

MEMORANDUM #5: FUTURE DAMASCUS MOBILITY PLAN AREA TRANSPORTATION SYSTEM CONDITIONS

Date: October 14, 2021

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Project: Damascus Mobility Plan

Subject: Draft Future Damascus Mobility Plan Area Transportation System Conditions (Task 7.1)

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Overview

This memorandum provides an overview of projected future traffic conditions in the Damascus area. It relies on Metro's 2040 regional travel demand model to identify any changes to study intersections and develop future volumes, the basis for the traffic operations analysis.

This effort focuses on potential vehicular improvement needs, and it references the recently completed Damascus Area Systemic Safety Enhancements for safety improvements and the Clackamas County Transit Development Plan for transit components, as well as the ongoing Bike Walk Clackamas Plan for bicycle and pedestrian improvements.

Memorandum #7: Sunnyside-Foster and 242nd Intersection Refinement details the intersection operations for intersections along Highway 212.

Roadway System

Metro's 2040 travel demand model includes the following future roadway system changes based on the Regional Transportation Plan and recent local agency planning efforts. Figure 1 includes the following changes to the local roadway network:

- A. SE Tong Road, which currently intersects with OR 212 around the 18000 block, has been rerouted in the model to intersect with OR 212 at SE 187th Avenue.
- B. SE Sunnyside Road, which currently intersects with OR 212 at SE Anderson Road, has been rerouted in the model to intersect with SE Foster Road.
- C. SE Sunnyside Road has a new eastern extension to SE Foster Road.
- D. SE Tillstrom Road, which currently ends at SE Foster Road, has been realigned in the model to end at SE 190th Drive.
 - » In the model, SE Tillstrom Road connects with SE 190th Drive in a continuous segment, and study intersection #1 no longer exists. A local connection is likely to still exist.
- E. The Clackamas to Columbia (C2C) Corridor will be complete, and the model shows a new road connecting SE 172nd Avenue with SE 190th Drive near the SE Cheldelin Road intersection.
- F. SE Tillstrom Road, which currently intersects with SE Bohna Park Road, will be rerouted to intersect with the SE Wiese Road and SE Bohna Park Road intersection.
 - » Under existing conditions, the SE Bohna Park Road and SE Tillstrom Road intersection is separate from the SE Wiese Road and SE Bohna Park Road intersection. In Metro's future conditions model, these are combined into a single, four-legged intersection. As a result, study intersection #6 no longer exists.

Figure 1 also shows the anticipated functional classification. There is one notable classification change:

- » The C2C Corridor between SE 172nd Avenue and SE 190th Drive is classified as a major arterial.

Local roadways do not necessarily appear in the Metro Model.

