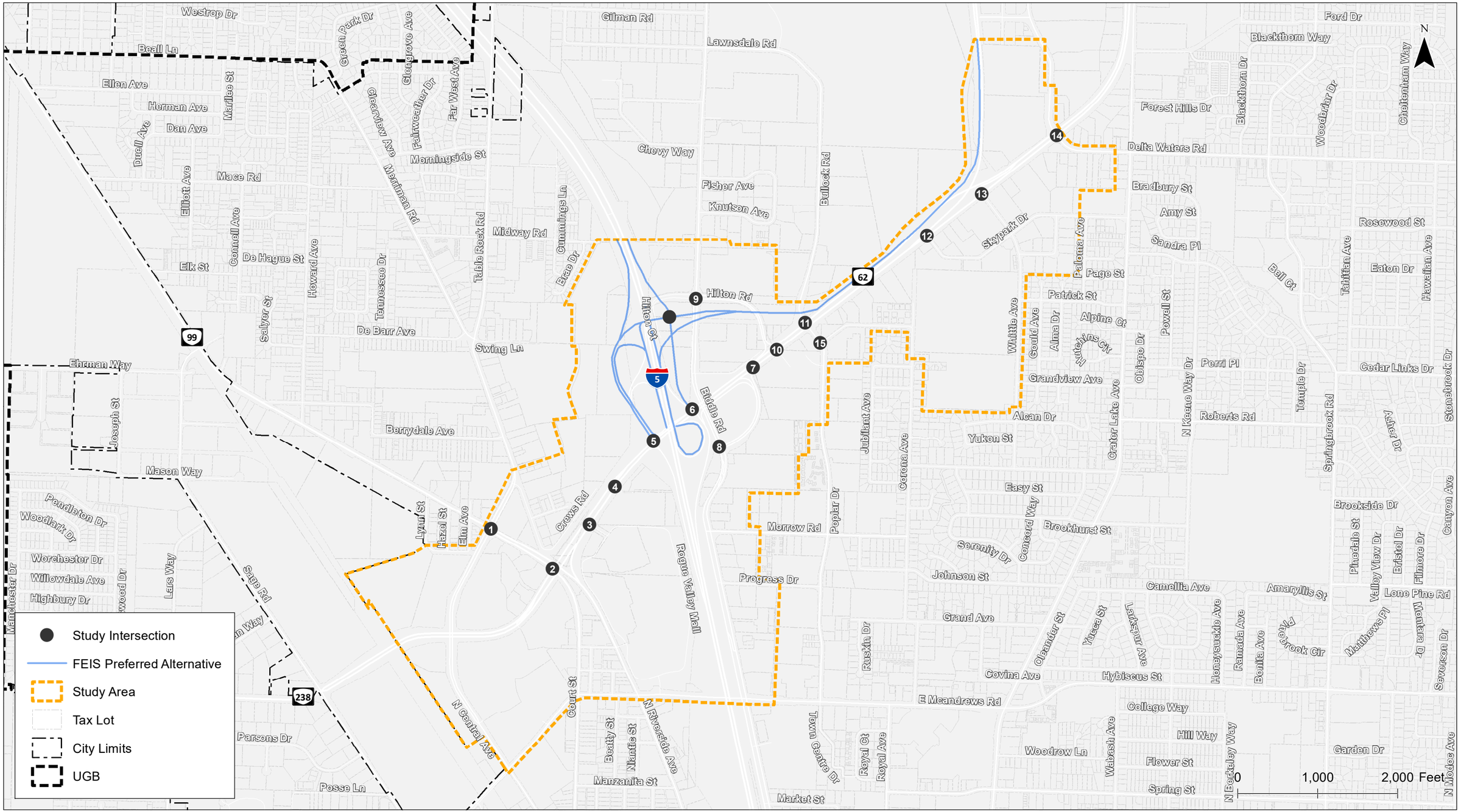
This memorandum summarizes future year 2042 full-build traffic conditions in the Interchange Management Study Area (IMSA) for the I-5 Exit 30 Interchange Area Management Plan (IAMP). Figure 1 illustrates the IMSA. This memorandum includes the results of the future full-build traffic operations analysis, future multimodal analysis, and future freight analysis. This memorandum also includes potential solutions to address transportation system deficiencies. For the purpose of this memorandum, full-build refers to full build-out of the Final Environmental Impact Statement (FEIS) Split Diamond Interchange form without any additional intersection modifications other than those necessary to accommodate new turning movements.

FUTURE FULL BUILD TRAFFIC OPERATIONS ANALYSIS

FEIS – Split Diamond Interchange Description

In 2013, an FEIS was adopted by ODOT and area agencies that determined a new alignment for an OR 62 bypass. The bypass was constructed and opened to traffic in early 2020 as documented in previous technical memorandums. Also included in the FEIS were a number of improvement concepts that were identified to address forecast longer-term regional circulation and capacity constraints. One such improvement is a new split diamond interchange that would directly connect the southern extent of the bypass to I-5 Exit 30. Graphical illustrations are included in Exhibit 1 that show how the recently constructed bypass and existing interchange are envisioned to be modified with inclusion of the FEIS Split Diamond Interchange concept. Major circulation changes associated with the FEIS include:

- Closure of the cut-and-cover: The bypass will no longer have a direct connection to OR 62. Instead, all bypass traffic will connect to the new interchange ramps and frontage roads. As a result, most intersections within the interchange vicinity would see significant traffic pattern and volume changes.
- Changes at the I-5 ramp terminals: The I-5 southbound off-ramp and I-5 northbound on-ramp will be significantly modified to accommodate the split diamond interchange form and to accommodate traffic to/from the new bypass.



Study Intersections
Medford, Oregon

Figure
1

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Coordinate System: NAD 1983 2011 StatePlane Oregon South FIPS 3602 Ft Intl
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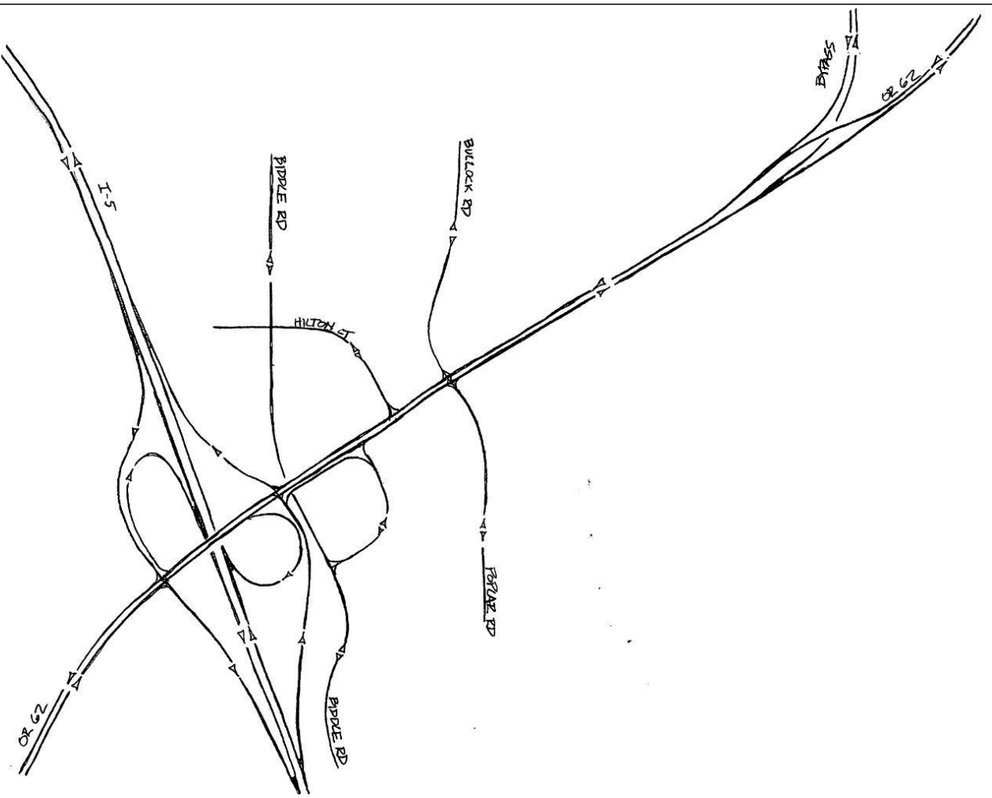


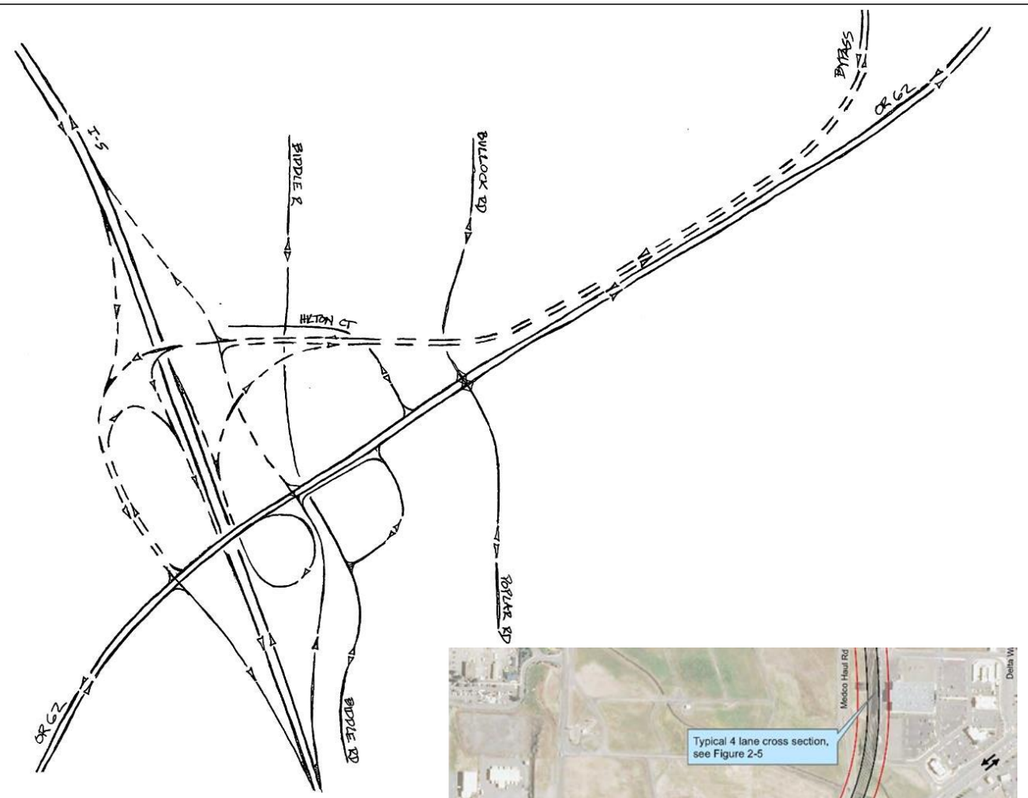
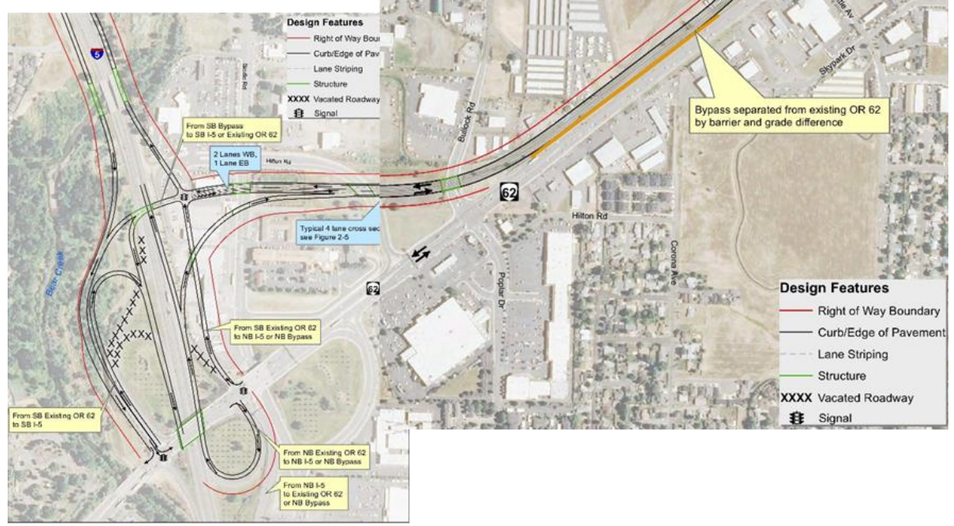


Exhibit 1:

- Single line drawing of the existing Exit 30 interchange, OR 62 corridor, and bypass
- Single line drawing of how the Exit 30 interchange, OR 62 corridor, and bypass would be conceptually modified with the inclusion of the FEIS Split Diamond Interchange (dashed lines represent new roadway connections)
- Conceptual double line drawing of the modified Exit 30 interchange, OR 62 corridor, and bypass with the FEIS Split Diamond Interchange



Traffic Volume Redistribution with FEIS Split Diamond Interchange

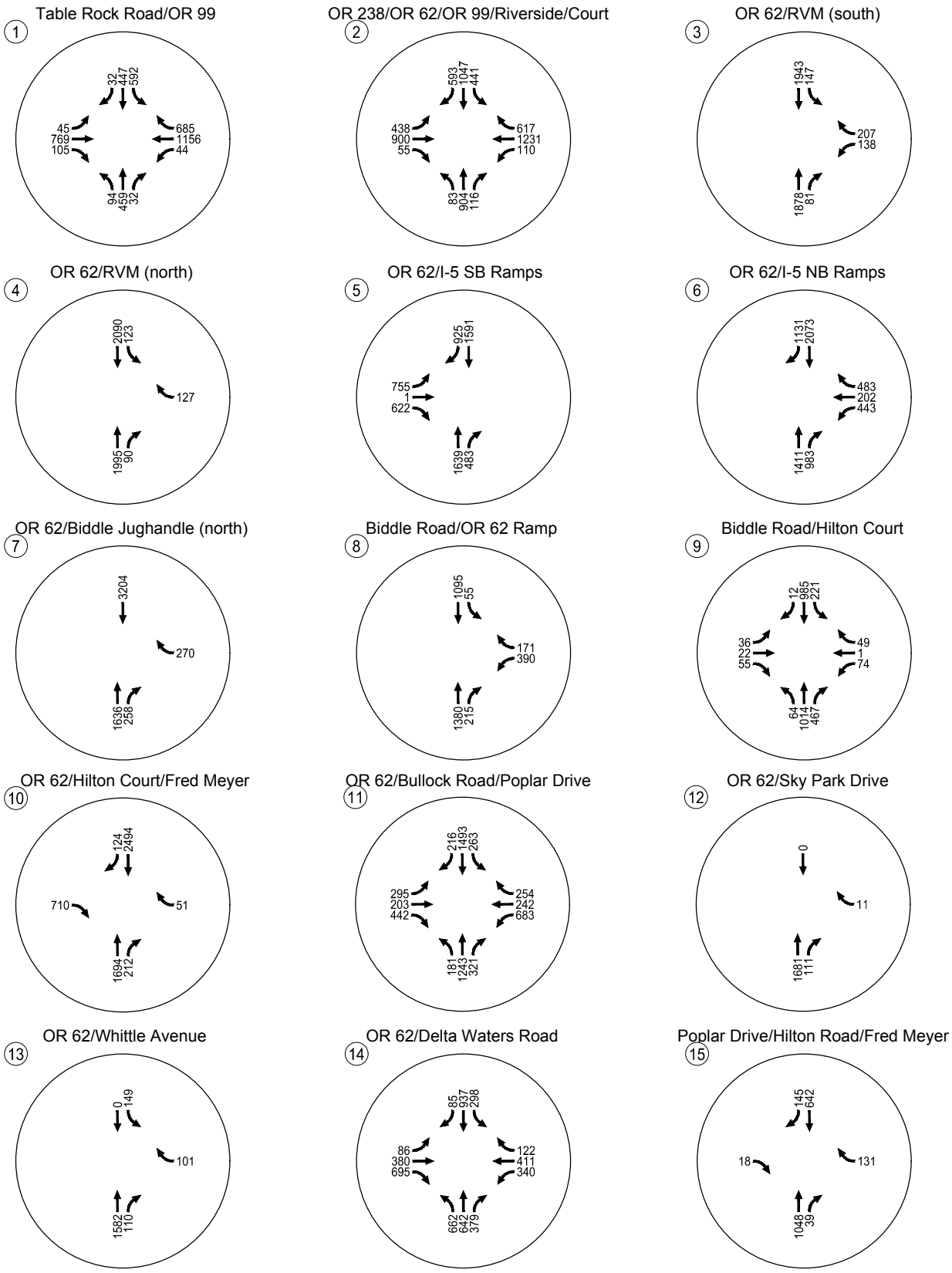
As noted in Technical Memorandum #4, forecast 2042 traffic volumes were developed for the study area intersections based on anticipated growth in the local and regional study area. With the inclusion of the FEIS Split Diamond Interchange shown in Exhibit 1, it is recognized that some of the forecast traffic movements will redistribute within the study area and at individual intersections. This redistribution is anticipated to result in the following significant changes:

- Through traffic volumes on OR 62 west of the Bullock Road-Poplar Drive intersection will reduce as the highway will no longer have a direct connection to the bypass.
- Bypass related traffic volumes to/from Bullock Road-Poplar Drive will experience a directional shift at OR 62 due to new travel patterns.
- The I-5 southbound ramp terminal at OR 62 will experience a significant increase in traffic volumes as it will be the new portal for southbound bypass-related travel demand.
- The I-5 northbound ramp terminal at OR 62 will experience a significant increase in traffic volumes as it will be the new portal for northbound bypass-related travel demand.

While these roadway segments and intersections are projected to see significant changes, it should be noted that most of the other major study area intersections such as the OR 62-OR 238 / OR 99-Court Street-N Riverside Avenue (Big X) and OR 62 / Delta Waters intersections will remain unchanged. Figure 1 shows the study intersections and Figure 2 shows the resulting volume redistribution assumptions.