Figure 1. Future Metro Model Roadway System and Functional Classification

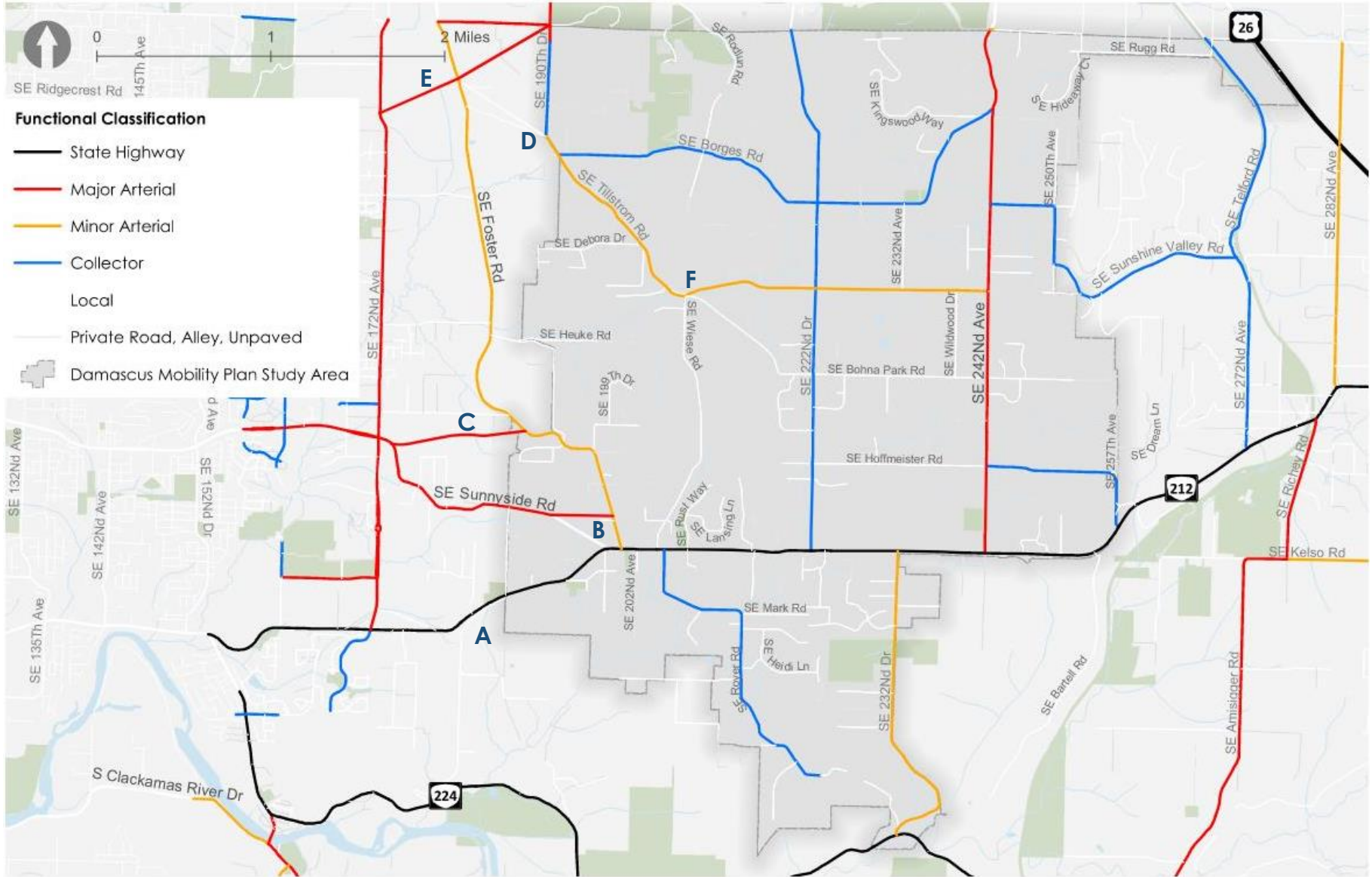


Figure 2 shows the assumed lane configurations and traffic control devices at the study intersections under future conditions and Figure 3 show the projected traffic volumes and operations at the study intersections. *Appendix A includes the traffic operations worksheets.*

Level-of-service (LOS) is a commonly used performance measure. LOS uses an “A” to “F” ranking based on the average control delay experienced by motorists. LOS “A” conditions have very low vehicles delay times (10 seconds or less), while LOS “F” conditions have high delay times (over 50 seconds on average per vehicle at an unsignalized intersection) that are considered unacceptable to most drivers. According to the Clackamas County Transportation System Plan, the LOS threshold for unsignalized intersections with rural areas of the county is LOS E during both the AM and PM peak hours.

One study intersection is located along OR 224, a District Highway managed by ODOT. As outlined in the OHP, a District Highway outside of an urban growth boundary on rural lands has a volume-to-capacity (V/C) ratio target of 0.75 during peak hour operating conditions.

As shown, all intersections meet Clackamas County’s LOS E threshold during the weekday PM peak hour, and the SE 232nd Drive/OR 224 intersection meets the ODOT v/c ratio target during the weekday PM peak hour as well.

Transit Network

The recently completed Clackamas County Transit Development Plan (TDP) outlines two future routes within the Damascus Mobility Plan study area. One local route (MT-9 in the TDP) would serve Damascus and Boring along Highway 212, turning around near SE Rock Creek Boulevard and SE 172nd Avenue. One regional route (MT-11 in the TDP) would run between the Sandy Transit Center and Clackamas Town Center, likely to be operated by Sandy Area Metro. The planned route would run along Highway 212, and then turn onto SE Sunnyside Road within the Damascus Mobility Plan study area. Additional services are available near the Damascus Mobility Plan study area, such as Sandy Area Metro’s Sandy – Gresham service, but do not enter the study area boundary.

The long-term horizon for the TDP adds additional runs to these two routes. The TDP does not provide a timeline for the introduction of “medium-term” or “long-term” service. Figure 4 shows these two planned routes within the Damascus Mobility Plan service area. The exact stop locations were not determined as part of this countywide TDP and would be identified as service implementation gets underway.

Figure 2. Assumed Lane Configurations and Traffic Control at Study Intersections

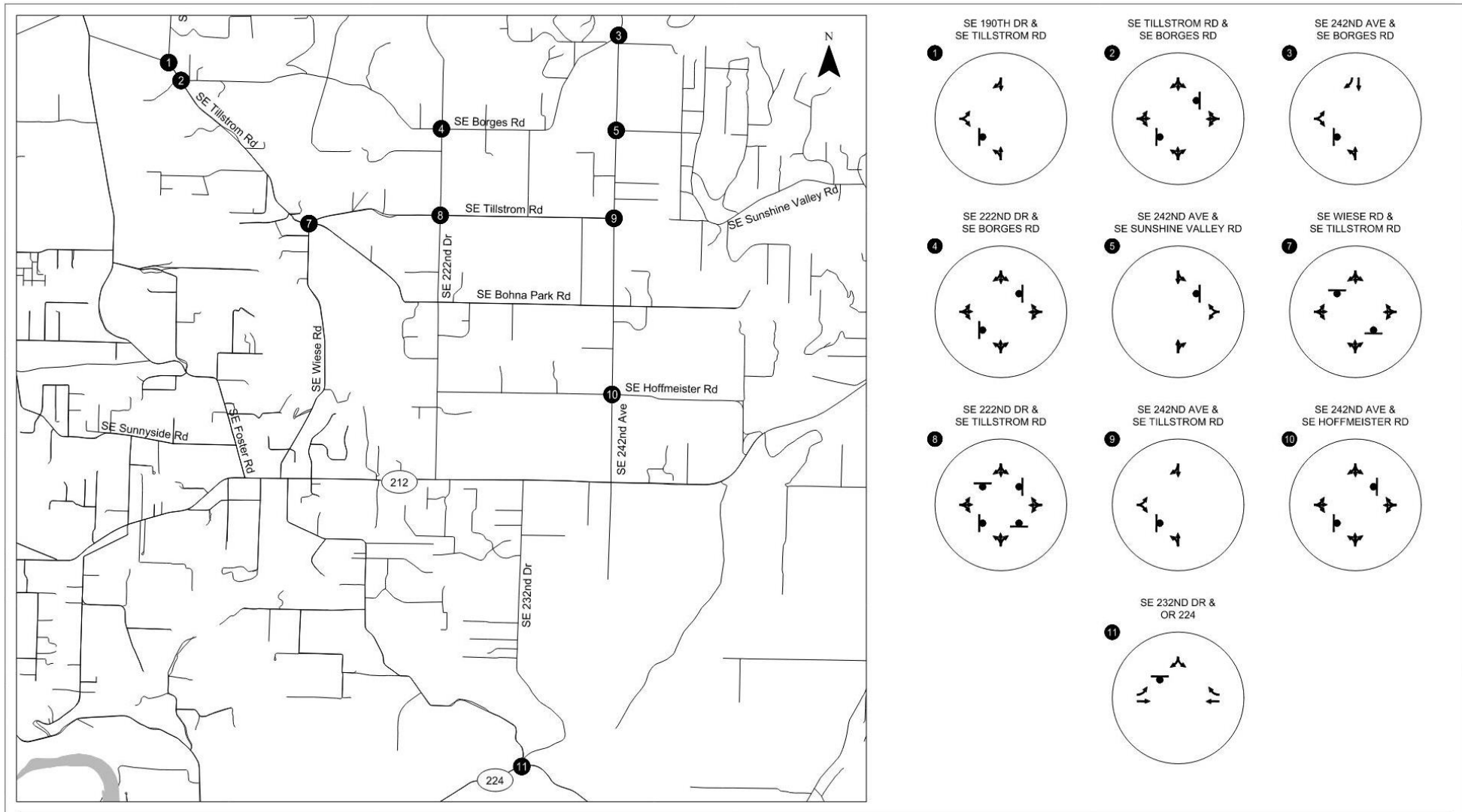


Figure 3. Future Traffic Volumes and Operations

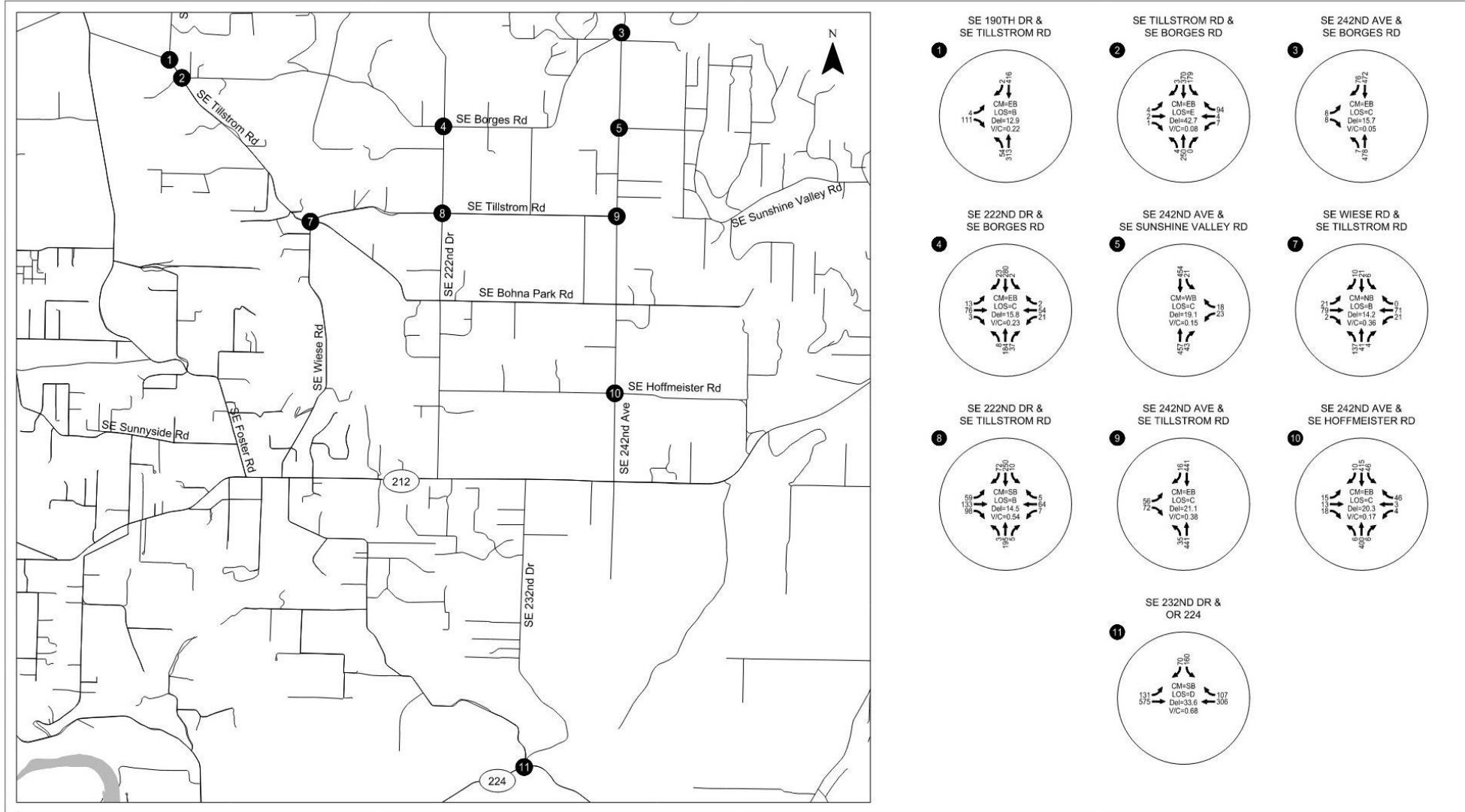
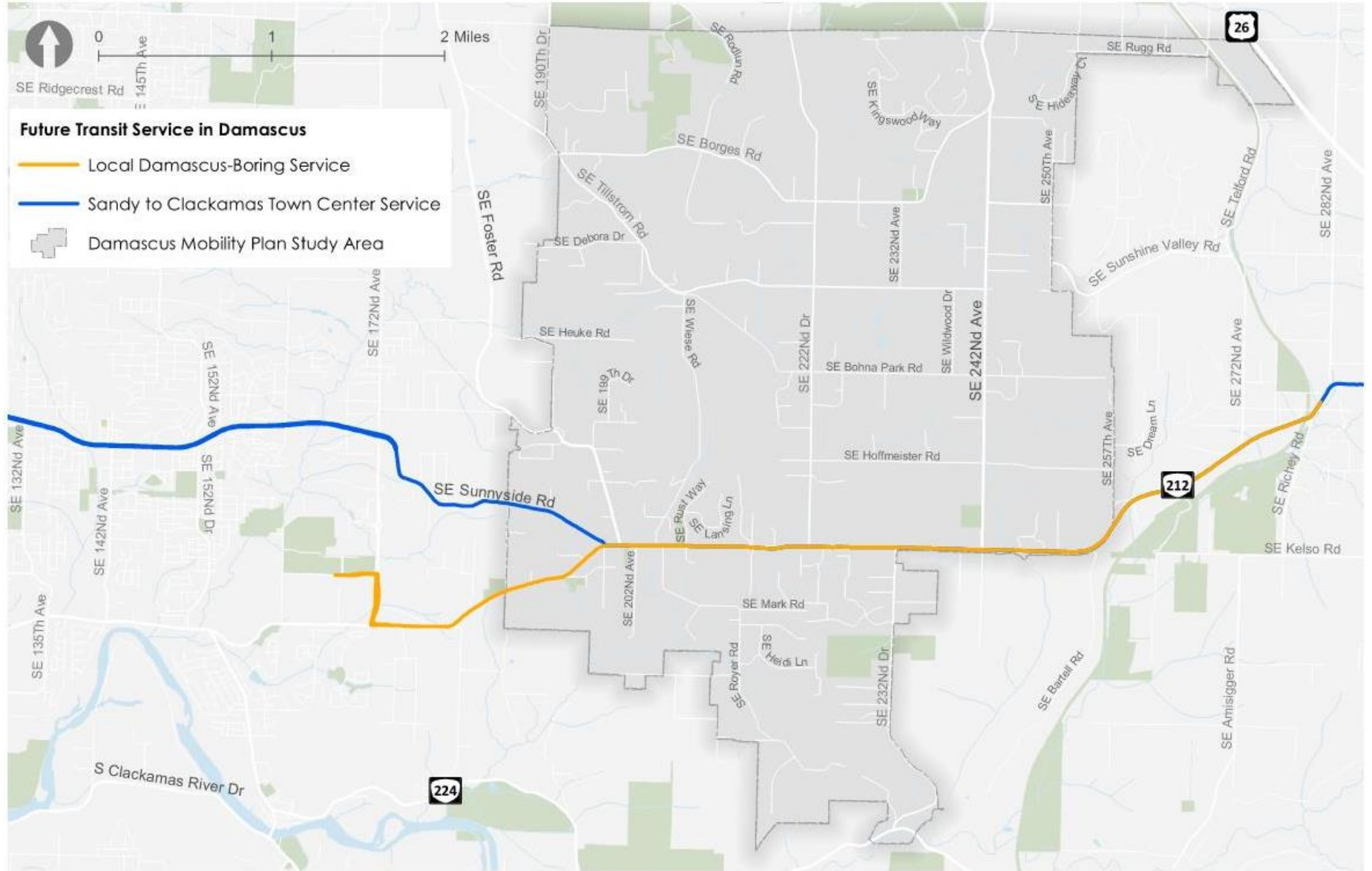