Intersection Operations Analysis with FEIS Split Diamond Interchange

While the 2013 FEIS identified the Split Diamond Interchange in conceptual form, it did not provide a detailed assessment of operational impacts at the study intersections when accounting for the anticipated redistribution of traffic volumes shown in Figure 2. To test these operational impacts, no traffic control or geometric enhancements were assumed with the inclusion of volumes shown in Figure 2 other than those necessary to accommodate routing changes. Table 1 summarizes the resulting intersection operations analysis results and compares them to applicable mobility standards and targets. As shown, several study intersections are forecast to exceed their applicable mobility standards and targets. *Attachment A contains the future full-build traffic conditions HCM 6th Edition and HCM 2000 worksheets.*



Redistribution of Future 2042 Full Build Traffic Volumes with FEIS Split Diamond Interchange, Weekday PM Peak Hour
Medford, Oregon

Figure 2

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Table 1: Future Full-Build Intersection Operations with FEIS Split Diamond Interchange

Map ID	Location	Control Type	Mobility Standard/Target	CM	V/C	Del	LOS
1	OR 99 / Table Rock Road	Signal	0.95	N/A	0.87	42.1	D
2	OR 62-OR 238 / OR 99-Court Street-N Riverside Avenue	Signal	0.90	N/A	**0.99**	67.3	E
3	OR 62 / Rogue Valley Mall entrance (west)	Signal	0.90	N/A	0.83	12.0	B
4	OR 62 / Rogue Valley Mall entrance (east, at Target)	Unsignalized	0.90 N-S/0.95 E-W	SBL	**>1.0**	>80.0	F
5[1]	OR 62 / I-5 Southbound Ramp Terminal	Signal	0.85[3]	N/A	**>1.0**	>80.0	F
6[1]	OR 62 / I-5 Northbound Ramp Terminal	Signal	0.85[3]	N/A	**>1.0**	48.6	D
7[2]	OR 62 / Biddle Road (north end of jug handle)	Unsignalized	0.85 N-S/0.95 E-W	WBR	0.30	10.5	B
8[1]	OR 62 / Biddle Road (south end of jug handle)	Signal	0.95	N/A	0.91	25.5	C
9	Biddle Road / Hilton Court	Signal	0.95	N/A	0.67	14.4	B
10[2]	OR 62 / Hilton Court-Fred Meyer Parking Lot Entrance	Unsignalized	0.85 N-S/0.90 5E-W	EBR	**0.93**	39.7	F
11	OR 62 / Bullock Road-Poplar Drive	Signal	0.85	N/A	**0.89**	>80.0	F
12	OR 62 / Sky Park Drive	Unsignalized	0.85 N-S/0.95 E-W	WBL	0.04	19.3	C
13	OR 62 / Whittle Avenue	Unsignalized	0.90 N-S/0.95 E-W	SBL	0.44	23.1	C
14	OR 62 / Delta Waters Road	Signal	0.90/LOS D[4]	N/A	**>1.0**	>80.0	F
15	Poplar Drive / Hilton Road	Unsignalized	LOS D	WBR	0.35	19.0	C

[1]Lane configurations not supported by HCM 2010 or 6th Edition methodologies, therefore, HCM 2000 results are reported.
[2]The HCM 2010 and HCM 6th Edition analysis results do not reflect field observations. Therefore, the HCM 2000 analysis results are reported.
[3]This mobility target may be increased to as much as 0.90 through the IAMP adoption process.
[4]City and State mobility standards and targets are shown given recent jurisdictional transfer of infrastructure within the study corridor.

The following intersections are forecast to exceed their respective mobility standards and targets under these conditions:

- OR 62-OR 238 / OR 99-Court Street-N Riverside Avenue – intersection operations are consistent with the previously documented 2042 no-build analysis.
- OR 62 / Rogue Valley Mall entrance (east, at Target) – intersection operations are consistent with the previously documented 2042 no-build analysis.
- OR 62 / I-5 Southbound Ramp Terminal – intersection operations diminish from the previously documented 2042 no-build analysis and capacity is exceeded due to the increase in bypass-related travel demand on the modified I-5 SB off-ramp.
- OR 62 / I-5 Northbound Ramp Terminal – intersection operations diminish from the previously documented 2042 no-build analysis and capacity is exceeded due to the increase in travel demand generated by OR 62 traffic destined to the new bypass connection.
- OR 62 / Hilton Court-Fred Meyer Parking Lot Entrance – intersection operations improve from the previously documented 2042 no-build analysis due to the decrease in travel demand on OR 62.
- OR 62 / Bullock Road-Poplar Drive – intersection operations improve from the previously documented 2042 no-build analysis due to the decrease in travel demand on OR 62.
- OR 62 / Delta Waters Road – intersection operations are consistent with the previously documented 2042 no-build analysis.

Potential solutions are investigated later in this memorandum for the signalized intersections listed above not meeting their mobility standard and target.

Queueing Analysis

Provided that select study intersections within the IMSA are forecast to be impacted by full build-out of the FEIS Split Diamond Interchange project, it is expected that unaffected study intersections will experience similar traffic queues. Therefore, a queuing analysis was conducted using SimTraffic microsimulation software within Synchro 10 for the study intersections forecasted to experience changes in traffic volume. Table 2 summarizes the 95th percentile queues during the weekday PM peak hour under future year 2042 full-build traffic conditions and indicates if existing storage can accommodate future queues. The vehicle queue and storage lengths were rounded to the nearest 25-feet. The turning movement storage lengths reflect the striped storage for each turn-lane pocket at the intersections and the through movement storage lengths reflect the distance to the nearest adjacent intersection and/or driveway. *Attachment B contains the SimTraffic reports.*

Table 2: Future Full-Build Queuing Analysis

Map ID	Location	Movement[1]	Storage Length (Feet)	95th Percentile Queue (Feet)	Adequate?
5	OR 62 / I-5 Southbound Ramp Terminal	NBT (x3)	670	200-475	Yes
		NBR	75	100	**No**
		SBT (x2)	530	225	Yes
		SBR	625	50	Yes
		EBL	200	350	Yes[3]
		EBTL	200	375	Yes[3]
		EBR	350	1,250	**No**
6	OR 62 / I-5 Northbound Ramp Terminal	NBT (x3)	530	325-725	**No**
		SBT (x3)	1,100	425-1,025	Yes
		SBR	295	575	Yes[6]
		WBL	675	525	Yes
		WBLTR	675	650	Yes
		WBR	675	475	Yes
7	OR 62 / Biddle Road (north end of jug handle)	WBR	1,125	50	Yes
8	OR 62 / Biddle Road (south end of jug handle)	NBT-TR	275	1,525	**No**
		SBL	100	75	Yes
		SBT (x2)	640	175-200	Yes
		WBL	875	450	Yes
		WBLR	875	625	Yes
9	Biddle Road / Hilton Court	NBL	320	200	Yes
		NBT (x2)	425	2,375-2,400	**No**
		NBR	220	350	**No**
		SBL	175	300	Yes[5]
		SBT-TR	540	1,325-1,350	Yes[2]
		EBL	375	575	Yes[6]
		EBTR	300	775	Yes[2]
		WBL (x2)	220	50-75	Yes
		WBTR	220	50	Yes
10	OR 62 / Hilton Court-Fred Meyer Parking Lot Entrance	NBR	90	0	Yes
		EBR	1,200	1,225	Yes[6]

Map ID	Location	Movement[1]	Storage Length (Feet)	95th Percentile Queue (Feet)	Adequate?
		WBR	200	50	Yes
11	OR 62 / Bullock Road-Poplar Drive	NBL	450	375	Yes
		NBT (x2)	360	425	Yes[2]
		NBTR	360	350	Yes
		SBL (x2)	410	275-425	Yes[8]
		SBT (x3)	2200	375-450	Yes
		SBR	425	450	Yes[8]
		EBL (x2)	350	175-600	**No**
		EBT	165	1,250	Yes[2]
		EBR	150	200	**No**
		WBL (x2)	250	275	Yes[6]
		WBT	930	300	Yes
		WBR	450	350	Yes

[1]WB= Westbound, SB = Southbound, EB = Eastbound, NB = Northbound, L = Left, T = Through, R = Right
[2]Sufficient storage is available, but queue blocks nearest driveway or minor street intersection.
[3]Additional storage is available on the southbound ramp, outside of the deceleration lane.
[5]Additional storage is available in the center two-way left-turn lane on Biddle Road.
[6]Additional storage is available in the through lane(s).
[7]Queue extends onto private property.
[8]Sufficient storage is available for this queue beyond the striped storage.

As shown in Table 2, 95th percentile queues for one or more movements at the following study intersections are forecast to exceed their current striped storage in 2042:[1]

- 5: OR 62 / I-5 Southbound Ramp Terminal – the northbound right-turn queue exceeds its striped storage and the eastbound right-turn queue exceeds its striped storage, blocking the outside (right) southbound lane of I-5.
- 6: OR 62 / I-5 Northbound Ramp Terminal – the northbound through queues block the upstream signalized intersection.
- 8: OR 62 / Biddle Road (south end of jug handle) – the northbound through-through/right queues block the upstream signalized intersection.
- 9: Biddle Road / Hilton Court – the northbound through queues block the upstream signalized intersection and the northbound right-turn queue exceeds its striped storage.
- 11: OR 62 / Bullock Road-Poplar Drive – the eastbound left- and right-turn queues exceed their striped storage.

[1] While it is important to be mindful of vehicle queues potentially impacting upstream signalized intersections, it is equally important to consider the trade-offs associated with capacity improvements intended to solve long queues. These improvements (e.g. adding lanes, providing free movements, etc.) have the potential to negatively impact other transportation modes, particularly walking and biking. Further, traffic modeling software such as Synchro is more effective for analyzing improvements for an existing deficiency, rather a long-range, forecasted deficiency. It is likely that as queues lengthen over time, drivers will choose alternate routes on the system, but this cannot be emulated in the modeling software.

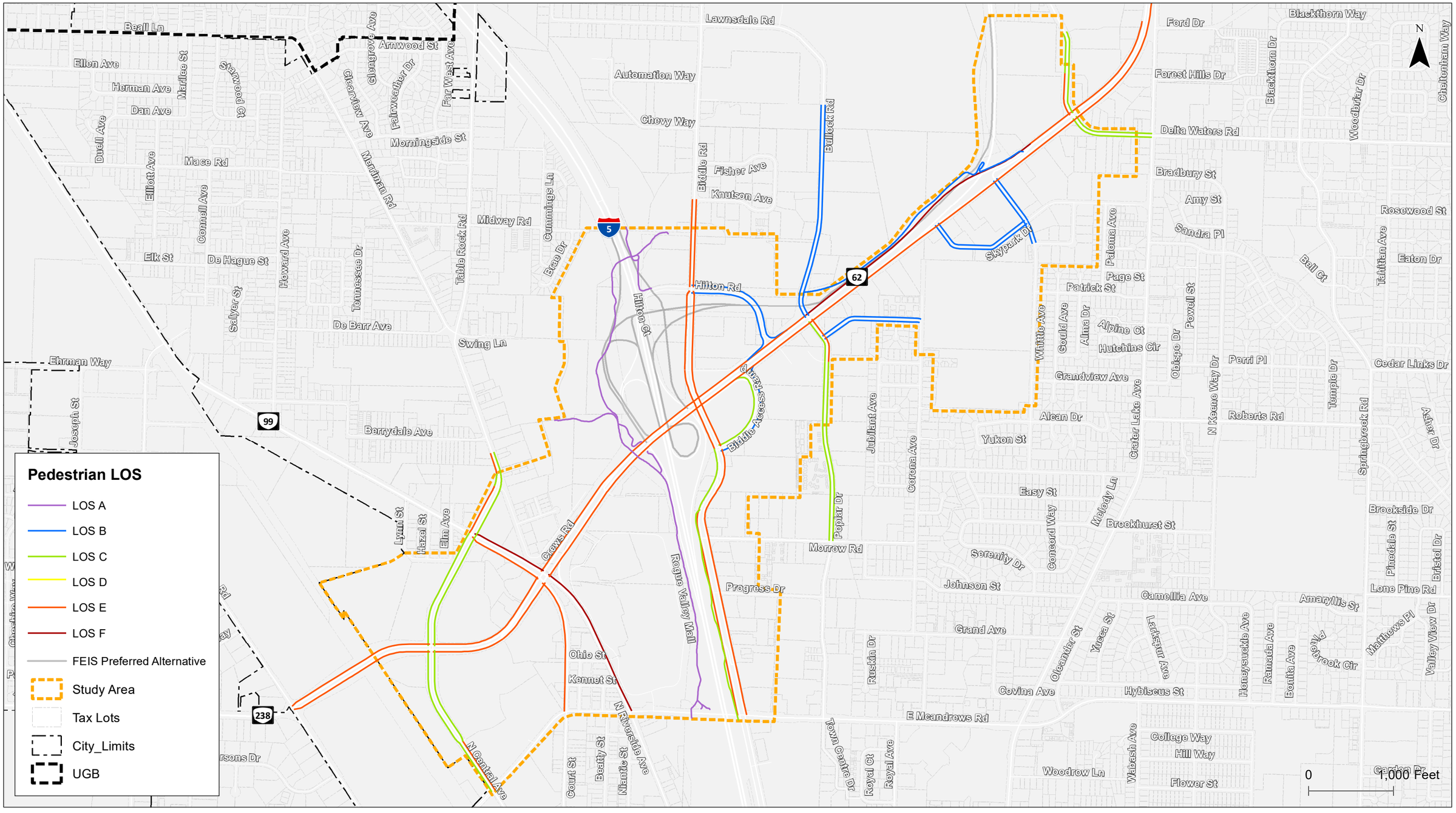
FUTURE MULTIMODAL ANALYSIS

The pedestrian, bicycle, and transit facilities and services within the IMSA were evaluated under year 2042 full-build traffic conditions in accordance with the simplified Multimodal Level-of-Service (LOS) analysis methodologies identified in Chapter 14 of the ODOT Analysis Procedures Manual (APM). Per the APM, these methodologies are intended for use when a detailed analysis is desired or when a no-build alternative is compared to one or more build alternatives. These methodologies are not meant for defining overall needs or making prioritization decisions, rather they are meant for evaluating alternatives. Multimodal LOS scores are based on user perceptions (traveler satisfaction) and are graded from best (LOS A) to worst (LOS F). A more detailed description of how the scores were developed is provided in *Tech Memo 2 Appendix C: Traffic Operations Analysis.* The results of the future multimodal analysis are summarized below.

Pedestrian Level of Service

As described in *Tech Memo 2C: Traffic Operations Analysis*, the simplified multimodal LOS analysis methodology uses four variables to estimate Pedestrian LOS. The only variable that is expected to change under year 2042 full-build conditions is directional traffic volume. Directional traffic volumes along OR 62 are expected to decrease between the I-5 SB Ramp Terminal and Skypark Drive as all traffic to/from the bypass will travel through the interchange; the only exception is the segment between the I-5 SB and NB Ramp Terminals where northbound traffic volumes are expected to increase. Turning movement volumes at the study intersection are also expected to increase and decrease along the corridor as traffic redistributes; however, the net difference is an overall decrease, except as noted above.

Figure 3 illustrates the future Pedestrian LOS analysis results for major roadways (collector and above) in the IMSA. As shown, most facilities are expected to continue to operate at LOS E with the exception of the segments with relatively low traffic volumes and/or travel speeds, such as Biddle Road, Bullock Road, and Poplar Drive. The segment of OR 62 from Bullock Road to the right-in/right-out commercial driveway is shown as LOS F; however, the shared-use path that runs parallel to OR 62 is LOS A. The segments that changed relative to existing conditions include Biddle Road from Morrow Road to the Jug Handle (the northbound segment changed from LOS C to LOS E) and the Jug Handle from OR 62 to Biddle Road (the southbound segment changed from LOS B to LOS C). *A tabulated summary of the Pedestrian LOS analysis results is provided in Attachment C*.



Pedestrian Level of Service (LOS)
Future Full-build Traffic Conditions
Medford, Oregon

Figure
3

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Coordinate System: NAD 1983 2011 StatePlane Oregon South FIPS 3602 Ft Intl

Bicycle Level of Service

As described in *Tech Memo 2C: Traffic Operations Analysis*, the simplified multimodal LOS analysis methodology uses four variables to estimate Bicycle LOS. However, none of the variables are expected to change under year 2042 full-build conditions.