Figure 4. Planned Fixed Route Transit Services from the Clackamas County Transit Development Plan



Safety Performance

The Damascus Area Systemic Safety Enhancements project identifies numerous planned improvements within the Damascus Mobility Plan study area. Figure 5 shows the locations of the planned safety improvements for this project, and Table 1 includes the project list. Construction of these safety projects is expected to begin in 2022.

Table 1. List of Projects in the Damascus Area Systemic Safety Enhancements Project

ID	Location	Description
1	SE Tillstrom Road & SE 190 th Drive	Install safety signage
2	SE Tillstrom Road & SE Borges Road	Install safety signage
3	SE Tillstrom Road & SE Bohna Park Road	Install safety signage
4	SE Wiese Road & SE Bohna Park Road	Install safety signage
5	SE 222 nd Drive & SE Borges Road	Install safety signage
6	SE 222 nd Drive & SE Tillstrom Road	Install safety signage and overhead flashing beacons
7	SE 222 nd Drive & SE Bohna Park Road	Install safety signage
8	SE 242 nd Avenue & SE Sunshine Valley Road	Install safety signage
9	SE 222 nd Drive & SE Hoffmeister Road	Install safety signage
10	SE 242 nd Avenue & SE Tillstrom Road	Install safety signage
11	SE 242 nd Avenue & SE Bohna Park Road	Install safety signage
12	SE 242 nd Avenue & SE Hoffmeister Road	Install safety signage
13	SE 222 nd Drive	Install safety signage
14	SE Wiese Road	Install safety signage

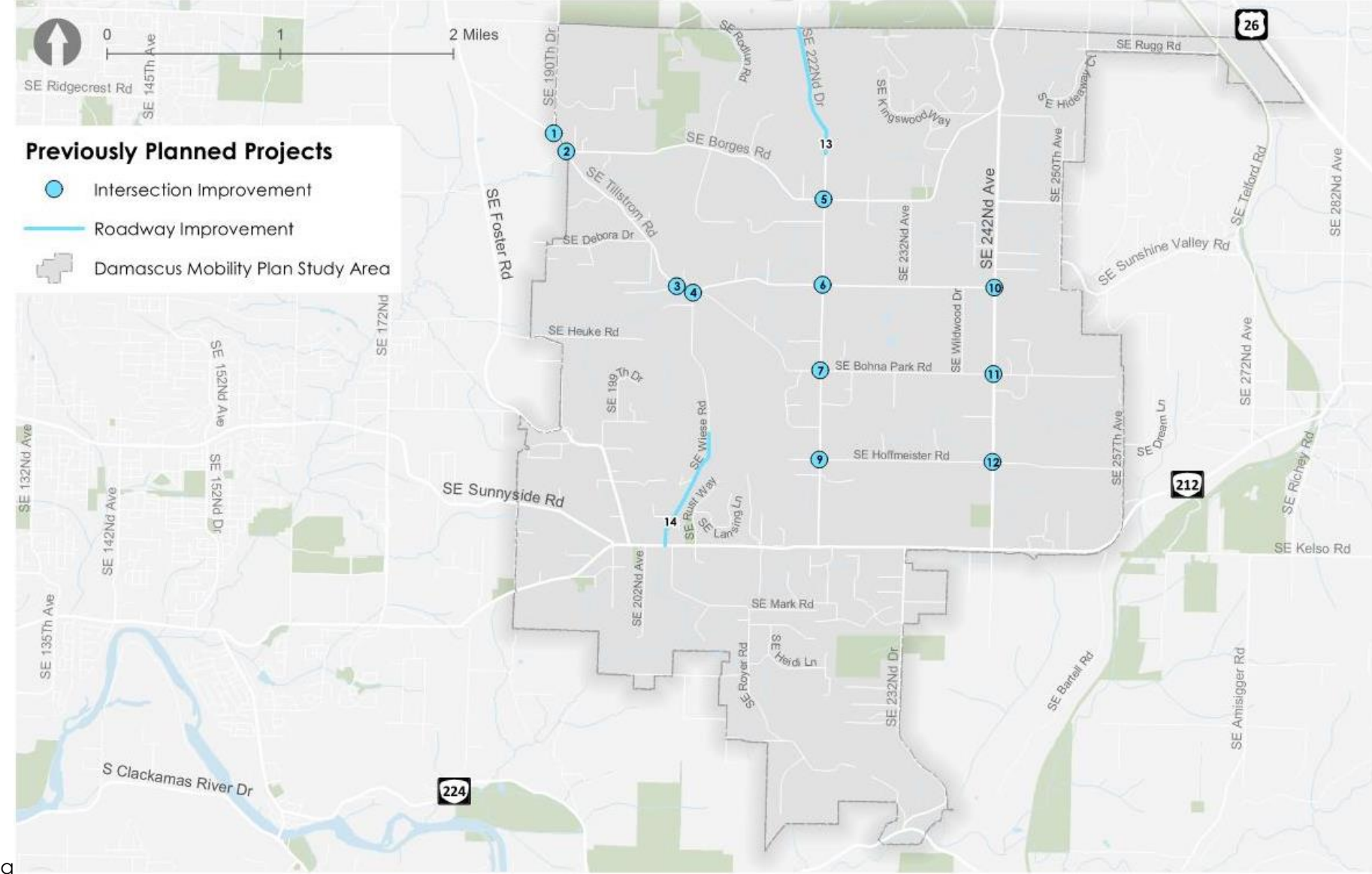
Memorandum #4: Evaluation of the Damascus Mobility Plan Area Transportation System included an intersection crash analysis of the study intersections. One intersection, SE Wiese Road and SE Bohna Park Road, exceeded ODOT's 90th percentile crash rate for three-legged, stop-controlled intersections in a rural setting. As discussed under the roadway system section above, however, Metro's 2040 travel demand model removes the SE Bohna Park Road and SE Tillstrom Road intersection, and instead brings SE Tillstrom Road to the SE Wiese Road and SE Bohna Park intersection to create a four-way, stop-controlled intersection. If constructed, the 90th percentile crash rate threshold will change, and a new intersection crash analysis will need to be conducted to determine if the new intersection exceeds the 90th percentile rate.

The virtual open house included several safety-related comments, which will be incorporated into the alternatives analysis memorandum.