Figure 4 illustrates the future Bicycle LOS analysis results for major roadways (collector and above) in the IMSA. As shown, most facilities are expected to continue to operate at LOS D with the exception of the segments with relatively low traffic volumes and/or travel speeds, such as Bullock Road. The segment of OR 62 from Poplar Road to Delta Waters Road is show as LOS F, despite buffered bike lanes, due to the number of unsignalized conflicts along the roadway. *A tabulated summary of the Bicycle LOS analysis results is provided in Attachment C.*

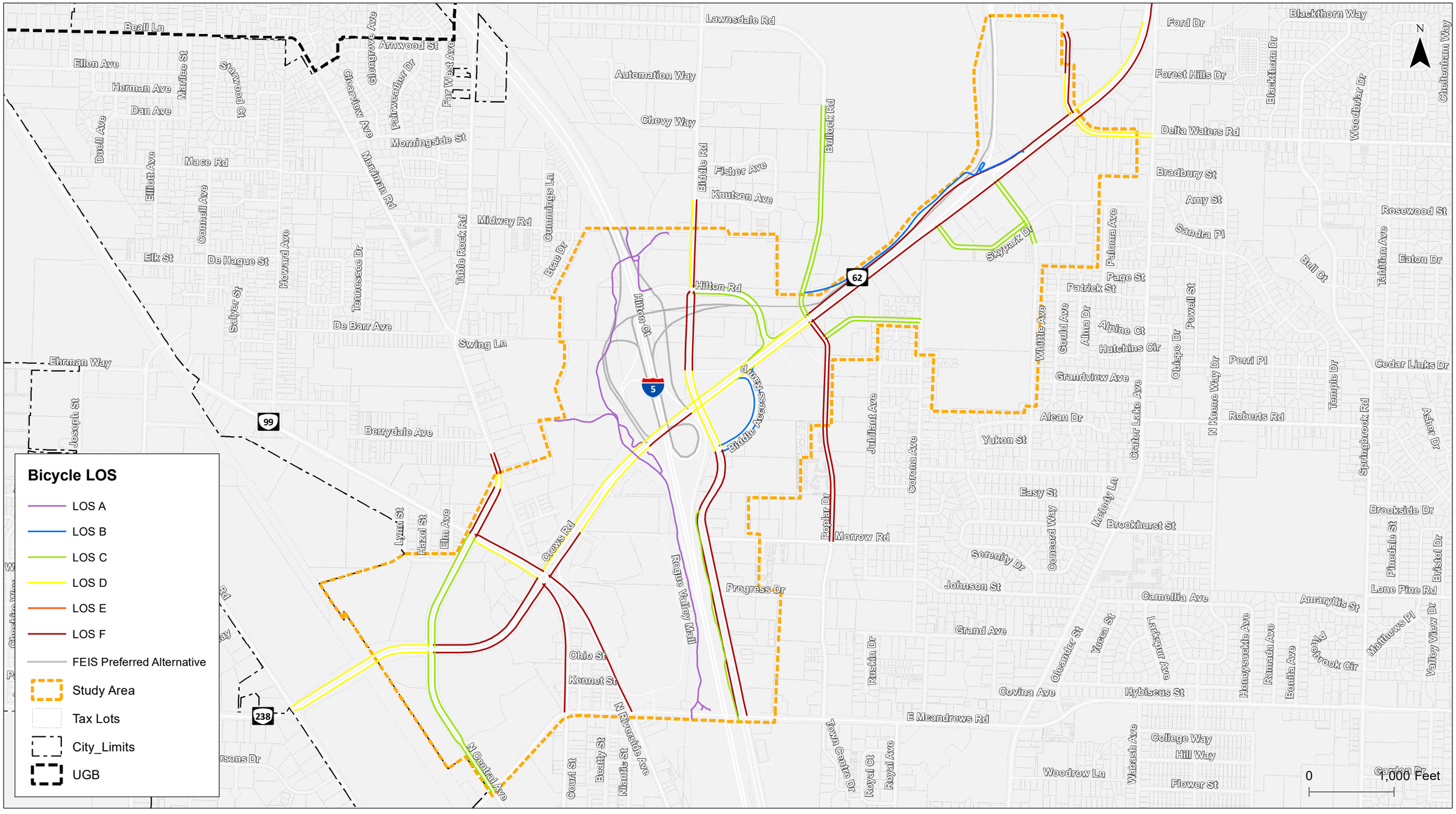
Transit Level of Service

As described in *Tech Memo 2C: Traffic Operations Analysis*, the simplified multimodal LOS analysis methodology uses four variables to estimate Transit LOS. The only variable that is expected to change under year 2042 full-build conditions is Pedestrian LOS. However, as indicated above, the changes are expected to be minimal.

Figure 5 illustrates the future Transit LOS analysis results for roadways in the IMSA with fixed-route transit service. As shown, the TLOS results continue to vary significantly between the roadways. Roadways that are served by multiple bus lines or by bus lines with shorter headways and/or travel times have better LOS. *A tabulated summary of the Transit LOS analysis results is provided in Attachment C.*

FUTURE FREIGHT ANALYSIS

The future freight analysis identifies potential issues with freight movements on designated freight routes within the IMSA, including freight route restrictions, bottlenecks, over-dimension load pinch points. As indicated in *Tech Memo 2B: Transportation Inventory*, the majority of state highways within the IMSA are designated freight routes and/or National Highway System (NHS) routes. Therefore, they have been designed to accommodate large trucks and the intersections have been designed to accommodate large truck turning movements. The Motor Carrier Transportation Division (MCTD) Freight Mobility Map also identifies the majority of state highways in the IMSA as *Orange Routes*, or generally unrestricted freight and oversize/overweight routes; OR 238 is identified as a *Magenta Route*, which is a route with some restrictions for both length and width. The inventory also indicates that there are no freight bottlenecks or over dimension load pinch points within the IMSA. Therefore, the only potential issues with future freight movements are the traffic operations and safety issues identified in this memo.



Bicycle Level of Service (LOS)
Future Full-build Traffic Conditions
Medford, Oregon

Figure **4**

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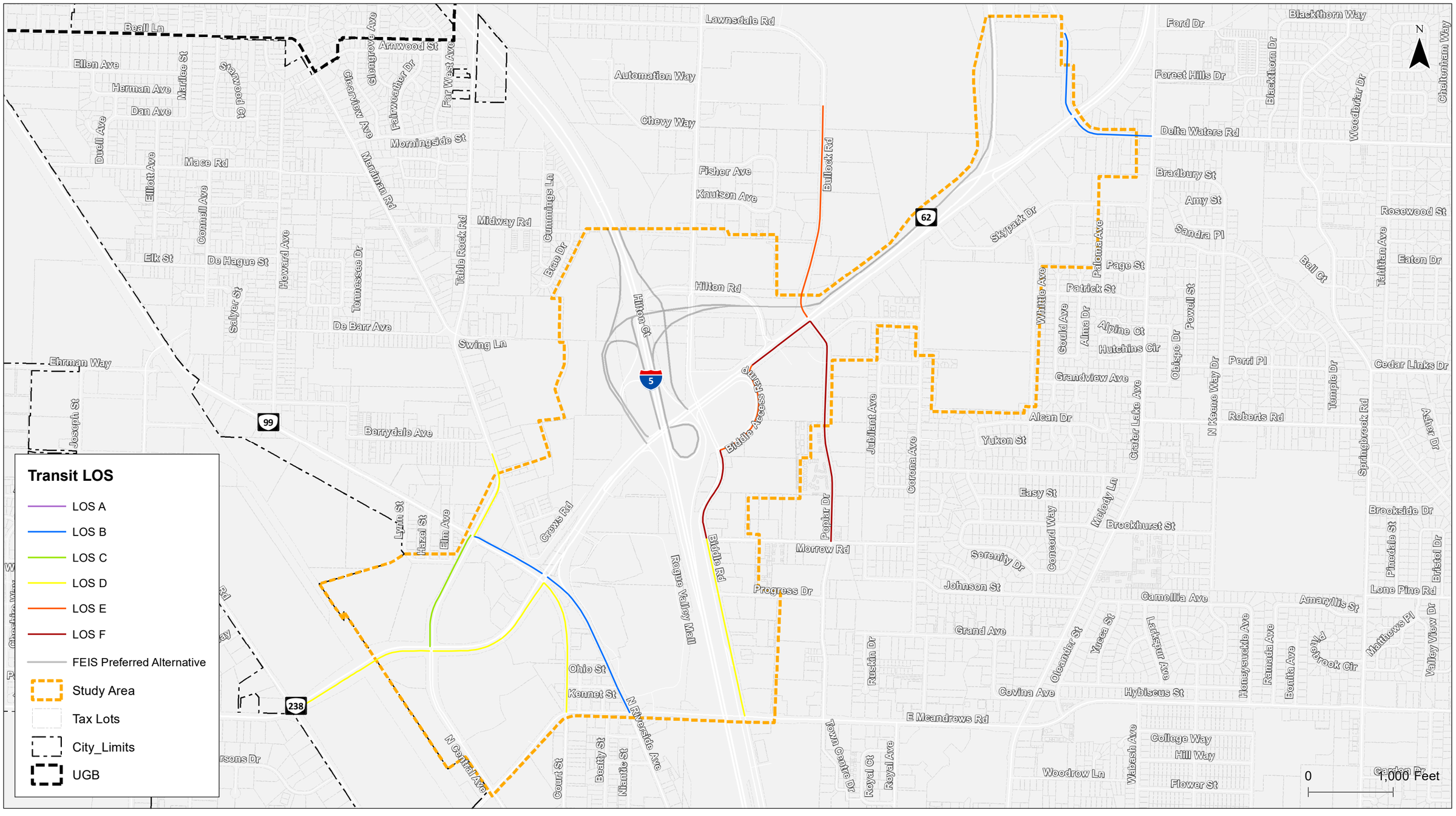
Coordinate System: NAD 1983 2011 StatePlane Oregon South FIPS 3602 Ft Intl



Transit Level of Service (LOS)
Future Full-build Traffic Conditions
Medford, Oregon

Figure **5**

Coordinate System: NAD 1983 2011 StatePlane Oregon South FIPS 3602 Ft Intl

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POTENTIAL SOLUTIONS

This section presents potential solutions to address transportation system deficiencies identified by the future full-build analysis. This section includes solutions that can be implemented on an incremental basis, prior to full build-out of the FEIS, and solutions that can be implemented along with the FEIS to address traffic operations. Potential solutions are provided for the following study intersections, which are forecast to exceed their applicable mobility standards and targets:

- OR 62-OR 238 / OR 99-Court Street-N Riverside Avenue
- OR 62 / Delta Waters Road
- OR 62 / I-5 SB Terminal
- OR 62 / I-5 NB Terminal
- OR 62 / Bullock Road-Poplar Drive

The intersection operations analysis of these potential solutions was conducted following the same methodology used in the intersection operations analysis described earlier in this memorandum. The following sections describe the approach to developing potential solutions at these intersections for the year 2042 following construction of the FEIS Split Diamond Interchange project.

The potential solutions evaluated through the intersection operations analysis aimed to increase capacity and achieve applicable mobility targets at the study intersections. While capacity improvements may provide benefit to vehicular traffic, such as lane additions or enabling turn movements to be free, they may also impact other modes such as walking, biking, and taking transit. Therefore, multimodal solutions are presented following the intersection capacity solutions. In instances where solutions may increase intersection capacity but do not achieve applicable mobility targets, alternative mobility targets are required as part of the solution where allowed.

Potential Solutions Uninfluenced by the FEIS Split Diamond Interchange

The signalized intersections within the study area listed below are expected to be uninfluenced by the FEIS Split Diamond Interchange project and have similar flows in traffic volumes after its construction:

- OR 62-OR 238 / OR 99-Court Street-N Riverside Avenue
- OR 62 / Delta Waters Road

The following sections summarize the deficiencies and potential solutions at these study intersections and tabulate the intersection operations analysis results associated with each potential solution.

OR 62-OR 238 / OR 99-Court Street-N Riverside Avenue

The OR 62-OR 238 / OR 99-Court Street-N Riverside Avenue intersection is expected to exceed its applicable mobility standard and target and operate near capacity in 2042 with or without full build-out of the FEIS. This is primarily driven by the northbound, southbound, and westbound through movements. Further, the northbound left-, northbound right-, eastbound left-, and westbound right-turn queues

exceed their striped storage and the northbound through and eastbound through-through/right queues block upstream signalized intersections. The following potential solutions were evaluated to increase capacity and storage for these movements.

- **Solution #1:** Convert the northbound (OR 238) right-turn lane into a shared through-right turn; and construct a third, outside receiving lane on the north leg (OR 62). This solution requires modification to the existing signal pole and mast arm for northbound traffic.
- **Solution #2:** Construct a third southbound (OR 62) left-turn lane and a third receiving lane on the east leg (Court Street). This solution potentially requires property acquisition.
- **Solution #3:** Convert the northbound (OR 238) right-turn lane into a shared through-right turn and construct a third, outside receiving lane on the north leg (OR 62); Construct a third southbound (OR 62) left-turn lane and a third receiving lane on the east leg (Court Street). This solution requires modification to the existing signal pole and mast arm for northbound traffic and potential property acquisition.
- **Solution #4:** Restrict the eastbound (OR 99) left-turn movements by removing the turn lanes. This solution does not improve capacity because it assumes that the eastbound (OR 99) left-turn volumes are reassigned to the northbound (OR 238) through lanes.
- **Solution #5:** Solution #1 + Solution #2; convert the eastbound (OR 99) shared through-right turn lane into a right-turn lane; and convert the outside eastbound (OR 99) left-turn lane into a through lane.
- **Solution #6:** Construct a second exclusive southbound (OR 62) right-turn lane. This improvement was identified in the Northgate Center Development Agreement in May of 2012.
- **Solution #7:** Construct a flyover for the eastbound (OR 99) left-turn movements.
- **Solution #8:** Construct flyovers for the eastbound (OR 99) and westbound (N Riverside Avenue) left-turn movements.
- **Solution #9:** Construct a flyover for the southbound (OR 62) left-turn movements.
- **Solution #10:** Construct flyovers for the southbound (OR 62) and northbound (OR 238) left-turn movements.

Table 3 summarizes the intersection operations analysis results for the potential solutions listed above.

Table 3: Potential Solutions - OR 62-OR 238 / OR 99-Court Street-N Riverside Avenue

Solution	V/C	Delay (sec)	LOS	Mobility Standard/Target	Meets Standard/Target
#1	0.92	56.6	E	0.90	No
#2	0.94	57.8	E		No
#3	0.86	54.4	D		Yes
#4	*No Improvement*				No
#5	0.95	58.5	E		No
#6	0.99	61.0	E		No
#7	0.83	56.4	E		Yes
#8	0.82	39.9	D		Yes

#9	0.93	52.3	D		No
#10	0.47	40.6	D		Yes

OR 62 / Delta Waters Road

While the OR 62 / Delta Waters Road intersection was not identified in the City of Medford Transportation System Plan (TSP) to need improvements by the year 2038, the intersection is expected to exceed its applicable mobility standard and operate over capacity in 2042 with or without full build-out of the FEIS. This is primarily driven by the northbound left-turn movements and the southbound approach. The following potential solutions were evaluated to increase capacity for these movements.

- **Solution #1:** Construct a second southbound (OR 62) left-turn lane and a second southbound (OR 62) right-turn lane.
- **Solution #2:** Construct a second southbound (OR 62) left-turn lane and a second westbound (Delta Waters Road) left-turn lane and restripe the westbound approach as two left-turn lanes, a through lane, and a right-turn lane.
- **Solution #3:** Construct a second southbound (OR 62) left-turn lane and a second southbound (OR 62) right-turn lane; and provide flashing yellow for the westbound and eastbound (Delta Waters Road) left-turn movements.
- **Solution #4:** Construct a second southbound (OR 62) left-turn lane and a second westbound (Delta Waters Road) left-turn lane; and construct a southbound (OR 62) right-turn lane.

Table 4 summarizes the intersection operations analysis results for the potential solutions listed above.

Table 4: Potential Solutions - OR 62 / Delta Waters Road

Solution	V/C	Delay (sec)	LOS	Mobility Standard/Target	Meets Standard/Target
#1	0.95	56.2	E	0.90	No
#2	0.86	54.4	D		Yes
#3	0.95	47.3	D		No
#4	0.83	47.3	D		Yes

Converting the traffic signal to a roundabout was also evaluated based on Exhibit 3-12 from the National Cooperative Highway Research Program (NCHRP) Report 672, *Roundabouts: An Informational Guide, Second Edition* (Reference 1 – NCHRP Report 672). The exhibit illustrates the vehicular demand at an intersection that is appropriate for a single- or double-lane roundabout by comparing the daily traffic volumes with the percentage of left-turn volumes. According to the exhibit, a roundabout at the OR 62 / Delta Waters Road intersection would require more than two lanes to provide sufficient capacity for the forecast 2042 traffic volumes. While a roundabout has the potential to improve level of stress for people walking and biking, more than two lanes introduces safety obstacles for vehicles by increasing the number of conflict points within the intersection and counteracts one of the primary goals: to improve intersection safety. For these reasons, a roundabout is not considered a feasible option.

Potential Solutions Influenced by the FEIS Split Diamon Interchange

The signalized intersections within the study area listed below are expected to be influenced by the FEIS Split Diamond Interchange project and have different flows in traffic volumes after its construction:

- OR 62 / I-5 Southbound Ramp Terminal
- OR 62 / I-5 Northbound Ramp Terminal
- OR 62 / Bullock Road-Poplar Drive

The following sections summarize the deficiencies and potential solutions at these study intersections and tabulate the intersection operations analysis results associated with each solution. The solutions that can be implemented on an incremental basis, prior to full build-out of the FEIS, are highlighted below.

OR 62 / I-5 Southbound Ramp Terminal

The OR 62 / I-5 Southbound Ramp Terminal intersection is expected to be significantly impacted by the FEIS Split Diamond Interchange project if the off-ramp location and lane configurations do not change. The intersection is expected to exceed its applicable mobility target but operate below capacity in 2042 with the FEIS. This is primarily driven by the eastbound approach, which includes volumes from the I-5 southbound off-ramp and the OR 62 bypass under full build-out of the FEIS. Further, the northbound right-turn queue is expected to exceed its striped storage and the eastbound right-turn queue is expected to exceed its striped storage, blocking the outside (right) southbound lane of I-5. All of the following solutions reflect a ramp terminal footprint that does not change before or after the FEIS Split Diamond Interchange project and can be implemented on an interim basis. However, the intersection would continue to exceed its applicable mobility target; therefore, an alternative mobility standard would be required for approval.

- **Solution #1:** Channelize the eastbound (I-5 SB Off-Ramp) right-turn lane and make the right-turn a free-flow movement. This would require a receiving lane on the south leg (OR 62) that merges back into traffic north of the downstream signal.
- **Solution #2:** Construct a second eastbound (I-5 Off-Ramp) right-turn lane.
- **Solution #3:** Construct a second eastbound (I-5 Off-Ramp) right-turn lane; and restripe the eastbound (I-5 Off-Ramp) approach as a right-turn lane, shared through-right-turn lane, and dual left-turn lanes.
- **Solution #4:** Construct a second eastbound (I-5 Off-Ramp) right-turn lane; restripe the eastbound (I-5 Off-Ramp) approach as a right-turn lane, shared through-right-turn lane, and dual left-turn lanes; and construct a second southbound (OR 62) right-turn lane.

Table 5Table 5 summarizes the intersection operations analysis results for the potential solutions listed above.

Table 5: Potential Solutions - OR 62 / I-5 Southbound Ramp Terminal

Solution	V/C	Delay (sec)	LOS	Mobility Standard/Target	Meets Standard/Target
#1	0.85	21.6	C	0.85	Yes
#2	0.85	63.4	E		Yes
#3	0.85	57.0	E		Yes
#4	0.85	50.5	D		Yes

OR 62 / I-5 Northbound Ramp Terminal

The OR 62 / I-5 Northbound Ramp Terminal intersection is expected to exceed its applicable mobility target and operate over capacity in 2042 with the FEIS. This is primarily driven by the northbound and southbound right-turn movements. Today, the off-ramp experiences queues that cause safety issues with I-5 through traffic. The issue is expected to be exacerbated in the future by traffic growth. Further, the northbound through queues block the upstream signalized intersection. The following potential solutions were evaluated to increase capacity and storage for these movements.

- **Solution #1:** Convert the southbound (OR 62) right-turn lane into a shared through-right turn lane; and construct an additional receiving lane on the south leg. This solution does not fully mitigate the intersection.
- **Solution #2:** Channelize and yield-control the southbound (OR 62) right-turn lane; and add a lane to the westbound (I-5 Off-Ramp) approach and restripe as a left-turn lane, shared left-through turn lane, and dual right-turn lanes. This solution does not fully mitigate the intersection.
- **Solutions #3-5:** Channelize and yield-control the southbound (OR 62) right-turn lane; and add a lane to the westbound (I-5 Off-Ramp) approach and restripe (#3: dual left-turn lanes, shared through-right turn lane, and right-turn lane; #4: left-turn lane, through lane, and dual right-turn lanes; #5: left-turn lane, shared left-through lane, shared through-right lane, and right-turn lane). These solutions do not fully mitigate the intersection.
- **Solution #6:** Channelize and yield-control the southbound (OR 62) right-turn lane; construct a southbound (OR 62) right-turn lane; and add a lane to the westbound (I-5 Off-Ramp) approach and restripe as a left-turn lane, a shared left-through lane, a shared through-right lane, and a right-turn lane. This solution does not fully mitigate the intersection.
- **Solution #7:** Channelize and yield-control the southbound (OR 62) right-turn lane; construct a southbound (OR 62) right-turn lane; add a lane to the westbound (I-5 Off-Ramp) approach and restripe as a left-turn lane, a shared left-through lane, a shared through-right lane, and a right-turn lane; and restripe the northbound (OR 62) approach as two through lanes, a shared through-right turn lane, and a right-turn lane.
- **Solution #8:** Restripe the southbound (OR 62) approach as two through lanes, a shared through-right turn lane, and a right-turn lane; add a lane to the westbound (I-5 Off-Ramp) approach and restripe as a left-turn lane, a shared left-through lane, a shared through-right lane, and a right-turn lane; and restripe the northbound (OR 62) approach as two through lanes, a shared through-right turn lane, and a right-turn lane.

- **Solution #9:** Construct an additional southbound (OR 62) through lane; channelize and yield-control the southbound (OR 62) right-turn lane; add a lane to the westbound (I-5 Off-Ramp) approach and restripe as a left-turn lane, a shared left-through lane, a shared through-right lane, and a right-turn lane; and restripe the northbound (OR 62) approach as two through lanes, a shared through-right turn lane, and a right-turn lane (this solution could be implemented on an interim basis to address traffic operations prior to full build-out of the FEIS). This solution does not fully mitigate the intersection.
- **Solution #10:** Construct a shared southbound (OR 62) through-right turn lane; add a lane to the westbound (I-5 Off-Ramp) approach and restripe as a left-turn lane, a shared left-through lane, a shared through-right lane, and a right-turn lane; and restripe the northbound (OR 62) approach as two through lanes, a shared through-right turn lane, and a right-turn lane (this solution could be implemented on an interim basis; however, the intersection would continue to exceed its applicable mobility target; therefore, an alternative mobility target would be required for approval).
- **Solution #11:** Make the southbound (OR 62) right-turn lane a free movement and construct a second receiving lane on the west leg (I-5 On-Ramp).
- **Solution #12:** Make the southbound (OR 62) right-turn lane a free movement and construct a second receiving lane on the west leg (I-5 On-Ramp); and remove the Biddle Road jug-handle connection and add a second westbound (I-5 Off-Ramp) right-turn lane (incorporates Biddle Road jug-handle traffic volumes).

Table 6 summarizes the intersection operations analysis results for the potential solutions listed above.

Table 6: Potential Solutions - OR 62 / I-5 Northbound Ramp Terminal

Solution	V/C	Delay (sec)	LOS	Mobility Standard/Target	Meets Standard/Target
#1	>1.00	>80.0	F	0.85	No
#2	>1.00	40.2	D		No
#3	>1.00	42.4	D		No
#4	>1.00	52.2	D		No
#5	>1.00	39.2	D		No
#6	0.98	27.8	C		No
#7	0.75	21.6	C		Yes
#8	0.89	25.9	C		Yes[1]
#9	>1.00	30.5	C		No
#10	0.79	21.8	C		Yes
#11	0.89	20.1	C		Yes[1]
#12	0.90	20.5	C		Yes[1]

[1] Policy 1F of the Oregon Highway Plan (OHP) allows a ramp terminal to have a v/c ratio of up to 0.90 if vehicle queues do not extend into the deceleration lane.

OR 62 / Bullock Road-Poplar Drive

The OR 62 / Bullock Road-Poplar Drive intersection is expected to exceed its applicable mobility standard and target but operate below capacity in 2042 with the FEIS. This is primarily driven by the eastbound and northbound right-turn movements and the westbound approach. Further, the eastbound left- and

right-turn queues exceed their striped storage. The following potential solutions were evaluated to increase capacity and storage for these movements.

- **Solution #1:** Allow the eastbound (Bullock Road) right-turn movements to overlap with non-conflicting left-turn movements.
- **Solution #2:** Restripe the eastbound (Bullock Road) approach as a left-turn lane, a through lane, and dual right-turn lanes.
- **Solution #3:** Construct a second eastbound (Bullock Road) right-turn lane.
- **Solution #4:** Construct a second eastbound (Bullock Road) right-turn lane and restripe the eastbound approach as a left-turn lane, a through lane, and dual right-turn lanes; channelize eastbound (Bullock Road) right-turn movements and allow them to overlap with non-conflicting left-turn movements; construct a northbound (OR 62) right-turn lane; and construct a second northbound (OR 62) left-turn lane and add a second receiving lane on the west leg (Bullock Road).
- **Solution #5:** Reconstruct the intersection, with its current mainline lane configurations, as a Restricted Crossing U-Turn (RCUT) intersection form; minor street right-turns include only two lanes.

Table 7 summarizes the intersection operations analysis results for the potential solutions listed above.

Table 7: Potential Solutions - OR 62 / Bullock Road-Poplar Drive

Solution	V/C	Delay (sec)	LOS	Mobility Standard/Target	Meets Standard/Target
#1	0.91	70.7	E	0.85	No
#2	0.91	75.7	E		No
#3	0.91	76.2	E		No
#4	0.84	58.0	E		Yes
#5	0.89 (Bullock Road Signal) 0.96 (Poplar Drive Signal	24.6 (Bullock Road Signal) 38.0 (Poplar Drive Signal	C (Bullock Road Signal) D (Poplar Drive Signal		No (Bullock Road Signal) No (Poplar Drive Signal

It should be noted that none of these solutions could be implemented on an interim basis to address traffic operations prior to full build-out of the FEIS. If the FEIS is not completed, other alternatives will need to be explored.

Converting the traffic signal to a roundabout was evaluated based on Exhibit 3-12 from *NCHRP Report 672*. According to the exhibit, a roundabout at the OR 62 / Bullock Road-Poplar Drive intersection would require more than two lanes to provide sufficient capacity for the forecast 2042 traffic volumes. While a roundabout has the potential to improve level of stress for people walking and biking, more than two lanes introduces safety obstacles for vehicles by increasing the number of conflict points within the intersection and counteracts one of the primary goals: to improve intersection safety. For these reasons, a roundabout is not considered a feasible option.

Multimodal Solutions

Multimodal solutions are needed along OR 62 as well as many other roadways within the study area to provide a comfortable environment for people to walk, bike, and take transit. As indicated above, most facilities are expected to operate at LOS E or LOS F, including those with existing sidewalks and on-street bike lanes. This is primarily due to relatively high traffic volumes and travel speeds as well as the number of through lanes in each direction and the widths (and type) of existing facilities. The following potential solutions were evaluated to improve multimodal LOS along the corridor.

- **Solution #1:** Fill in the gaps in the sidewalks and on-street bike lanes along study area roadways consistent with adjacent facilities. While this solution would not significantly improve multimodal LOS in all areas, it is sufficient in some areas and would provide continuous facilities along both sides of study area roadways.
- **Solution #2:** Widen the existing sidewalks and on-street bike lanes along study area roadways (and fill in the gaps). This solution would improve multimodal LOS; however, some facilities would continue to operate at LOS E or LOS F. This is due, in part, to the methodology, but also to the physical and operational characteristics of the roadways.
- **Solution #3:** Install shared-use paths along one or two sides of the study area roadways. This solution would significantly improve multimodal LOS but would likely require additional right-of-way and may not be feasible (or needed) in some areas.
- **Solution #4:** Implement a mix of Solutions #1, #2, and #3 based on the individual characteristics of the study areas roadways.

The following summarize the potential solutions along study area roadways. Given the nature of these solutions, all of them can be implemented on an incremental basis, prior to full build-out of the FEIS.

OR 62

- Install a 12-foot (min) shared-use path on the north/west side of the roadway from Central Avenue to Delta Waters Road consistent with the Rogue Valley Active Transportation Plan (RVATP) – this may require reconfiguring the north/west side of the roadway (e.g., reallocating the space currently used by the westbound bike lane to the path).
- Install enhanced crossing treatments and wayfinding along the shared-use path.
- Install a 7-foot (min) buffered bike lane on the south/east side of the roadway – this may require reconfiguring the south/east side of the roadway (e.g., narrowing the travel lanes).
- Install skip striping through major intersections and across on- and off-ramps.
- Install 1-2 enhanced crossings between the RV Mall Driveway and I-5 NB Ramp Terminal.

OR 99

- Widen the existing sidewalks on both sides of the roadway to 8-foot curb tight sidewalks or reconstruct the existing sidewalks as 6-foot sidewalks with 4-foot (min) buffers.
- Install 7-foot (min) buffered bike lanes on both sides of the roadway – this may require reconfiguring the roadway (e.g., narrowing the travel lanes).

Court Street

- Widen the existing sidewalks on both sides of the roadway to 8-foot curb tight sidewalks or reconstruct the existing sidewalks as 6-foot sidewalks with 4-foot (min) buffers.
- Install a 7-foot (min) buffered bike lane/separated bike lane on the west side of the roadway consistent with the RVATP – this may require reconfiguring the roadway (e.g., eliminating a travel lane).

Riverside Avenue

- Widen the existing sidewalks on both sides of the roadway to 8-foot curb tight sidewalks or reconstruct the existing sidewalks as 6-foot sidewalks with 4-foot (min) buffers.
- Install a 7-foot (min) buffered bike lane/separated bike lane on the east side of the roadway consistent with the RVATP – this may require reconfiguring the roadway (e.g., eliminating a travel lane).

Biddle Road

- Install 8-foot curb tight sidewalks or 6-foot sidewalks with 4-foot (min) buffers on the west side of the roadway from Knutson Avenue to Hilton Court.
- Widen the existing sidewalks on both sides of the roadway from Knutson Avenue to Hilton Court to 8-foot curb tight sidewalks and/or reconstruct the existing sidewalks as 6-foot sidewalks with 4-foot (min) buffers.
- Fill in the gaps in the sidewalks on the west side of the roadway from North of Morrow Road to McAndrews Road
- Reconstruct the shared-use path on the west side of the roadway to a 12-foot shared-use path from north of Morrow Road to McAndrews Road.
- Install 7-foot (min) buffered bike lanes on both sides of the roadway from Knutson Avenue to Hilton Court – this may require reconfiguring the roadway (e.g., narrowing the travel lanes).
- Install 6-foot bike lanes on both sides of the roadway from Hilton Court to McAndrews Road – this may require reconfiguring the roadway (e.g., narrowing the travel lanes).

Table Rock Road

- Fill in the gaps in the sidewalks on the west side of the roadway from Berrydale Avenue to Adams Lane consistent with City standards.
- Install 6-foot bike lanes on both sides of the roadway from Berrydale Avenue to OR 99 – this may require reconfiguring the roadway (e.g., narrowing the travel lanes).

Central Avenue

- Widen the sidewalks on the east side of the roadway from the commercial driveway to McAndrews Road consistent with City standards – maintain buffer if feasible.

Poplar Drive

- Install 6-foot bike lanes on both sides of the roadway from OR 62 to the south – this may require reconfiguring the roadway (e.g., narrowing the travel lanes).

Sky Park Drive

- Fill in the gaps in the sidewalks on both sides of the roadway from OR 62 to Whittle Avenue

Whittle Avenue

- Fill in the gaps in the sidewalks on the east side of the roadway from OR 62 to Skypark Drive

The improvements shown above would significantly improve multimodal level of services along study area roadways. Additional consideration should be given to enhanced crossing treatments at all major intersections to ensure they accommodate bicycle and pedestrian movements.

REFERENCES

1. National Highway Cooperative Research Program. *Report 672 – Roundabouts: An Informational Guide, Second Edition,* 2010.

2. Oregon Department of Transportation. *Oregon Highway Plan*, 2015.

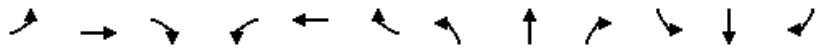
Attachment A Future Build Traffic Conditions Worksheets

HCM 6th Edition Worksheets

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	769	105	44	1156	685	94	459	32	592	447	32
Future Volume (veh/h)	45	769	105	44	1156	685	94	459	32	592	447	32
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1573	1723	1736	1750	1723	1750	1750	1736	1750	1750	1723	1627
Adj Flow Rate, veh/h	47	801	109	46	1204	714	98	478	33	617	466	33
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	13	2	1	0	2	0	0	1	0	0	2	9
Cap, veh/h	56	1064	145	61	1204	870	125	576	40	725	529	37
Arrive On Green	0.04	0.37	0.37	0.04	0.37	0.37	0.07	0.18	0.18	0.22	0.33	0.33
Sat Flow, veh/h	1498	2885	393	1667	3273	1461	1667	3131	216	3233	1588	112
Grp Volume(v), veh/h	47	454	456	46	1204	714	98	251	260	617	0	499
Grp Sat Flow(s),veh/h/ln	1498	1637	1641	1667	1637	1461	1667	1650	1697	1617	0	1700
Q Serve(g_s), s	3.0	23.4	23.4	2.6	35.5	35.5	5.6	14.2	14.2	17.7	0.0	26.7
Cycle Q Clear(g_c), s	3.0	23.4	23.4	2.6	35.5	35.5	5.6	14.2	14.2	17.7	0.0	26.7
Prop In Lane	1.00		0.24	1.00		1.00	1.00		0.13	1.00		0.07
Lane Grp Cap(c), veh/h	56	603	605	61	1204	870	125	303	312	725	0	567
V/C Ratio(X)	0.83	0.75	0.75	0.75	1.00	0.82	0.78	0.83	0.83	0.85	0.00	0.88
Avail Cap(c_a), veh/h	209	603	605	233	1204	870	337	436	448	921	0	590
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	46.2	26.6	26.6	46.1	30.5	15.7	43.9	37.9	38.0	35.9	0.0	30.4
Incr Delay (d2), s/veh	20.3	5.8	5.8	12.8	26.0	6.6	7.8	7.5	7.7	5.8	0.0	13.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	9.7	9.7	1.3	17.5	12.5	2.5	6.2	6.4	7.3	0.0	12.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.5	32.4	32.4	58.9	56.5	22.4	51.7	45.5	45.6	41.7	0.0	44.2
LnGrp LOS	E	C	C	E	F	C	D	D	D	D	A	D
Approach Vol, veh/h		957			1964			609			1116	
Approach Delay, s/veh		34.1			44.2			46.5			42.8	
Approach LOS		C			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.0	40.1	11.7	36.7	8.1	40.0	26.2	22.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	13.5	35.5	19.5	33.5	13.5	35.5	27.5	25.5
Max Q Clear Time (g_c+I1), s	4.6	25.4	7.6	28.7	5.0	37.5	19.7	16.2
Green Ext Time (p_c), s	0.1	7.5	0.2	1.0	0.1	0.0	2.0	1.5

Intersection Summary	
HCM 6th Ctrl Delay	42.1
HCM 6th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	438	900	55	110	1231	617	83	904	116	441	1047	593
Future Volume (veh/h)	438	900	55	110	1231	617	83	904	116	441	1047	593
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.97	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1736	1723	1736	1723	1736	1723	1695	1709	1736	1709	1723
Adj Flow Rate, veh/h	461	947	58	116	1296	649	87	952	122	464	1102	624
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	1	2	1	2	1	2	4	3	1	3	2
Cap, veh/h	527	1156	71	139	1340	1137	108	792	354	523	1115	741
Arrive On Green	0.17	0.37	0.37	0.08	0.28	0.28	0.07	0.25	0.25	0.16	0.34	0.34
Sat Flow, veh/h	3183	3154	193	1654	4703	2509	1641	3221	1438	3208	3247	1452
Grp Volume(v), veh/h	461	495	510	116	1296	649	87	952	122	464	1102	624
Grp Sat Flow(s),veh/h/ln	1591	1650	1698	1654	1568	1254	1641	1611	1438	1604	1624	1452
Q Serve(g_s), s	18.1	34.8	34.8	8.9	34.8	24.7	6.7	31.5	9.0	18.1	43.2	44.0
Cycle Q Clear(g_c), s	18.1	34.8	34.8	8.9	34.8	24.7	6.7	31.5	9.0	18.1	43.2	44.0
Prop In Lane	1.00		0.11	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	527	605	622	139	1340	1137	108	792	354	523	1115	741
V/C Ratio(X)	0.87	0.82	0.82	0.84	0.97	0.57	0.81	1.20	0.35	0.89	0.99	0.84
Avail Cap(c_a), veh/h	634	624	643	174	1340	1137	173	792	354	588	1115	741
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.2	36.7	36.7	57.8	45.2	26.3	59.1	48.3	39.8	52.4	41.8	27.1
Incr Delay (d2), s/veh	10.9	8.8	8.6	22.2	17.4	0.9	10.5	102.8	0.4	13.7	24.0	8.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.0	15.2	15.6	4.5	15.5	7.4	3.1	23.8	3.2	8.2	20.6	17.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.0	45.5	45.3	80.0	62.6	27.2	69.5	151.1	40.2	66.1	65.8	35.6
LnGrp LOS	E	D	D	E	E	C	E	F	D	E	E	D
Approach Vol, veh/h		1466			2061			1161			2190	
Approach Delay, s/veh		50.9			52.4			133.4			57.2	
Approach LOS		D			D			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.3	51.5	12.9	48.5	25.7	41.0	25.4	36.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	13.5	48.5	13.5	41.5	25.5	36.5	23.5	31.5
Max Q Clear Time (g_c+I1), s	10.9	36.8	8.7	46.0	20.1	36.8	20.1	33.5
Green Ext Time (p_c), s	0.1	9.0	0.1	0.0	1.1	0.0	0.8	0.0