Freight System

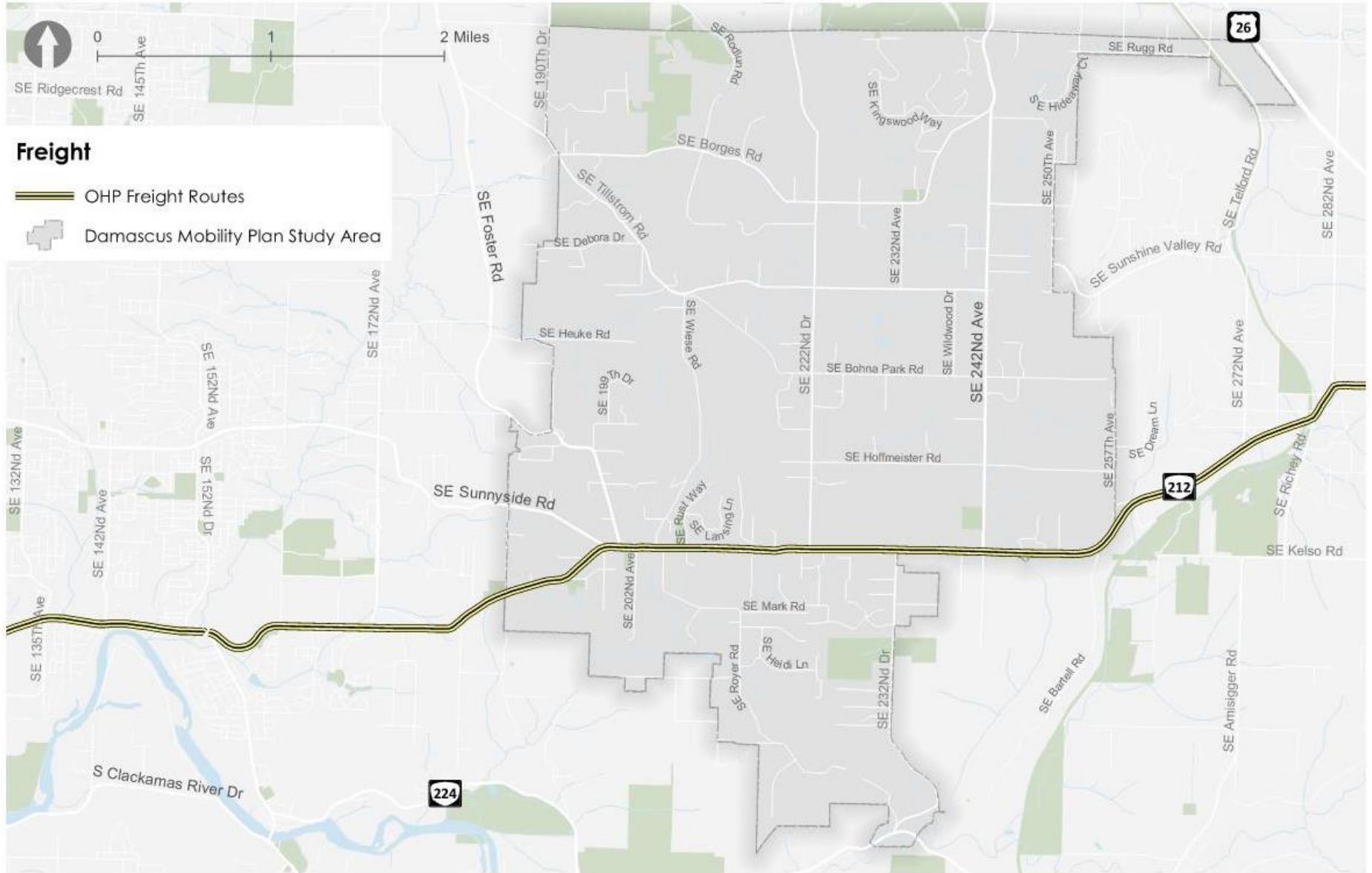
As discussed in *Memorandum #4: Evaluation of the Damascus Mobility Plan Area Transportation System*, OR 212 is the only Oregon Highway Plan (OHP) designated freight route within the study area. Under future conditions, this designation is not anticipated to change, and no additional freight routes are expected to be added. Figure 6 shows the OR 212 freight route.

Figure 5. Planned Safety Improvements from the Damascus Area Systemic Safety Enhancements Plan



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Figure 6. Future Freight Network



Future Needs

Key future needs identified in this memorandum include the following:

- » Monitor demand in the study area to ensure intersections are projected to continue to operate acceptably.
- » Monitor the performance of the new SE Tillstrom Road/SE Wiese Road/SE Bohna Park intersection. The existing SE Wiese Road/SE Bohna Park Road intersection exceeds ODOT's 90th percentile crash rate for similar intersections. The change in traffic patterns and geometric changes in the area may impact safety performance.
- » Consider the existing and future freight and transit networks in future recommendations.

Next Steps

This memorandum will be used to inform *TM #6: Alternatives Analysis, Project List, and Cost Estimates*.

Appendix A: Traffic Operations Worksheets

Intersection						
Int Delay, s/veh	2.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗	↖		↗	
Traffic Vol, veh/h	4	111	54	313	416	2
Future Vol, veh/h	4	111	54	313	416	2
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	0	-	-	-
Veh in Median Storage, #	0	-	-	16979	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	2	3	7	3	3
Mvmt Flow	5	129	63	364	484	2

Major/Minor	Minor2		Major2	
Conflicting Flow All	485	485	-	0
Stage 1	485	-	-	-
Stage 2	0	-	-	-
Critical Hdwy	6.4	6.22	-	-
Critical Hdwy Stg 1	5.4	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	3.5	3.318	-	-
Pot Cap-1 Maneuver	545	582	-	-
Stage 1	623	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %			-	-
Mov Cap-1 Maneuver	545	582	-	-
Mov Cap-2 Maneuver	545	-	-	-
Stage 1	623	-	-	-
Stage 2	-	-	-	-

Approach	EB	SB
HCM Control Delay, s	12.9	0
HCM LOS	B	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	582	-	-
HCM Lane V/C Ratio	0.222	-	-
HCM Control Delay (s)	12.9	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	0.8	-	-

Intersection												
Int Delay, s/veh	3.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	2	1	7	4	94	4	250	0	179	370	3
Future Vol, veh/h	4	2	1	7	4	94	4	250	0	179	370	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	81	81	81	81	81	81	81	81	81
Heavy Vehicles, %	40	0	100	0	0	2	33	2	0	3	3	0
Mvmt Flow	5	2	1	9	5	116	5	309	0	221	457	4