Intersection Summary	
HCM 6th Ctrl Delay	67.3
HCM 6th LOS	E

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	138	207	1878	81	147	1943
Future Volume (veh/h)	138	207	1878	81	147	1943
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		0.98	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1736	1736	1709	1736	1750	1695
Adj Flow Rate, veh/h	145	218	1977	85	155	2045
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	3	1	0	4
Cap, veh/h	202	503	2999	926	233	2478
Arrive On Green	0.12	0.12	0.64	0.64	0.07	0.77
Sat Flow, veh/h	1654	2590	4820	1441	3233	3306
Grp Volume(v), veh/h	145	218	1977	85	155	2045
Grp Sat Flow(s),veh/h/ln	1654	1295	1555	1441	1617	1611
Q Serve(g_s), s	7.0	6.1	21.7	1.9	3.9	33.2
Cycle Q Clear(g_c), s	7.0	6.1	21.7	1.9	3.9	33.2
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	202	503	2999	926	233	2478
V/C Ratio(X)	0.72	0.43	0.66	0.09	0.66	0.83
Avail Cap(c_a), veh/h	330	703	2999	926	449	2510
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.0	29.3	9.2	5.6	37.4	6.0
Incr Delay (d2), s/veh	3.5	0.4	0.6	0.1	2.4	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	1.9	6.0	0.5	1.6	7.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	38.5	29.8	9.8	5.7	39.8	8.5
LnGrp LOS	D	C	A	A	D	A
Approach Vol, veh/h	363		2062			2200
Approach Delay, s/veh	33.3		9.6			10.7
Approach LOS	C		A			B

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	10.5	57.7			68.2	14.6
Change Period (Y+Rc), s	4.5	4.5			4.5	4.5
Max Green Setting (Gmax), s	11.5	48.5			64.5	16.5
Max Q Clear Time (g_c+I1), s	5.9	23.7			35.2	9.0
Green Ext Time (p_c), s	0.3	23.9			28.5	1.1

Intersection Summary	
HCM 6th Ctrl Delay	12.0
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	9.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	127	1995	90	123	2090
Future Vol, veh/h	0	127	1995	90	123	2090
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	100	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	1	2	0	1	3
Mvmt Flow	0	135	2122	96	131	2223

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	1061	0	0	2218	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.12	-	-	5.32	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.91	-	-	3.11	-
Pot Cap-1 Maneuver	0	190	-	-	~ 98	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	190	-	-	~ 98	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	60.4	0	15.8
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	190	~ 98	-
HCM Lane V/C Ratio	-	-	0.711	1.335	-
HCM Control Delay (s)	-	-	60.4	283.8	-
HCM Lane LOS	-	-	F	F	-
HCM 95th %tile Q(veh)	-	-	4.5	9.4	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.

Intersection	
Int Delay, s/veh	6.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↑↑	↱		↑↑↑
Traffic Vol, veh/h	0	270	1636	258	0	3204
Future Vol, veh/h	0	270	1636	258	0	3204
Conflicting Peds, #/hr	0	0	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Free	-	Free
Storage Length	-	0	-	75	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	0	6	0	0
Mvmt Flow	0	281	1704	269	0	3338

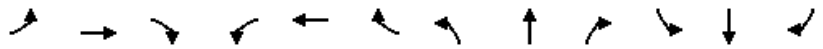
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	852	0	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.1	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.9	-	-	-	-
Pot Cap-1 Maneuver	0	~ 263	-	0	0	-
Stage 1	0	-	-	0	0	-
Stage 2	0	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	-	~ 263	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	117	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	263	-
HCM Lane V/C Ratio	-	1.069	-
HCM Control Delay (s)	-	117	-
HCM Lane LOS	-	F	-
HCM 95th %tile Q(veh)	-	11.5	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 6th Edition methodology does not support turning movements with shared & exclusive lanes.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	22	55	74	1	49	64	1014	467	221	985	12
Future Volume (veh/h)	36	22	55	74	1	49	64	1014	467	221	985	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1682	1750	1682	1750	1750	1723	1709	1750	1723	1736	1750
Adj Flow Rate, veh/h	38	23	58	78	1	52	67	1067	492	233	1037	13
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	5	0	5	0	0	2	3	0	2	1	0
Cap, veh/h	272	35	88	482	3	150	367	1515	777	361	1740	22
Arrive On Green	0.04	0.08	0.08	0.06	0.10	0.10	0.05	0.47	0.47	0.11	0.52	0.52
Sat Flow, veh/h	1667	421	1061	3107	28	1451	1641	3247	1478	1641	3335	42
Grp Volume(v), veh/h	38	0	81	78	0	53	67	1067	492	233	513	537
Grp Sat Flow(s),veh/h/ln	1667	0	1482	1554	0	1479	1641	1624	1478	1641	1650	1728
Q Serve(g_s), s	1.3	0.0	3.4	1.4	0.0	2.1	1.3	16.7	15.1	4.3	13.8	13.8
Cycle Q Clear(g_c), s	1.3	0.0	3.4	1.4	0.0	2.1	1.3	16.7	15.1	4.3	13.8	13.8
Prop In Lane	1.00		0.72	1.00		0.98	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	272	0	123	482	0	153	367	1515	777	361	861	902
V/C Ratio(X)	0.14	0.00	0.66	0.16	0.00	0.35	0.18	0.70	0.63	0.65	0.60	0.60
Avail Cap(c_a), veh/h	613	0	360	1054	0	359	804	1552	794	708	861	902
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.2	0.0	28.4	24.2	0.0	26.6	8.6	13.5	10.8	11.7	10.6	10.6
Incr Delay (d2), s/veh	0.2	0.0	4.4	0.1	0.0	1.0	0.2	1.6	1.9	1.4	1.4	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	1.3	0.5	0.0	0.8	0.4	5.6	4.5	1.5	4.5	4.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.4	0.0	32.8	24.3	0.0	27.6	8.7	15.1	12.7	13.1	12.0	11.9
LnGrp LOS	C	A	C	C	A	C	A	B	B	B	B	B
Approach Vol, veh/h		119			131			1626			1283	
Approach Delay, s/veh		30.4			25.7			14.1			12.2	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.0	37.8	7.0	11.1	11.5	34.3	8.2	9.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	20.5	30.5	15.5	15.5	20.5	30.5	15.5	15.5
Max Q Clear Time (g_c+I1), s	3.3	15.8	3.3	4.1	6.3	18.7	3.4	5.4
Green Ext Time (p_c), s	0.2	11.6	0.1	0.1	0.8	11.1	0.2	0.2

Intersection Summary	
HCM 6th Ctrl Delay	14.4
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	305.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑↑↑	↱		↑↑↑	↱
Traffic Vol, veh/h	0	0	710	0	0	51	0	1694	212	0	2494	124
Future Vol, veh/h	0	0	710	0	0	51	0	1694	212	0	2494	124
Conflicting Peds, #/hr	4	0	0	0	0	4	4	0	2	2	0	4
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Stop	-	-	None	-	-	None	-	-	Free
Storage Length	-	-	0	-	-	0	-	-	90	-	-	140
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	0	4	0	0	2	0	2	1	0	2	5
Mvmt Flow	0	0	740	0	0	53	0	1765	221	0	2598	129

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	1299	-	-	889	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.18	-	-	7.14	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.94	-	-	3.92	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	~ 128	0	0	246	0	-	-	0	-	0
Stage 1	0	0	-	0	0	-	0	-	-	0	-	0
Stage 2	0	0	-	0	0	-	0	-	-	0	-	0
Platoon blocked, %								-	-		-	
Mov Cap-1 Maneuver	-	-	~ 128	-	-	245	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, $	2216.7	23.7	0	0
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT
Capacity (veh/h)	-	-	128	245	-
HCM Lane V/C Ratio	-	-	5.778	0.217	-
HCM Control Delay (s)	-	-	$ 2216.7	23.7	-
HCM Lane LOS	-	-	F	C	-
HCM 95th %tile Q(veh)	-	-	79.9	0.8	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	295	203	442	683	242	254	181	1243	321	263	1493	216
Future Volume (veh/h)	295	203	442	683	242	254	181	1243	321	263	1493	216
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1736	1709	1750	1736	1736	1723	1723	1736	1750	1723	1709
Adj Flow Rate, veh/h	307	211	460	711	252	265	189	1295	334	274	1555	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	1	3	0	1	1	2	2	1	0	2	3
Cap, veh/h	502	220	181	577	247	206	170	1713	441	339	2153	
Arrive On Green	0.16	0.13	0.13	0.17	0.14	0.14	0.03	0.15	0.15	0.10	0.46	0.00
Sat Flow, veh/h	3183	1736	1424	3333	1736	1450	1641	3725	960	3333	4703	1448
Grp Volume(v), veh/h	307	211	460	711	252	265	189	1090	539	274	1555	0
Grp Sat Flow(s),veh/h/ln	1591	1736	1424	1667	1736	1450	1641	1568	1549	1667	1568	1448
Q Serve(g_s), s	11.7	15.7	16.5	22.5	18.5	14.8	13.5	43.3	43.4	10.5	34.8	0.0
Cycle Q Clear(g_c), s	11.7	15.7	16.5	22.5	18.5	14.8	13.5	43.3	43.4	10.5	34.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.62	1.00		1.00
Lane Grp Cap(c), veh/h	502	220	181	577	247	206	170	1442	712	339	2153	
V/C Ratio(X)	0.61	0.96	2.54	1.23	1.02	1.28	1.11	0.76	0.76	0.81	0.72	
Avail Cap(c_a), veh/h	502	220	181	577	247	206	170	1442	712	551	2153	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	51.0	56.4	56.8	53.7	55.8	35.7	62.8	48.1	48.2	57.1	28.6	0.0
Incr Delay (d2), s/veh	1.9	48.4	711.0	119.1	62.5	159.6	101.3	3.7	7.4	3.4	2.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	9.8	41.6	18.9	12.3	14.4	10.8	19.0	19.5	4.5	12.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.0	104.8	767.8	172.9	118.2	195.3	164.0	51.9	55.5	60.6	30.7	0.0
LnGrp LOS	D	F	F	F	F	F	F	D	E	E	C	
Approach Vol, veh/h		978			1228			1818			1829	A
Approach Delay, s/veh		400.4			166.5			64.6			35.2	
Approach LOS		F			F			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.7	64.3	27.0	21.0	18.0	64.0	25.0	23.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	21.5	51.5	22.5	16.5	13.5	59.5	20.5	18.5
Max Q Clear Time (g_c+I1), s	12.5	45.4	24.5	18.5	15.5	36.8	13.7	20.5
Green Ext Time (p_c), s	0.8	5.9	0.0	0.0	0.0	19.6	0.8	0.0

Intersection Summary	
HCM 6th Ctrl Delay	132.9
HCM 6th LOS	F

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	11	1681	111	0	0
Future Vol, veh/h	0	11	1681	111	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	99	99	99	99	99	99
Heavy Vehicles, %	0	11	2	2	0	2
Mvmt Flow	0	11	1698	112	0	0

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	905	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.12	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.41	-	-	-	-
Pot Cap-1 Maneuver	0	263	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	263	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.3	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	263	-
HCM Lane V/C Ratio	-	-	0.042	-
HCM Control Delay (s)	-	-	19.3	-
HCM Lane LOS	-	-	C	-
HCM 95th %tile Q(veh)	-	-	0.1	-

Intersection	
Int Delay, s/veh	3.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	101	1582	110	149	0
Future Vol, veh/h	0	101	1582	110	149	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	650	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	5	3	2	0	2
Mvmt Flow	0	106	1665	116	157	0

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	891	0	0	1781	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7	-	-	4.1	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.35	-	-	2.2	-
Pot Cap-1 Maneuver	0	280	-	-	353	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	280	-	-	353	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	25.5	0	23.1
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	280	353	-
HCM Lane V/C Ratio	-	-	0.38	0.444	-
HCM Control Delay (s)	-	-	25.5	23.1	-
HCM Lane LOS	-	-	D	C	-
HCM 95th %tile Q(veh)	-	-	1.7	2.2	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	86	380	695	340	411	122	662	642	379	298	937	85
Future Volume (veh/h)	86	380	695	340	411	122	662	642	379	298	937	85
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1709	1736	1736	1723	1709	1750	1736	1682	1723	1709	1709	1750
Adj Flow Rate, veh/h	91	400	732	358	433	128	697	676	399	314	986	89
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	1	1	2	3	0	1	5	2	3	3	0
Cap, veh/h	94	457	871	378	770	225	642	1003	458	292	882	80
Arrive On Green	0.06	0.14	0.14	0.23	0.31	0.31	0.20	0.31	0.31	0.18	0.29	0.29
Sat Flow, veh/h	1628	3299	2543	1641	2474	724	3208	3195	1457	1628	3008	271
Grp Volume(v), veh/h	91	400	732	358	283	278	697	676	399	314	532	543
Grp Sat Flow(s),veh/h/ln	1628	1650	1272	1641	1624	1575	1604	1598	1457	1628	1624	1655
Q Serve(g_s), s	7.2	15.4	18.0	27.9	18.9	19.2	26.0	23.9	33.6	23.3	38.1	38.1
Cycle Q Clear(g_c), s	7.2	15.4	18.0	27.9	18.9	19.2	26.0	23.9	33.6	23.3	38.1	38.1
Prop In Lane	1.00		1.00	1.00		0.46	1.00		1.00	1.00		0.16
Lane Grp Cap(c), veh/h	94	457	871	378	505	490	642	1003	458	292	476	485
V/C Ratio(X)	0.97	0.88	0.84	0.95	0.56	0.57	1.09	0.67	0.87	1.08	1.12	1.12
Avail Cap(c_a), veh/h	94	457	871	379	506	491	642	1003	458	292	476	485
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	61.1	54.9	39.8	49.2	37.3	37.4	52.0	38.8	42.1	53.3	45.9	45.9
Incr Delay (d2), s/veh	81.9	16.4	7.0	32.5	0.8	1.0	61.0	1.5	16.0	74.3	77.5	77.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	7.4	11.5	14.7	7.6	7.5	15.6	9.3	13.9	15.3	25.0	25.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	143.0	71.3	46.9	81.7	38.2	38.4	112.9	40.2	58.1	127.6	123.4	123.2
LnGrp LOS	F	E	D	F	D	D	F	D	E	F	F	F
Approach Vol, veh/h		1223			919			1772			1389	
Approach Delay, s/veh		62.0			55.2			72.9			124.3	
Approach LOS		E			E			E			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	27.3	46.2	33.9	22.5	30.0	43.5	11.5	44.9
Change Period (Y+Rc), s	4.0	* 5.4	4.0	4.5	4.0	* 5.4	4.0	4.5
Max Green Setting (Gmax), s	23.3	* 41	30.0	18.0	26.0	* 38	7.5	40.5
Max Q Clear Time (g_c+I1), s	25.3	35.6	29.9	20.0	28.0	40.1	9.2	21.2
Green Ext Time (p_c), s	0.0	2.1	0.0	0.0	0.0	0.0	0.0	3.8

Intersection Summary	
HCM 6th Ctrl Delay	80.8
HCM 6th LOS	F

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	18	0	0	131	0	1048	39	0	642	145
Future Vol, veh/h	0	0	18	0	0	131	0	1048	39	0	642	145
Conflicting Peds, #/hr	1	0	1	1	0	1	0	0	4	4	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	1	0	1	0	0	1	1
Mvmt Flow	0	0	19	0	0	138	0	1103	41	0	676	153

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	416	-	-	577	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.9	-	-	7.12	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.3	-	-	3.91	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	591	0	0	396	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	590	-	-	394	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.3	19	0	0
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	590	394	-	-
HCM Lane V/C Ratio	-	-	0.032	0.35	-	-
HCM Control Delay (s)	-	-	11.3	19	-	-
HCM Lane LOS	-	-	B	C	-	-
HCM 95th %tile Q(veh)	-	-	0.1	1.5	-	-

HCM 6th Edition Analysis September 2020
Based on ODOT Analysis Procedures Manual, Volume 2, Chapter 13

INTERSECTION	1. OR 99/Table Rock Road				
CYCLE LENGTH	120				
TOTAL LOST TIME	18				
TOTAL LOST TIME (2025)					
CRITICAL MOVEMENTS	**EB (L)**	**WB (T)**	**NB (TR)**	**SB (L)**	
	2042 FUTURE PM - FULL BUILD				
Adj Flow Rate, (veh/h)	47	1204	511	617	
Sat Flow (veh/h)	1498	3273	3347	3233	
Flow Ratio	0.03	0.37	0.15	0.19	
CRITICAL INTERSECTION V/C RATIO	**0.87**				

INTERSECTION	2. OR 238-OR 62/OR 99-Court Road-N Riverside Drive				
CYCLE LENGTH	135				
TOTAL LOST TIME	18				
TOTAL LOST TIME (2025)					
CRITICAL MOVEMENTS	**EB (L)**	**WB (T)**	**NB (T)**	**SB (L)**	
	2042 FUTURE PM - FULL BUILD				
Adj Flow Rate, (veh/h)	461	1296	952	464	
Sat Flow (veh/h)	3183	4703	3221	3208	
Flow Ratio	0.14	0.28	0.30	0.14	
CRITICAL INTERSECTION V/C RATIO	**0.99**				

INTERSECTION	3. OR 62/RVM Main Entrance				
CYCLE LENGTH	90				
TOTAL LOST TIME	13.5				
TOTAL LOST TIME (2025)					
CRITICAL MOVEMENTS	**WB (L)**	**EB (T)**	**NB (L)**	**SB (T)**	
	2042 FUTURE PM - FULL BUILD				
Adj Flow Rate, (veh/h)	145	0	0	2045	
Sat Flow (veh/h)	1654	0	0	3306	
Flow Ratio	0.09	0.00	0.00	0.62	
CRITICAL INTERSECTION V/C RATIO	**0.83**				

INTERSECTION	9. Biddle Road/Hilton Court				
CYCLE LENGTH	100				
TOTAL LOST TIME	18				
TOTAL LOST TIME (2025)					
CRITICAL MOVEMENTS	**EB (TR)**	**WB (L)**	**NB (T)**	**SB (L)**	
	2042 FUTURE PM - FULL BUILD				
Adj Flow Rate, (veh/h)	81	78	1067	233	
Sat Flow (veh/h)	1482	3107	3247	1641	
Flow Ratio	0.05	0.03	0.33	0.14	
CRITICAL INTERSECTION V/C RATIO	**0.67**				

INTERSECTION	11. OR 62/Bullock Road-Poplar Drive				
CYCLE LENGTH	130				
TOTAL LOST TIME	18				
TOTAL LOST TIME (2025)					
CRITICAL MOVEMENTS	**EB (T)**	**WB (L)**	**NB (TR)**	**SB (L)**	
	2042 FUTURE PM - FULL BUILD				
Adj Flow Rate, (veh/h)	211	711	1629	274	
Sat Flow (veh/h)	1736	3333	4685	3333	
Flow Ratio	0.12	0.21	0.35	0.08	
CRITICAL INTERSECTION V/C RATIO	**0.89**				

INTERSECTION	14. OR 62/Delta Waters Road				
CYCLE LENGTH	130				
TOTAL LOST TIME	17.9				
TOTAL LOST TIME (2025)					
CRITICAL MOVEMENTS	**EB (T)**	**WB (L)**	**NB (L)**	**SB (TR)**	
	2042 FUTURE PM - FULL BUILD				
Adj Flow Rate, (veh/h)	400	358	697	1075	
Sat Flow (veh/h)	3299	1641	3208	3279	
Flow Ratio	0.12	0.22	0.22	0.33	
CRITICAL INTERSECTION V/C RATIO	**1.03**				

HCM 2000 Worksheets

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	769	105	44	1156	685	94	459	32	592	447	32
Future Volume (vph)	45	769	105	44	1156	685	94	459	32	592	447	32
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		0.97	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1471	3197		1662	3260	1475	1662	3259		3225	1690	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1471	3197		1662	3260	1475	1662	3259		3225	1690	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	47	801	109	46	1204	714	98	478	33	617	466	33
RTOR Reduction (vph)	0	9	0	0	0	112	0	4	0	0	2	0
Lane Group Flow (vph)	47	901	0	46	1204	602	98	507	0	617	497	0
Confl. Peds. (#/hr)	1					1			2	2		
Confl. Bikes (#/hr)			1			3						2
Heavy Vehicles (%)	13%	2%	1%	0%	2%	0%	0%	1%	0%	0%	2%	9%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases						6						
Actuated Green, G (s)	7.0	36.8		6.6	36.4	60.2	9.4	22.1		23.8	36.5	
Effective Green, g (s)	7.0	36.8		6.6	36.4	60.2	9.4	22.1		23.8	36.5	
Actuated g/C Ratio	0.07	0.34		0.06	0.34	0.56	0.09	0.21		0.22	0.34	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Vehicle Extension (s)	2.5	4.2		2.5	4.2	2.5	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	95	1096		102	1105	889	145	671		715	574	
v/s Ratio Prot	c0.03	0.28		0.03	c0.37	0.15	0.06	0.16		c0.19	c0.29	
v/s Ratio Perm						0.26						
v/c Ratio	0.49	0.82		0.45	1.09	0.68	0.68	0.76		0.86	0.87	
Uniform Delay, d1	48.4	32.3		48.6	35.5	16.7	47.5	40.1		40.2	33.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.9	5.4		2.3	54.9	1.9	10.8	4.6		10.4	12.8	
Delay (s)	51.4	37.7		50.9	90.3	18.5	58.2	44.7		50.6	45.9	
Level of Service	D	D		D	F	B	E	D		D	D	
Approach Delay (s)		38.4			63.3			46.9			48.5	
Approach LOS		D			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	52.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	107.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	85.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	438	900	55	110	1231	617	83	904	116	441	1047	593
Future Volume (vph)	438	900	55	110	1231	617	83	904	116	441	1047	593
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.97	0.95		1.00	0.91	0.88	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3162	3257		1646	4684	2568	1630	3197	1422	3193	3228	1444
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3162	3257		1646	4684	2568	1630	3197	1422	3193	3228	1444
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	461	947	58	116	1296	649	87	952	122	464	1102	624
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	92	0	0	48
Lane Group Flow (vph)	461	1002	0	116	1296	649	87	952	30	464	1102	576
Confl. Peds. (#/hr)	3		18	18		3	6		3	3		6
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	2%	1%	2%	1%	2%	1%	2%	4%	3%	1%	3%	2%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	5	2		1	6	7	3	8		7	4	5
Permitted Phases						6			8			4
Actuated Green, G (s)	22.8	47.3		12.1	36.6	57.9	11.0	31.8	31.8	21.3	42.1	64.9
Effective Green, g (s)	22.8	47.3		12.1	36.6	57.9	11.0	31.8	31.8	21.3	42.1	64.9
Actuated g/C Ratio	0.17	0.36		0.09	0.28	0.44	0.08	0.24	0.24	0.16	0.32	0.50
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.5	4.2		2.5	4.2	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Lane Grp Cap (vph)	552	1180		152	1313	1227	137	779	346	521	1041	767
v/s Ratio Prot	c0.15	0.31		0.07	c0.28	0.09	0.05	c0.30		c0.15	c0.34	c0.13
v/s Ratio Perm						0.17			0.02			0.27
v/c Ratio	0.84	0.85		0.76	0.99	0.53	0.64	1.22	0.09	0.89	1.06	0.75
Uniform Delay, d1	52.0	38.3		57.8	46.7	26.4	57.8	49.4	38.1	53.5	44.2	26.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.4	6.2		19.3	21.6	0.3	8.1	111.3	0.1	17.1	44.8	4.0
Delay (s)	62.4	44.5		77.1	68.3	26.7	66.0	160.7	38.2	70.6	89.0	30.3
Level of Service	E	D		E	E	C	E	F	D	E	F	C
Approach Delay (s)		50.1			55.7			140.7			68.4	
Approach LOS		D			E			F			E	

Intersection Summary			
HCM 2000 Control Delay	72.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	130.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	95.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	138	207	1878	81	147	1943
Future Volume (vph)	138	207	1878	81	147	1943
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.88	0.91	1.00	0.97	0.95
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1646	2570	4638	1454	3225	3197
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1646	2570	4638	1454	3225	3197
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	145	218	1977	85	155	2045
RTOR Reduction (vph)	0	9	0	23	0	0
Lane Group Flow (vph)	145	209	1977	62	155	2045
Confl. Peds. (#/hr)		3				
Confl. Bikes (#/hr)				1		
Heavy Vehicles (%)	1%	1%	3%	1%	0%	4%
Turn Type	Prot	pm+ov	NA	Perm	Prot	NA
Protected Phases	3	1	2		1	6
Permitted Phases		3		2		
Actuated Green, G (s)	11.5	20.2	39.7	39.7	8.7	52.9
Effective Green, g (s)	11.5	20.2	39.7	39.7	8.7	52.9
Actuated g/C Ratio	0.16	0.28	0.54	0.54	0.12	0.72
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.5	2.5	4.2	4.2	2.5	4.2
Lane Grp Cap (vph)	257	864	2508	786	382	2304
v/s Ratio Prot	c0.09	0.03	0.43		0.05	c0.64
v/s Ratio Perm		0.05		0.04		
v/c Ratio	0.56	0.24	0.79	0.08	0.41	0.89
Uniform Delay, d1	28.6	20.7	13.5	8.1	30.0	7.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.3	0.1	1.9	0.1	0.5	4.7
Delay (s)	30.9	20.8	15.3	8.1	30.5	12.7
Level of Service	C	C	B	A	C	B
Approach Delay (s)	24.8		15.0			13.9
Approach LOS	C		B			B

Intersection Summary			
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	73.4	Sum of lost time (s)	13.5
Intersection Capacity Utilization	74.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	127	1995	90	123	2090
Future Volume (Veh/h)	0	127	1995	90	123	2090
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	135	2122	96	131	2223
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			833			508
pX, platoon unblocked	0.84	0.68			0.68	
vC, conflicting volume	3496	707			2218	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1321	0			1136	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	82			69	
cM capacity (veh/h)	86	738			418	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	135	707	707	707	96	131	1112	1112
Volume Left	0	0	0	0	0	131	0	0
Volume Right	135	0	0	0	96	0	0	0
cSH	738	1700	1700	1700	1700	418	1700	1700
Volume to Capacity	0.18	0.42	0.42	0.42	0.06	0.31	0.65	0.65
Queue Length 95th (ft)	17	0	0	0	0	33	0	0
Control Delay (s)	11.0	0.0	0.0	0.0	0.0	17.5	0.0	0.0
Lane LOS	B					C		
Approach Delay (s)	11.0	0.0				1.0		
Approach LOS	B							

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	755	1	622	0	0	0	0	1639	483	0	1591	925
Future Volume (vph)	755	1	622	0	0	0	0	1639	483	0	1591	925
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5	4.5					4.5	4.5		4.5	4.5
Lane Util. Factor	0.95	0.95	1.00					0.91	1.00		0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00					1.00	0.97		1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00					1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85					1.00	0.85		1.00	0.85
Flt Protected	0.95	0.95	1.00					1.00	1.00		1.00	1.00
Satd. Flow (prot)	1533	1537	1417					4684	1407		3228	1416
Flt Permitted	0.95	0.95	1.00					1.00	1.00		1.00	1.00
Satd. Flow (perm)	1533	1537	1417					4684	1407		3228	1416
Peak-hour factor, PHF	0.90	0.90	0.90	0.96	0.96	0.96	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	839	1	691	0	0	0	0	1725	508	0	1675	974
RTOR Reduction (vph)	0	0	34	0	0	0	0	0	67	0	0	281
Lane Group Flow (vph)	419	421	657	0	0	0	0	1725	441	0	1675	693
Confl. Peds. (#/hr)							12		7	7		12
Confl. Bikes (#/hr)									2			1
Heavy Vehicles (%)	3%	0%	5%	0%	0%	0%	0%	2%	3%	100%	3%	2%
Turn Type	Perm	NA	Perm					NA	Perm		NA	Perm
Protected Phases		4						2			6	
Permitted Phases	4		4						2			6
Actuated Green, G (s)	28.5	28.5	28.5					92.5	92.5		92.5	92.5
Effective Green, g (s)	28.5	28.5	28.5					92.5	92.5		92.5	92.5
Actuated g/C Ratio	0.22	0.22	0.22					0.71	0.71		0.71	0.71
Clearance Time (s)	4.5	4.5	4.5					4.5	4.5		4.5	4.5
Vehicle Extension (s)	2.5	2.5	2.5					4.2	4.2		4.2	4.2
Lane Grp Cap (vph)	336	336	310					3332	1001		2296	1007
v/s Ratio Prot								0.37			c0.52	
v/s Ratio Perm	0.27	0.27	c0.46						0.31			0.49
v/c Ratio	1.25	1.25	2.12					0.52	0.44		0.73	0.69
Uniform Delay, d1	50.8	50.8	50.8					8.6	7.9		11.2	10.6
Progression Factor	1.00	1.00	1.00					1.00	1.00		0.52	7.67
Incremental Delay, d2	133.7	136.0	514.0					0.6	1.4		1.3	2.4
Delay (s)	184.4	186.8	564.7					9.1	9.3		7.1	83.7
Level of Service	F	F	F					A	A		A	F
Approach Delay (s)		356.7			0.0			9.2			35.3	
Approach LOS		F			A			A			D	

Intersection Summary			
HCM 2000 Control Delay	102.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	97.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	443	202	483	0	1411	983	0	2073	1131
Future Volume (vph)	0	0	0	443	202	483	0	1411	983	0	2073	1131
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)				4.5	4.5	4.5		4.5	4.5		4.5	4.5
Lane Util. Factor				0.95	0.91	0.95		0.91	1.00		0.91	1.00
Frpb, ped/bikes				1.00	0.99	0.96		1.00	0.98		1.00	0.96
Flpb, ped/bikes				1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt				1.00	0.95	0.85		1.00	0.85		1.00	0.85
Flt Protected				0.95	0.99	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)				1504	1448	1295		4684	1386		4638	1374
Flt Permitted				0.95	0.99	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)				1504	1448	1295		4684	1386		4638	1374
Peak-hour factor, PHF	0.98	0.98	0.98	0.88	0.88	0.88	0.93	0.93	0.93	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	503	230	549	0	1517	1057	0	2137	1166
RTOR Reduction (vph)	0	0	0	0	14	24	0	0	150	0	0	157
Lane Group Flow (vph)	0	0	0	443	424	377	0	1517	907	0	2137	1009
Confl. Peds. (#/hr)	12					12	24		1	1		24
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	0%	0%	0%	5%	0%	5%	0%	2%	5%	0%	3%	4%
Turn Type				Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases					8			2			6	
Permitted Phases				8		8			2			6
Actuated Green, G (s)				40.9	40.9	40.9		80.1	80.1		80.1	80.1
Effective Green, g (s)				40.9	40.9	40.9		80.1	80.1		80.1	80.1
Actuated g/C Ratio				0.31	0.31	0.31		0.62	0.62		0.62	0.62
Clearance Time (s)				4.5	4.5	4.5		4.5	4.5		4.5	4.5
Vehicle Extension (s)				2.5	2.5	2.5		4.2	4.2		4.2	4.2
Lane Grp Cap (vph)				473	455	407		2886	853		2857	846
v/s Ratio Prot								0.32			0.46	
v/s Ratio Perm				c0.29	0.29	0.29			0.65			c0.73
v/c Ratio				0.94	0.93	0.93		0.53	1.06		0.75	1.19
Uniform Delay, d1				43.3	43.2	43.1		14.2	25.0		17.8	25.0
Progression Factor				1.00	1.00	1.00		0.83	0.99		0.82	0.84
Incremental Delay, d2				26.1	25.9	26.8		0.4	43.3		1.2	94.4
Delay (s)				69.4	69.0	69.9		12.1	68.1		15.8	115.5
Level of Service				E	E	E		B	E		B	F
Approach Delay (s)		0.0			69.4			35.1			51.0	
Approach LOS		A			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	48.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	110.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	270	1636	258	0	3204
Future Volume (Veh/h)	0	270	1636	258	0	3204
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	281	1704	269	0	3338
Pedestrians	1					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			827			1005
pX, platoon unblocked	0.82	0.86			0.86	
vC, conflicting volume	2818	569			1705	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1267	0			1234	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	70			100	
cM capacity (veh/h)	134	933			489	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	281	568	568	568	269	1113	1113	1113
Volume Left	0	0	0	0	0	0	0	0
Volume Right	281	0	0	0	269	0	0	0
cSH	933	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.30	0.33	0.33	0.33	0.16	0.65	0.65	0.65
Queue Length 95th (ft)	32	0	0	0	0	0	0	0
Control Delay (s)	10.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B							
Approach Delay (s)	10.5	0.0				0.0		
Approach LOS	B							

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	390	171	1380	215	55	1095
Future Volume (vph)	390	171	1380	215	55	1095
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5		4.5		4.5	4.5
Lane Util. Factor	0.97		0.95		1.00	0.95
Frpb, ped/bikes	0.99		1.00		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.95		0.98		1.00	1.00
Flt Protected	0.97		1.00		0.95	1.00
Satd. Flow (prot)	3031		3190		1662	3292
Flt Permitted	0.97		1.00		0.95	1.00
Satd. Flow (perm)	3031		3190		1662	3292
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	411	180	1453	226	58	1153
RTOR Reduction (vph)	54	0	12	0	0	0
Lane Group Flow (vph)	537	0	1667	0	58	1153
Confl. Peds. (#/hr)		1				
Heavy Vehicles (%)	2%	4%	2%	3%	0%	1%
Turn Type	Prot		NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases						
Actuated Green, G (s)	17.3		43.5		6.4	54.4
Effective Green, g (s)	17.3		43.5		6.4	54.4
Actuated g/C Ratio	0.21		0.54		0.08	0.67
Clearance Time (s)	4.5		4.5		4.5	4.5
Vehicle Extension (s)	2.5		4.2		2.5	4.2
Lane Grp Cap (vph)	649		1719		131	2219
v/s Ratio Prot	c0.18		c0.52		0.03	c0.35
v/s Ratio Perm						
v/c Ratio	0.83		0.97		0.44	0.52
Uniform Delay, d1	30.3		18.0		35.4	6.6
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	8.3		15.3		1.7	0.3
Delay (s)	38.6		33.2		37.2	6.9
Level of Service	D		C		D	A
Approach Delay (s)	38.6		33.2			8.3
Approach LOS	D		C			A