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1281	1220	459	1222	1222	309	461	0	0	309	0	0
Stage 1	901	901	-	319	319	-	-	-	-	-	-	-
Stage 2	380	319	-	903	903	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	7.2	7.1	6.5	6.22	4.43	-	-	4.13	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.86	4	4.2	3.5	4	3.318	2.497	-	-	2.227	-	-
Pot Cap-1 Maneuver	119	182	442	158	181	731	955	-	-	1246	-	-
Stage 1	286	360	-	697	657	-	-	-	-	-	-	-
Stage 2	572	657	-	335	359	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	79	138	442	126	137	731	955	-	-	1246	-	-
Mov Cap-2 Maneuver	79	138	-	126	137	-	-	-	-	-	-	-
Stage 1	284	274	-	693	653	-	-	-	-	-	-	-
Stage 2	475	653	-	252	274	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	42.7		14.9		0.1		2.8	
HCM LOS	E		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	955	-	-	104	492	1246	-	-
HCM Lane V/C Ratio	0.005	-	-	0.083	0.263	0.177	-	-
HCM Control Delay (s)	8.8	0	-	42.7	14.9	8.5	0	-
HCM Lane LOS	A	A	-	E	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	1	0.6	-	-

Intersection												
Int Delay, s/veh	3.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	13	76	3	21	54	2	8	184	37	2	280	23
Future Vol, veh/h	13	76	3	21	54	2	8	184	37	2	280	23
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
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	3	0	6	5	0	0	2	7	0	1	0
Mvmt Flow	14	80	3	22	57	2	8	194	39	2	295	24

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	570	560	307	583	553	214	319	0	0	233	0	0
Stage 1	311	311	-	230	230	-	-	-	-	-	-	-
Stage 2	259	249	-	353	323	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.53	6.2	7.16	6.55	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.53	-	6.16	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.53	-	6.16	5.55	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.027	3.3	3.554	4.045	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	435	436	738	418	437	831	1252	-	-	1346	-	-
Stage 1	704	656	-	764	708	-	-	-	-	-	-	-
Stage 2	750	699	-	656	645	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	388	432	738	354	433	831	1252	-	-	1346	-	-
Mov Cap-2 Maneuver	388	432	-	354	433	-	-	-	-	-	-	-
Stage 1	699	655	-	759	703	-	-	-	-	-	-	-
Stage 2	683	694	-	572	644	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	15.8		15.8		0.3		0.1	
HCM LOS	C		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1252	-	-	431	413	1346	-	-
HCM Lane V/C Ratio	0.007	-	-	0.225	0.196	0.002	-	-
HCM Control Delay (s)	7.9	0	-	15.8	15.8	7.7	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.9	0.7	0	-	-

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	8	7	478	472	76
Future Vol, veh/h	8	8	7	478	472	76
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Free
Storage Length	0	-	-	-	-	30
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	0	17	5	4	2
Mvmt Flow	9	9	7	509	502	81

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1025	502	502	0	-	0
Stage 1	502	-	-	-	-	-
Stage 2	523	-	-	-	-	-
Critical Hdwy	6.42	6.2	4.27	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.3	2.353	-	-	-
Pot Cap-1 Maneuver	260	573	989	-	-	0
Stage 1	608	-	-	-	-	0
Stage 2	595	-	-	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	257	573	989	-	-	-
Mov Cap-2 Maneuver	257	-	-	-	-	-
Stage 1	602	-	-	-	-	-
Stage 2	595	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.7	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT
Capacity (veh/h)	989	-	355	-
HCM Lane V/C Ratio	0.008	-	0.048	-
HCM Control Delay (s)	8.7	0	15.7	-
HCM Lane LOS	A	A	C	-
HCM 95th %tile Q(veh)	0	-	0.2	-

Intersection						
Int Delay, s/veh	1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↑		↑			↑
Traffic Vol, veh/h	23	18	457	43	21	454
Future Vol, veh/h	23	18	457	43	21	454
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	89	89	89	89	89	89
Heavy Vehicles, %	6	7	4	0	0	2
Mvmt Flow	26	20	513	48	24	510

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1095	537	0	0	561	0
Stage 1	537	-	-	-	-	-
Stage 2	558	-	-	-	-	-
Critical Hdwy	6.46	6.27	-	-	4.1	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.363	-	-	2.2	-
Pot Cap-1 Maneuver	232	534	-	-	1020	-
Stage 1	578	-	-	-	-	-
Stage 2	565	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	224	534	-	-	1020	-
Mov Cap-2 Maneuver	224	-	-	-	-	-
Stage 1	578	-	-	-	-	-
Stage 2	546	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.1	0	0.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	301	1020
HCM Lane V/C Ratio	-	-	0.153	0.023
HCM Control Delay (s)	-	-	19.1	8.6
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	0.5	0.1

Intersection												
Int Delay, s/veh	8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	21	79	2	21	71	0	137	41	4	6	21	10
Future Vol, veh/h	21	79	2	21	71	0	137	41	4	6	21	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	0	3	2	33	3	0	4	0	0	2	2	2
Mvmt Flow	25	95	2	25	86	0	165	49	5	7	25	12

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	86	0	0	97	0	0	301	282	96	309	283	86
Stage 1	-	-	-	-	-	-	146	146	-	136	136	-
Stage 2	-	-	-	-	-	-	155	136	-	173	147	-
Critical Hdwy	4.1	-	-	4.43	-	-	7.14	6.5	6.2	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.5	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.5	-	6.12	5.52	-
Follow-up Hdwy	2.2	-	-	2.497	-	-	3.536	4	3.3	3.518	4.018	3.318
Pot Cap-1 Maneuver	1523	-	-	1323	-	-	647	630	966	643	626	973
Stage 1	-	-	-	-	-	-	852	780	-	867	784	-
Stage 2	-	-	-	-	-	-	843	788	-	829	775	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1523	-	-	1323	-	-	601	607	966	583	603	973
Mov Cap-2 Maneuver	-	-	-	-	-	-	601	607	-	583	603	-
Stage 1	-	-	-	-	-	-	838	767	-	852	768	-
Stage 2	-	-	-	-	-	-	789	772	-	759	762	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.5			1.8			14.2			10.8		
HCM LOS							B			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	607	1523	-	-	1323	-	-	668
HCM Lane V/C Ratio	0.361	0.017	-	-	0.019	-	-	0.067
HCM Control Delay (s)	14.2	7.4	0	-	7.8	0	-	10.8
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	1.6	0.1	-	-	0.1	-	-	0.2