Intersection Summary			
HCM 2000 Control Delay	25.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	80.7	Sum of lost time (s)	13.5
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	22	55	74	1	49	64	1014	467	221	985	12
Future Volume (vph)	36	22	55	74	1	49	64	1014	467	221	985	12
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	1.00		0.97	1.00		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.89		1.00	0.85		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1662	1519		3065	1492		1630	3228	1461	1630	3285	
Flt Permitted	0.72	1.00		0.54	1.00		0.24	1.00	1.00	0.13	1.00	
Satd. Flow (perm)	1264	1519		1739	1492		408	3228	1461	225	3285	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	38	23	58	78	1	52	67	1067	492	233	1037	13
RTOR Reduction (vph)	0	53	0	0	46	0	0	0	239	0	0	0
Lane Group Flow (vph)	38	28	0	78	7	0	67	1067	253	233	1050	0
Confl. Peds. (#/hr)			2	2			3		1	1		3
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	0%	5%	0%	5%	0%	0%	2%	3%	0%	2%	1%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	3	8		7	4		1	6	7	5	2	
Permitted Phases	8			4			6		6	2		
Actuated Green, G (s)	10.0	6.2		13.8	8.1		36.8	32.1	37.8	48.0	38.8	
Effective Green, g (s)	10.0	6.2		13.8	8.1		36.8	32.1	37.8	48.0	38.8	
Actuated g/C Ratio	0.14	0.08		0.19	0.11		0.50	0.44	0.51	0.65	0.53	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	4.2	2.5	2.5	4.2	
Lane Grp Cap (vph)	192	128		429	164		282	1411	841	365	1736	
v/s Ratio Prot	0.01	0.02		0.01	0.00		0.02	c0.33	c0.02	c0.10	0.32	
v/s Ratio Perm	0.02			c0.02			0.10		0.15	0.32		
v/c Ratio	0.20	0.22		0.18	0.04		0.24	0.76	0.30	0.64	0.60	
Uniform Delay, d1	28.0	31.3		24.9	29.2		9.7	17.4	10.2	10.5	12.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	0.6		0.1	0.1		0.3	2.6	0.1	3.2	0.7	
Delay (s)	28.4	32.0		25.0	29.3		10.0	19.9	10.4	13.7	12.7	
Level of Service	C	C		C	C		A	B	B	B	B	
Approach Delay (s)		30.8			26.7			16.6			12.9	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	73.4	Sum of lost time (s)	18.0
Intersection Capacity Utilization	63.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	710	0	0	51	0	1694	212	0	2494	124
Future Volume (Veh/h)	0	0	710	0	0	51	0	1694	212	0	2494	124
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	0	740	0	0	53	0	1765	221	0	2598	129
Pedestrians		4			2						4	
Lane Width (ft)		12.0			12.0						12.0	
Walking Speed (ft/s)		3.5			3.5						3.5	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								1229			603	
pX, platoon unblocked	0.79	0.79	0.74	0.79	0.79	0.91	0.74			0.91		
vC, conflicting volume	3247	4590	870	2633	4369	594	2602			1988		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2167	3876	0	1384	3595	227	1943			1752		
tC, single (s)	7.5	6.5	7.0	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	7	100	100	92	100			100		
cM capacity (veh/h)	19	3	797	6	4	705	226			331		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	740	53	588	588	588	221	866	866	866	129
Volume Left	0	0	0	0	0	0	0	0	0	0
Volume Right	740	53	0	0	0	221	0	0	0	129
cSH	797	705	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.93	0.08	0.35	0.35	0.35	0.13	0.51	0.51	0.51	0.08
Queue Length 95th (ft)	337	6	0	0	0	0	0	0	0	0
Control Delay (s)	39.7	10.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	E	B								
Approach Delay (s)	39.7	10.5	0.0				0.0			
Approach LOS	E	B								

Intersection Summary				
Average Delay	5.4			
Intersection Capacity Utilization	106.7%	ICU Level of Service	G	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	295	203	442	683	242	254	181	1243	321	263	1493	216
Future Volume (vph)	295	203	442	683	242	254	181	1243	321	263	1493	216
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	0.97	1.00	1.00	*1.00	1.00	1.00	1.00	0.91		*1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3162	1733	1444	3325	1733	1434	1630	4549		3325	4684	1413
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3162	1733	1444	3325	1733	1434	1630	4549		3325	4684	1413
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	307	211	460	711	252	265	189	1295	334	274	1555	225
RTOR Reduction (vph)	0	0	154	0	0	207	0	32	0	0	0	122
Lane Group Flow (vph)	307	211	306	711	252	58	189	1597	0	274	1555	103
Confl. Peds. (#/hr)	7					7	1					1
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	2%	1%	3%	0%	1%	1%	2%	2%	1%	0%	2%	3%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						6
Actuated Green, G (s)	20.5	16.5	16.5	22.5	18.5	18.5	13.5	57.6		15.4	59.5	59.5
Effective Green, g (s)	20.5	16.5	16.5	22.5	18.5	18.5	13.5	57.6		15.4	59.5	59.5
Actuated g/C Ratio	0.16	0.13	0.13	0.17	0.14	0.14	0.10	0.44		0.12	0.46	0.46
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	4.2		2.5	4.2	4.2
Lane Grp Cap (vph)	498	219	183	575	246	204	169	2015		393	2143	646
v/s Ratio Prot	c0.10	0.12		c0.21	0.15		c0.12	c0.35		0.08	0.33	
v/s Ratio Perm			c0.21			0.04						0.07
v/c Ratio	0.62	0.96	1.67	1.24	1.02	0.29	1.12	0.79		0.70	0.73	0.16
Uniform Delay, d1	51.1	56.5	56.8	53.8	55.8	49.8	58.2	31.1		55.1	28.6	20.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.78	1.18		1.00	1.00	1.00
Incremental Delay, d2	1.9	50.1	326.0	120.8	63.8	0.6	99.9	2.9		4.9	2.2	0.5
Delay (s)	53.0	106.6	382.8	174.6	119.6	50.4	145.4	39.6		60.0	30.8	21.1
Level of Service	D	F	F	F	F	D	F	D		E	C	C
Approach Delay (s)		219.7			136.5			50.6			33.6	
Approach LOS		F			F			D			C	

Intersection Summary			
HCM 2000 Control Delay	89.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	93.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	11	1681	111	0	0
Future Volume (Veh/h)	0	11	1681	111	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	0	11	1698	112	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			Raised			Raised
Median storage veh)			2			2
Upstream signal (ft)			998			
pX, platoon unblocked	0.68	0.68			0.68	
vC, conflicting volume	1754	905			1810	
vC1, stage 1 conf vol	1754					
vC2, stage 2 conf vol	0					
vCu, unblocked vol	1158	0			1241	
tC, single (s)	6.8	7.1			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.4			2.2	
p0 queue free %	100	98			100	
cM capacity (veh/h)	175	714			384	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	11	1132	678	0	0	0
Volume Left	0	0	0	0	0	0
Volume Right	11	0	112	0	0	0
cSH	714	1700	1700	1700	1700	1700
Volume to Capacity	0.02	0.67	0.40	0.00	0.00	0.00
Queue Length 95th (ft)	1	0	0	0	0	0
Control Delay (s)	10.1	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	10.1	0.0		0.0		
Approach LOS	B					

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	101	1582	110	149	0
Future Volume (Veh/h)	0	101	1582	110	149	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	106	1665	116	157	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			Raised			Raised
Median storage veh)			2			2
Upstream signal (ft)						917
pX, platoon unblocked						
vC, conflicting volume	2037	890			1781	
vC1, stage 1 conf vol	1723					
vC2, stage 2 conf vol	314					
vCu, unblocked vol	2037	890			1781	
tC, single (s)	6.8	7.0			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	62			56	
cM capacity (veh/h)	123	280			353	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	106	1110	671	157	0	0
Volume Left	0	0	0	157	0	0
Volume Right	106	0	116	0	0	0
cSH	280	1700	1700	353	1700	1700
Volume to Capacity	0.38	0.65	0.39	0.44	0.00	0.00
Queue Length 95th (ft)	42	0	0	55	0	0
Control Delay (s)	25.5	0.0	0.0	23.1	0.0	0.0
Lane LOS	D			C		
Approach Delay (s)	25.5	0.0		23.1		
Approach LOS	D					

Intersection Summary				
Average Delay	3.1			
Intersection Capacity Utilization	66.9%	ICU Level of Service	C	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	86	380	695	340	411	122	662	642	379	298	937	85
Future Volume (vph)	86	380	695	340	411	122	662	642	379	298	937	85
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.5	4.0	4.0	4.5		4.0	5.4	5.4	4.0	5.4	
Lane Util. Factor	1.00	0.95	0.88	1.00	0.95		0.97	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1614	3292	2564	1630	3139		3193	3167	1437	1614	3192	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1614	3292	2564	1630	3139		3193	3167	1437	1614	3192	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	91	400	732	358	433	128	697	676	399	314	986	89
RTOR Reduction (vph)	0	0	74	0	22	0	0	0	272	0	5	0
Lane Group Flow (vph)	91	400	658	358	539	0	697	676	127	314	1070	0
Confl. Peds. (#/hr)			5	5					2	2		
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	3%	1%	1%	2%	3%	0%	1%	5%	2%	3%	3%	0%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	7.5	16.8	42.8	29.0	38.3		26.0	40.8	40.8	23.3	38.1	
Effective Green, g (s)	7.5	16.8	42.8	29.0	38.3		26.0	40.8	40.8	23.3	38.1	
Actuated g/C Ratio	0.06	0.13	0.33	0.23	0.30		0.20	0.32	0.32	0.18	0.30	
Clearance Time (s)	4.0	4.5	4.0	4.0	4.5		4.0	5.4	5.4	4.0	5.4	
Vehicle Extension (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	94	432	858	369	940		649	1011	458	294	951	
v/s Ratio Prot	0.06	c0.12	0.16	c0.22	0.17		c0.22	c0.21		0.19	c0.34	
v/s Ratio Perm			0.10						0.09			
v/c Ratio	0.97	0.93	0.77	0.97	0.57		1.07	0.67	0.28	1.07	1.13	
Uniform Delay, d1	60.0	54.9	38.0	49.0	37.8		50.9	37.6	32.5	52.2	44.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	81.1	25.3	3.7	38.7	0.5		56.9	1.3	0.1	71.7	70.0	
Delay (s)	141.1	80.2	41.7	87.6	38.4		107.8	39.0	32.6	123.9	114.9	
Level of Service	F	F	D	F	D		F	D	C	F	F	
Approach Delay (s)		61.7			57.6			64.6			116.9	
Approach LOS		E			E			E			F	

Intersection Summary			
HCM 2000 Control Delay	76.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	127.8	Sum of lost time (s)	17.9
Intersection Capacity Utilization	98.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	18	0	0	131	0	1048	39	0	642	145
Future Volume (Veh/h)	0	0	18	0	0	131	0	1048	39	0	642	145
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	19	0	0	138	0	1103	41	0	676	153
Pedestrians					4			1			1	
Lane Width (ft)					12.0			12.0			12.0	
Walking Speed (ft/s)					3.5			3.5			3.5	
Percent Blockage					0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											326	
pX, platoon unblocked												
vC, conflicting volume	1259	1900	416	1486	1956	393	829			1148		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1259	1900	416	1486	1956	393	829			1148		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	97	100	100	77	100			100		
cM capacity (veh/h)	100	70	591	85	64	606	811			614		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	19	138	441	441	262	451	378
Volume Left	0	0	0	0	0	0	0
Volume Right	19	138	0	0	41	0	153
cSH	591	606	1700	1700	1700	1700	1700
Volume to Capacity	0.03	0.23	0.26	0.26	0.15	0.27	0.22
Queue Length 95th (ft)	2	22	0	0	0	0	0
Control Delay (s)	11.3	12.7	0.0	0.0	0.0	0.0	0.0
Lane LOS	B	B					
Approach Delay (s)	11.3	12.7	0.0			0.0	
Approach LOS	B	B					

Intersection Summary				
Average Delay	0.9			
Intersection Capacity Utilization	38.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Attachment B SimTraffic Reports

1: 48748. Table Rock Rd & Hwy 63/N Pacific Hwy Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.8	15.2	2.0	0.0	0.0	0.0	0.0	0.0	0.0	28.7	22.6	1.7
Total Delay (hr)	4.0	65.3	8.2	0.7	14.5	3.8	1.2	6.0	0.4	57.9	20.7	1.3
Stop Delay (hr)	3.8	62.1	7.9	0.6	10.3	1.7	1.1	5.0	0.4	56.1	18.7	1.2

1: 48748. Table Rock Rd & Hwy 63/N Pacific Hwy Performance by movement

Movement	All
Denied Delay (hr)	71.1
Total Delay (hr)	184.0
Stop Delay (hr)	168.9

2: 37165. OR-62 & OR-99 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.1	0.1	0.1	0.0	0.0	0.0	3.0	32.6	3.8	0.0	0.0	0.0
Total Delay (hr)	21.4	32.9	1.9	2.7	45.4	3.7	15.3	197.9	23.0	4.9	8.5	2.2
Stop Delay (hr)	19.9	28.9	1.7	2.5	39.9	2.6	15.1	197.1	23.1	4.4	6.6	1.5

2: 37165. OR-62 & OR-99 Performance by movement

Movement	All
Denied Delay (hr)	39.6
Total Delay (hr)	359.9
Stop Delay (hr)	343.2

3: 110085. OR-62 & Rogue Valley Mall Main Ent Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (hr)	1.3	1.2	23.3	1.1	0.9	2.7	30.5
Stop Delay (hr)	1.1	1.1	19.0	0.9	0.8	0.8	23.9

4: 110080. OR-62 & Rogue Valley Mall Ent Performance by movement

Movement	WBR	NBT	NBR	SBL	SBT	All
Denied Delay (hr)	25.4	0.5	0.1	0.0	0.0	26.1
Total Delay (hr)	12.8	15.0	0.8	1.1	0.8	30.5
Stop Delay (hr)	13.0	9.4	0.5	1.0	0.1	24.0

5: 37160. OR-62 & I-5 SB Ramps Performance by movement

Movement	EBL	EBT	EBR	NBT	NBR	SBT	SBR	All
Denied Delay (hr)	215.4	0.0	174.1	0.8	0.4	0.0	0.0	390.7
Total Delay (hr)	23.5	0.0	15.8	7.9	3.1	3.0	1.5	55.0
Stop Delay (hr)	20.1	0.0	13.6	4.5	1.8	1.4	0.0	41.5

6: 37161. OR-62 & I-5 NB Ramps Performance by movement

Movement	WBL	WBT	WBR	NBT	NBR	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.1	0.7	0.0	0.1	1.0
Total Delay (hr)	7.0	4.0	4.0	6.2	6.6	7.4	10.0	45.1
Stop Delay (hr)	5.8	3.2	3.1	3.5	3.2	4.2	6.0	28.9

7: north-south street name & east-west street name Performance by movement

Movement	WBT	WBR	NBT	NBR	SBT	All
Denied Delay (hr)	0.0	0.0	0.3	0.1	0.6	1.0
Total Delay (hr)	0.0	0.1	1.6	1.0	5.6	8.2
Stop Delay (hr)	0.0	0.0	0.4	0.6	3.1	4.2

8: 110086. Biddle Rd Conn 1 & South End of Jug Handle Performance by movement

Movement	WBL	WBT	WBR	NBT	NBR	SBL	SBT	All
Denied Delay (hr)	17.7	0.0	7.0	345.1	54.5	0.0	0.0	424.3
Total Delay (hr)	4.5	0.0	8.9	62.8	11.4	0.3	1.2	89.0
Stop Delay (hr)	4.0	0.0	9.0	62.6	11.4	0.2	0.5	87.7

9: 110088. Biddle Rd Conn 1 & Hilton Ct Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	1.8	0.6	2.5	0.0	0.0	0.0	0.0	0.0	0.0	55.7	277.1	3.8
Total Delay (hr)	0.1	4.5	6.8	0.3	0.0	0.1	3.0	54.2	57.7	33.0	27.0	0.1
Stop Delay (hr)	0.1	4.4	6.8	0.2	0.0	0.0	3.0	52.7	58.6	33.1	25.8	0.1

9: 110088. Biddle Rd Conn 1 & Hilton Ct Performance by movement

Movement	All
Denied Delay (hr)	341.4
Total Delay (hr)	187.0
Stop Delay (hr)	185.0

10: 37166. OR-62 & Biddle Rd Ramp Performance by movement

Movement	EBT	EBR	WBR	NBT	NBR	SBT	SBR	All
Denied Delay (hr)	0.0	13.3	0.0	0.0	0.0	0.0	0.0	13.3
Total Delay (hr)	0.6	42.4	0.1	0.9	0.1	4.1	0.2	48.5
Stop Delay (hr)	0.6	44.1	0.1	0.4	0.1	0.9	0.0	46.2

11: 37163. OR-62 & Poplar Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	56.2	40.9	83.7	0.0	0.0	0.0	0.0	0.0	0.0	11.5	77.7	11.0
Total Delay (hr)	10.5	11.2	20.6	12.6	4.9	0.9	4.4	6.5	0.9	4.5	16.3	1.1
Stop Delay (hr)	9.3	10.1	18.8	12.0	4.6	0.8	4.2	4.4	0.6	4.2	13.3	0.8

11: 37163. OR-62 & Poplar Dr Performance by movement

Movement	All
Denied Delay (hr)	281.1
Total Delay (hr)	94.3
Stop Delay (hr)	83.0

12: 110083. OR-62 & Sky Park Dr Performance by movement

Movement	WBR	NBT	NBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0
Total Delay (hr)	0.0	0.6	0.0	0.7
Stop Delay (hr)	0.0	0.0	0.0	0.0

13: 110084. OR-62 & Whittle Ave Performance by movement

Movement	WBR	NBT	NBR	SBL	SBT	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (hr)	0.3	0.6	0.0	1.9	4.5	7.3
Stop Delay (hr)	0.3	0.0	0.0	1.6	2.6	4.5

14: 140087. Crater Lake Hwy & Delta Waters Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	12.3	37.6	3.3
Total Delay (hr)	2.6	11.9	5.5	10.6	6.6	1.6	7.6	5.8	1.3	20.9	60.3	5.4
Stop Delay (hr)	2.5	10.7	3.7	9.8	5.5	1.3	6.7	4.6	0.9	18.5	51.6	4.7

14: 140087. Crater Lake Hwy & Delta Waters Rd Performance by movement

Movement	All
Denied Delay (hr)	53.7
Total Delay (hr)	140.3
Stop Delay (hr)	120.5

15: 110089. Poplar Dr & Hilton Rd Performance by movement

Movement	EBR	WBR	NBT	NBR	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	293.0	9.4	0.0	0.0	302.4
Total Delay (hr)	0.0	1.2	16.2	0.1	0.2	0.0	17.8
Stop Delay (hr)	0.0	1.2	15.3	0.1	0.0	0.0	16.7

Total Network Performance

Denied Delay (hr)	1945.8
Total Delay (hr)	1324.3
Stop Delay (hr)	1183.8

Intersection: 1: 48748. Table Rock Rd & Hwy 63/N Pacific Hwy

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	TR	L	L
Maximum Queue (ft)	275	1848	1846	289	603	622	549	178	328	329	525	1610
Average Queue (ft)	131	1220	1211	61	363	387	271	77	175	179	484	1174
95th Queue (ft)	327	2223	2212	195	583	599	542	142	267	274	626	1985
Link Distance (ft)		1924	1924		852	852	852		2093	2093		1571
Upstream Blk Time (%)		29	27									42
Queuing Penalty (veh)		0	0									0
Storage Bay Dist (ft)	250			200				340			500	
Storage Blk Time (%)	0	73			30				1		18	65
Queuing Penalty (veh)	0	32			13				1		52	191

Intersection: 1: 48748. Table Rock Rd & Hwy 63/N Pacific Hwy

Movement	SB
Directions Served	TR
Maximum Queue (ft)	1609
Average Queue (ft)	1112
95th Queue (ft)	1997
Link Distance (ft)	1571
Upstream Blk Time (%)	40
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: 37165. OR-62 & OR-99

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	WB	B26	B26
Directions Served	L	L	T	TR	L	T	T	T	R	R	T	T
Maximum Queue (ft)	455	540	879	891	516	740	756	737	705	220	216	270
Average Queue (ft)	294	519	836	836	243	554	581	558	244	52	22	61
95th Queue (ft)	492	618	947	952	616	817	833	806	717	226	206	339
Link Distance (ft)			852	852	686	686	686	686	686		4343	4343
Upstream Blk Time (%)			21	22	2	15	18	11	7			
Queuing Penalty (veh)			146	154	0	0	0	0	0			
Storage Bay Dist (ft)	380	380								250		
Storage Blk Time (%)	0	30	75						7	2		
Queuing Penalty (veh)	1	133	326						21	7		

Intersection: 2: 37165. OR-62 & OR-99

Movement	B26	B26	NB	NB	NB	NB	SB	SB	SB	SB	SB	
Directions Served	T	T	L	T	T	R	L	L	T	T	R	
Maximum Queue (ft)	336	350	315	4742	4760	500	241	335	450	477	442	
Average Queue (ft)	91	98	133	3598	3613	382	132	159	264	278	172	
95th Queue (ft)	430	467	338	5711	5682	709	207	267	392	411	342	
Link Distance (ft)	4343	4343		4693	4693				524	524		
Upstream Blk Time (%)				40	40				0	0		
Queuing Penalty (veh)				0	0				0	1		
Storage Bay Dist (ft)			150			390	315	315			400	
Storage Blk Time (%)			0	50	89	0			3	1	0	
Queuing Penalty (veh)			1	42	103	0			15	5	1	

Intersection: 3: 110085. OR-62 & Rogue Valley Mall Main Ent

Movement	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB	
Directions Served	L	R	R	T	T	T	R	L	L	T	T	
Maximum Queue (ft)	176	122	184	517	692	686	180	95	109	264	293	
Average Queue (ft)	90	42	63	207	522	535	88	23	55	109	137	
95th Queue (ft)	156	92	138	466	828	804	226	66	95	227	258	
Link Distance (ft)	338	338	338	524	524	524				766	766	
Upstream Blk Time (%)				1	30	38						
Queuing Penalty (veh)				7	192	248						
Storage Bay Dist (ft)							100	280	280			
Storage Blk Time (%)						53	0			0		
Queuing Penalty (veh)						43	0			0		

Intersection: 4: 110080. OR-62 & Rogue Valley Mall Ent

Movement	WB	NB	NB	NB	NB	SB	SB
Directions Served	R	T	T	T	R	L	T
Maximum Queue (ft)	373	490	791	800	200	148	57
Average Queue (ft)	340	41	328	647	95	67	2
95th Queue (ft)	440	269	825	933	258	131	41
Link Distance (ft)	341	766	766	766			438
Upstream Blk Time (%)	89	0	0	5			
Queuing Penalty (veh)	0	0	2	37			
Storage Bay Dist (ft)					100	200	
Storage Blk Time (%)				46			
Queuing Penalty (veh)				41			

Intersection: 5: 37160. OR-62 & I-5 SB Ramps

Movement	EB	EB	EB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	LT	R	T	T	T	R	T	T	R
Maximum Queue (ft)	270	345	1268	275	446	466	80	241	227	35
Average Queue (ft)	228	342	1222	88	176	443	66	126	128	2
95th Queue (ft)	339	375	1244	196	381	468	87	207	210	28
Link Distance (ft)			1196	438	438	438		551	551	551
Upstream Blk Time (%)			60		0	16				
Queuing Penalty (veh)			0		2	111				
Storage Bay Dist (ft)	195	195					50			
Storage Blk Time (%)	8	59	48			34	2			
Queuing Penalty (veh)	50	366	368			163	12			

Intersection: 6: 37161. OR-62 & I-5 NB Ramps

Movement	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LTR	R	T	T	T	R	T	T	T	R
Maximum Queue (ft)	575	691	535	528	560	589	88	714	781	817	440
Average Queue (ft)	252	402	228	150	212	461	73	200	340	514	355
95th Queue (ft)	513	648	475	321	436	706	91	405	717	1007	563
Link Distance (ft)	3096	3096	3096	551	551	551		749	749	749	
Upstream Blk Time (%)				0	0	8		0	0	14	
Queuing Penalty (veh)				0	1	67		0	5	154	
Storage Bay Dist (ft)							50				290
Storage Blk Time (%)						27	10			1	25
Queuing Penalty (veh)						263	49			12	174

Intersection: 7: north-south street name & east-west street name

Movement	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	R	T	T	T	R	T	T	T
Maximum Queue (ft)	45	128	151	154	94	188	358	427
Average Queue (ft)	2	8	21	33	11	12	74	231
95th Queue (ft)	32	121	211	282	58	109	301	562
Link Distance (ft)	476	749	749	749		347	347	347
Upstream Blk Time (%)			0	2		0	0	6
Queuing Penalty (veh)			0	12		0	4	59
Storage Bay Dist (ft)					75			
Storage Blk Time (%)				0	0			
Queuing Penalty (veh)				0	1			

Intersection: 8: 110086. Biddle Rd Conn 1 & South End of Jug Handle

Movement	WB	WB	B44	NB	NB	SB	SB	SB
Directions Served	L	LR	T	T	TR	L	T	T
Maximum Queue (ft)	494	525	112	1230	1220	97	251	272
Average Queue (ft)	230	343	54	1094	1094	24	50	67
95th Queue (ft)	444	612	304	1521	1510	72	155	179
Link Distance (ft)	618	618	476	1175	1175		1967	1967
Upstream Blk Time (%)		12	6	80	83			
Queuing Penalty (veh)		15	14	0	0			
Storage Bay Dist (ft)						100		
Storage Blk Time (%)						0	2	
Queuing Penalty (veh)						1	1	

Intersection: 9: 110088. Biddle Rd Conn 1 & Hilton Ct

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	L	TR	L	T	T	R	L	T	TR
Maximum Queue (ft)	383	566	39	64	34	355	2009	1997	330	285	1140	1138
Average Queue (ft)	124	327	6	23	12	40	1881	1885	329	276	1061	1053
95th Queue (ft)	568	771	26	54	32	190	2388	2373	334	296	1322	1333
Link Distance (ft)	849	849			1196		1967	1967			1100	1100
Upstream Blk Time (%)	11	13					39	52			84	81
Queuing Penalty (veh)	0	0					300	397			0	0
Storage Bay Dist (ft)			220	220		320			220	175		
Storage Blk Time (%)							3	7	99	99	3	
Queuing Penalty (veh)							2	35	502	489	6	

Intersection: 10: 37166. OR-62 & Biddle Rd Ramp

Movement	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	R	R	T	T	T	R	T	T	T	R
Maximum Queue (ft)	1212	61	100	65	21	7	192	375	439	151
Average Queue (ft)	1204	26	10	6	2	0	14	38	82	14
95th Queue (ft)	1211	50	62	50	19	0	109	207	329	96
Link Distance (ft)	1196	237	347	347	347		507	507	507	
Upstream Blk Time (%)	64							0	0	
Queuing Penalty (veh)	457							0	2	
Storage Bay Dist (ft)						90				140
Storage Blk Time (%)									7	
Queuing Penalty (veh)									8	

Intersection: 11: 37163. OR-62 & Poplar Dr

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	L	T	R	L	L	T	R	L	T	T	TR
Maximum Queue (ft)	204	460	1243	160	230	295	285	289	349	438	445	421
Average Queue (ft)	88	425	1211	158	204	246	230	207	177	256	263	197
95th Queue (ft)	162	596	1230	181	269	271	284	334	369	425	415	344
Link Distance (ft)			1187			230	230	230		507	507	507
Upstream Blk Time (%)			78		2	69	38	29	1	1	0	0
Queuing Penalty (veh)			0		0	270	151	115	0	8	1	0
Storage Bay Dist (ft)	350	350		135	250				450			
Storage Blk Time (%)	0	0	35	64	2	69			5	1		
Queuing Penalty (veh)	0	0	257	317	8	234			19	1		

Intersection: 11: 37163. OR-62 & Poplar Dr

Movement	SB	SB	SB	SB	SB	SB
Directions Served	L	L	T	T	T	R
Maximum Queue (ft)	290	332	334	327	333	316
Average Queue (ft)	130	251	296	298	276	215
95th Queue (ft)	265	401	360	361	443	436
Link Distance (ft)						
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	410	410				350
Storage Blk Time (%)					0	
Queuing Penalty (veh)					1	

Intersection: 12: 110083. OR-62 & Sky Park Dr

Movement	WB	NB	NB	B19	B19
Directions Served	R	T	TR	T	T
Maximum Queue (ft)	45	10	12	327	437
Average Queue (ft)	11	0	1	15	22
95th Queue (ft)	39	7	12	163	200
Link Distance (ft)	432	275	275	591	591
Upstream Blk Time (%)					0
Queuing Penalty (veh)					0
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 13: 110084. OR-62 & Whittle Ave

Movement	WB	NB	NB	SB
Directions Served	R	T	TR	L
Maximum Queue (ft)	105	23	16	262
Average Queue (ft)	49	1	1	94
95th Queue (ft)	86	12	8	220
Link Distance (ft)	479	409	409	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				650
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 14: 140087. Crater Lake Hwy & Delta Waters Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	R	L	T	TR	L	L	T	T
Maximum Queue (ft)	309	432	448	413	407	466	598	571	340	356	417	436
Average Queue (ft)	127	251	259	271	227	325	330	307	193	204	178	187
95th Queue (ft)	262	372	400	389	375	498	614	584	303	314	322	331
Link Distance (ft)		1246	1246				1401	1401			823	823
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	225			450	450	400			500	500		
Storage Blk Time (%)	1	24	0	0	0	11	9				0	9
Queuing Penalty (veh)	1	20	1	0	0	22	31				0	34

Intersection: 14: 140087. Crater Lake Hwy & Delta Waters Rd

Movement	NB	SB	SB	SB
Directions Served	R	L	T	TR
Maximum Queue (ft)	333	300	1470	1486
Average Queue (ft)	118	290	1386	1378
95th Queue (ft)	250	345	1668	1678
Link Distance (ft)			1423	1423
Upstream Blk Time (%)			72	59
Queuing Penalty (veh)			0	0
Storage Bay Dist (ft)	200	200		
Storage Blk Time (%)	1	38	63	
Queuing Penalty (veh)	4	176	187	

Intersection: 15: 110089. Poplar Dr & Hilton Rd

Movement	EB	WB	NB	NB	NB	SB	SB
Directions Served	R	R	T	T	TR	T	TR
Maximum Queue (ft)	40	216	301	296	290	12	43
Average Queue (ft)	17	81	280	279	278	0	1
95th Queue (ft)	44	175	293	289	287	9	14
Link Distance (ft)	464	466	260	260	260	230	230
Upstream Blk Time (%)			90	92	75		
Queuing Penalty (veh)			0	0	0		
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Network Summary

Network wide Queuing Penalty: 7778

Attachment C Pedestrian, Bicycle, and Transit LOS Analysis Results

Segment LOS Output Summary

Roadway	Dir	From-To	Pedestrian LOS	Bicycle LOS	Transit LOS
OR 238	EB	Sage Road to Central Avenue	E	D	D
OR 238	EB	Central Avenue to OR 99	E	F	D
OR 62	EB	OR 99 to RV Mall Entrance (west)	E	F	
OR 62	EB	RV Mall Entrance (west) to RV Mall Entrance (east, at Target)	E	D	
OR 62	EB	RV Mall Entrance (east, at Target) to I-5 SB Ramp Terminal	E	D	
OR 62	EB	I-5 SB Ramp Terminal to I-5 NB Ramp Terminal	E	F	
OR 62	EB	I-5 NB Ramp Terminal to Biddle Road (north end of jug handle)	E	D	
OR 62	EB	Biddle Road (north end of jug handle) to Fred Meyer Driveway	E	D	F
OR 62	EB	Fred Meyer Driveway to Poplar Drive	E	D	F
OR 62	EB	Poplar Drive to Sky Park Drive	E	F	
OR 62	EB	Sky Park Drive to Whittle Avenue	E	F	
OR 62	EB	Whittle Avenue to Delta Waters Road	E	F	
OR 62	EB	Delta Waters Road to East end of IMSA	E	F	
OR 62	WB	East end of IMSA to Delta Waters Road	E	D	
OR 62	WB	Delta Waters Road to RI/RO Commercial Driveway	E	D	
OR 62	WB	RI/RO Commercial Driveway to Bullock Road	F	F	
OR 62	WB	Bullock Road to Hilton Court	E	D	
OR 62	WB	Hilton Court to I-5 NB Ramp Terminal	E	D	
OR 62	WB	I-5 NB Ramp Terminal to I-5 SB Ramp Terminal	E	D	
OR 62	WB	I-5 SB Ramp Terminal to RV Mall Entrance (west)	E	D	
OR 238	WB	RV Mall Entrance (west) to OR 99	E	D	
OR 238	WB	OR 99 to Central Avenue	E	F	
OR 238	WB	Central Avenue to Sage Road	E	D	
Table Rock Road	SB	Berrydale Avenue to Adams Lane	C	F	
Table Rock Road	SB	Adams Lane to Table Rock Road	C	D	
Table Rock Road	SB	Table Rock Road to OR 99	E	F	
Table Rock Road	NB	OR 99 to Table Rock Road	C	F	D
Table Rock Road	NB	Table Rock Road to Adams Lane	C	D	D
Table Rock Road	NB	Adams Lane to Berrydale Avenue	C	F	D
Central Avenue	SB	OR 99 to OR 238	C	C	C
Central Avenue	SB	OR 238 to Commercial Driveway	C	C	
Central Avenue	SB	Commercial Driveway to McAndrews (does not intersect)	C	C	
Central Avenue	NB	McAndrews (does not intersect) to Commercial Driveway	C	C	

Segment LOS Output Summary

Roadway	Dir	From-To	Pedestrian LOS	Bicycle LOS	Transit LOS
Central Avenue	NB	Commercial Driveway to OR 238	C	C	
Central Avenue	NB	OR 238 to OR 99	C	C	
OR 99	EB	Table Rock Road to OR 238	E	D	
OR 99	WB	OR 238 to Table Roock Road	F	F	B
Court Street	SB	OR 238 to Ohio Street	E	F	D
Court Street	SB	Ohio Street to McAndrews Road	E	F	D
Riverside Avenue	NB	McAndrews Road to Ohio Street	F	F	B
Riverside Avenue	NB	Ohio Street to OR 238	F	F	B
Biddle Road	SB	Knutson Avenue to Commercial Driveway	E	D	
Biddle Road	SB	Commercial Driveway to Hilton Court	E	D	
Biddle Road	SB	Hilton Court to OR 62 (does not intersect)	C	F	
Biddle Road	SB	OR 62 (does not intersect) to Biddle Road jug handle	C	D	
Biddle Road	SB	Biddle Road jug handle to North of Morrow Road	C	F	
Biddle Road	SB	North of Morrow Road to Progress Drive	C	F	
Biddle Road	SB	Progress Drive to McAndrews Road	C	F	
Biddle Road	NB	McAndrews Road to Progress Drive	E	F	D
Biddle Road	NB	Progress Drive to Morrow Road	E	F	D
Biddle Road	NB	Morrow Road to Biddle Road jug handle	E	F	F
Biddle Road	NB	Biddle Road jug handle to OR 62 (does not intersect)	E	D	
Biddle Road	NB	OR 62 to Hilton Court	E	F	
Biddle Road	NB	Hilton Court to Commercial Driveway	E	F	
Biddle Road	NB	Hilton Court to Knutson Avenue	E	F	
Hilton Court	EB	Biddle Road to OR 62	B	C	
Hilton Court	WB	OR 62 to Biddle Road	B	C	
Biddle Road jug handle	SB	OR 62 to Biddle Road	C	B	
Biddle Road jug handle	NB	Biddle Road to OR 62	B	B	E
Bullock Road	SB	North IMSA Boundary to OR 62	B	C	
Bullock Road	NB	OR 62 to North IMSA Boundary	B	C	E
Poplar Drive	SB	OR 62 to Hilton Road	C	F	F
Poplar Drive	SB	Hilton Road to Fred Meyer Driveway	C	F	F
Poplar Drive	SB	Fred Meyer Driveway to South IMSA Boundary	C	F	
Poplar Drive	NB	South IMSA Bouundary to Fred Meyer Driveway	C	F	F

Segment LOS Output Summary

Roadway	Dir	From-To	Pedestrian LOS	Bicycle LOS	Transit LOS
Poplar Drive	NB	Fred Meyer Driveway to Holton Road	E	F	F
Poplar Drive	NB	Hilton Road to OR 62	E	F	F
Hilton Road	EB	Poplar Road to East IMSA Boundary	B	C	
Hilton Road	WB	East IMSA Boundary to Poplar Road	B	C	
Sky Park Drive	EB	OR 62 to Wittle Road	B	C	
Sky Park Drive	WB	Whittle Road to OR 62	B	C	
Whittle Avenue	SB	OR 62 to Sky Park Drive	B	C	
Whittle Avenue	SB	Sky Park Drive to United Way	B	C	
Whittle Avenue	NB	United Way to Sky Park Drive	B	C	
Whittle Avenue	NB	Sky Park Drive to OR 62	B	C	
Delta waters Road	SB	Commercial Driveway to Commercial Driveway	C	F	
Delta waters Road	SB	Commercial Driveway to OR 62	E	D	
Delta Waters Road	SB	OR 62 to Crater Lake Avenue	C	D	
Delta Waters Road	NB	Craster Lake Avenue to OR 62	C	D	B
Delta Waters Road	NB	OR 62 to Commercial Driveway	C	F	B
Delta Waters Road	NB	Commercial Driveway to Commercial Driveway	C	F	B