Intersection	
Intersection Delay, s/veh	13.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	59	133	98	7	64	5	3	195	5	10	250	72
Future Vol, veh/h	59	133	98	7	64	5	3	195	5	10	250	72
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	0	4	3	8	0	0	8	2	0	0	2	0
Mvmt Flow	65	146	108	8	70	5	3	214	5	11	275	79
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	13.8	10.4	12.1	14.5
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	1%	20%	9%	3%
Vol Thru, %	96%	46%	84%	75%
Vol Right, %	2%	34%	7%	22%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	203	290	76	332
LT Vol	3	59	7	10
Through Vol	195	133	64	250
RT Vol	5	98	5	72
Lane Flow Rate	223	319	84	365
Geometry Grp	1	1	1	1
Degree of Util (X)	0.359	0.488	0.145	0.54
Departure Headway (Hd)	5.786	5.508	6.252	5.33
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	618	650	570	675
Service Time	3.854	3.568	4.334	3.388
HCM Lane V/C Ratio	0.361	0.491	0.147	0.541
HCM Control Delay	12.1	13.8	10.4	14.5
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	1.6	2.7	0.5	3.2

Intersection						
Int Delay, s/veh	2.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T		T		T	
Traffic Vol, veh/h	56	72	35	441	441	16
Future Vol, veh/h	56	72	35	441	441	16
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	93	93	93	93	93	93
Heavy Vehicles, %	5	4	3	5	4	7
Mvmt Flow	60	77	38	474	474	17

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1033	483	491	0	-	0
Stage 1	483	-	-	-	-	-
Stage 2	550	-	-	-	-	-
Critical Hdwy	6.45	6.24	4.13	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.336	2.227	-	-	-
Pot Cap-1 Maneuver	254	580	1067	-	-	-
Stage 1	614	-	-	-	-	-
Stage 2	572	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	242	580	1067	-	-	-
Mov Cap-2 Maneuver	242	-	-	-	-	-
Stage 1	585	-	-	-	-	-
Stage 2	572	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	21.1	0.6	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1067	-	360	-	-
HCM Lane V/C Ratio	0.035	-	0.382	-	-
HCM Control Delay (s)	8.5	0	21.1	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.1	-	1.7	-	-

Intersection												
Int Delay, s/veh	2.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	15	13	18	4	3	46	6	400	6	46	415	10
Future Vol, veh/h	15	13	18	4	3	46	6	400	6	46	415	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
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	0	0	5	12	12	3	0
Mvmt Flow	16	14	19	4	3	48	6	421	6	48	437	11

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1001	978	443	991	980	424	448	0	0	427	0	0
Stage 1	539	539	-	436	436	-	-	-	-	-	-	-
Stage 2	462	439	-	555	544	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.22	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.308	-	-
Pot Cap-1 Maneuver	223	252	619	227	252	634	1123	-	-	1081	-	-
Stage 1	530	525	-	603	583	-	-	-	-	-	-	-
Stage 2	584	582	-	520	522	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	194	235	619	200	235	634	1123	-	-	1081	-	-
Mov Cap-2 Maneuver	194	235	-	200	235	-	-	-	-	-	-	-
Stage 1	526	494	-	599	579	-	-	-	-	-	-	-
Stage 2	533	578	-	461	491	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	20.3		13		0.1		0.8	
HCM LOS	C		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1123	-	-	284	503	1081	-	-
HCM Lane V/C Ratio	0.006	-	-	0.17	0.111	0.045	-	-
HCM Control Delay (s)	8.2	0	-	20.3	13	8.5	0	-
HCM Lane LOS	A	A	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.6	0.4	0.1	-	-

Intersection						
Int Delay, s/veh	6.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	131	575	306	107	160	70
Future Vol, veh/h	131	575	306	107	160	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	130	-	-	85	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	3	7	3	4	0
Mvmt Flow	139	612	326	114	170	74

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	440	0	-	0	1216 326
Stage 1	-	-	-	-	326 -
Stage 2	-	-	-	-	890 -
Critical Hdwy	4.12	-	-	-	6.44 6.2
Critical Hdwy Stg 1	-	-	-	-	5.44 -
Critical Hdwy Stg 2	-	-	-	-	5.44 -
Follow-up Hdwy	2.218	-	-	-	3.536 3.3
Pot Cap-1 Maneuver	1120	-	-	-	198 720
Stage 1	-	-	-	-	727 -
Stage 2	-	-	-	-	398 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1120	-	-	-	173 720
Mov Cap-2 Maneuver	-	-	-	-	296 -
Stage 1	-	-	-	-	637 -
Stage 2	-	-	-	-	398 -

Approach	EB	WB	SB
HCM Control Delay, s	1.6	0	33.6
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1120	-	-	-	361
HCM Lane V/C Ratio	0.124	-	-	-	0.678
HCM Control Delay (s)	8.7	-	-	-	33.6
HCM Lane LOS	A	-	-	-	D
HCM 95th %tile Q(veh)	0.4	-	-	-	4.8