

**APPENDIX D**  
**Future Conditions**



# 1. ANALYSIS OF FUTURE CONDITIONS

This appendix presents a discussion of expected future traffic growth within the Aurora Urban Growth Boundary (UGB) and relates this growth to expected future (2030) traffic volumes and operational conditions at key intersections in the study area. Two types of operational analysis are included in this appendix – no build and mitigated. No build analysis is the study of operations of key study intersection, assuming no new significant transportation demand management or capacity increasing investments occur within the City of Aurora between 2009 and 2030. Mitigated analysis is the study of operations of key intersections assuming the construction of transportation improvements needed to accommodate future traffic growth. The intersection analysis worksheets and traffic analysis methodologies which support this appendix are included in Technical Memorandum #1: Existing and Future Conditions and Technical Memorandum #2: Transportation System Alternatives. Technical Memorandums #1 and #2 are available from the City of Aurora.

## 1.1 FUTURE (2030) NO-BUILD TRAFFIC OPERATIONS

### 2030 Traffic Volumes

The 2030 traffic volume forecasts prepared for the Aurora TSP are based on the 2007 traffic counts collected by the Oregon Department of Transportation (ODOT) for this project. These counts were adjusted to reflect seasonal variations in traffic levels consistent with the guidance provided in ODOT's Analysis Procedures Manual. The counts were also adjusted to reflect general traffic growth between 2007 and 2008, using growth factors derived from ODOT's Transportation Planning and Analysis Unit's (TPAU) future volume historic trending tables. For the development of the 2030 future no-build forecast volumes, the growth factor was applied to through traffic on Oregon 99E only.

Land use/demographic data tables provided by Mid-Willamette Valley Council of Governments (MWVCOG) were used to forecast future turn-movement volumes for the minor streets. The technical process followed ODOT's Level 2 methodology for cumulative analysis, based on the forecasted development by Transportation Analysis Zone (TAZ). Based on community growth and development assumptions, it is anticipated that there will be approximately 900 new 30 HV peak trips on the Aurora Street system by 2030.

### 2030 Traffic Operations

The Synchro traffic simulation model developed specifically for the study area intersections was also used to assess traffic operations with forecasted 2030 (30 HV) volumes in Figure D-1. This assessment assumes that no improvements would be made to the existing street system, thus incorporating the street network characteristics illustrated in Figure D-1.

Table D-1 summarizes the results of 2030 traffic operational analysis for the 30 HV at the study area intersections. Data in this table includes the overall intersection Volume-to-Capacity (V/C) ratios, average intersection delay, and intersection Level of Service (LOS). V/C ratios above 1.0 are useful indicators of potential concerns such as sub-optimal signal timing, inadequate turn lane storage, or overall intersection saturation.

As indicated in the table, without any improvements to the existing roadway system, the signalized intersection of Liberty and Oregon 99E and the unsignalized intersections at Oregon 99E/Ottaway Road and Airport Road/Ehlen Road would fail to meet their relevant mobility standards.

**Table D-1. 2030 No-Build Traffic Operations Analysis Results**

	2030 No Build		
	V/C Ratio	Critical Delay (sec/vehicle)	Critical LOS
<b>Signalized Intersection/Critical Movement</b>			
Oregon 99E @ Liberty/1st Street	1.19	>150.0	F
<i>Eastbound Left</i>	1.43	>150.0	F
<b>Unsignalized Intersection/Critical Movement</b>			
Airport Road @ Ehlen Road			
<i>Eastbound</i>	0.03	0.9	A
<i>Southbound</i>	1.22	1.22	F
Oregon 99E @ 2nd Street			
<i>Eastbound</i>	0.13	28.9	D
<i>Southbound Thru-Right</i>	0.64	0.0	A
<i>Westbound</i>	0.11	24.1	C
Oregon 99E @ Main Street			
<i>Eastbound</i>	0.44	28.3	C
<i>Southbound Thru-Right</i>	0.57	0.0	A
<i>Westbound</i>	0.17	25.4	D
Oregon 99E @ Bob's Avenue			
<i>Westbound</i>	0.55	100.4	F
<i>Eastbound</i>	0.43	87.8	F
Oregon 99E @ Ottaway Road			
<i>Eastbound</i>	1.16	>150.0	F
<i>Westbound</i>	1.99	>150.0	F

Notes:

- (1) V/C ratio is a ratio between traffic volumes and the roadway or intersection's capacity.
- (2) LOS means intersection level of service.
- (3) "Critical Delay" and "Critical LOS" refer to the delay or LOS experienced for the specific intersection traffic movement listed.
- (4) Shading indicates failure to meet existing County or State V/C standards, as appropriate.

**Intersection Traffic Queuing**

Traffic queuing results shown in Table D-2 indicate that at the intersection of Oregon 99E and Liberty/1<sup>st</sup> Street, both the eastbound left turn lane and the southbound right turn lane will continue to exceed the available vehicle storage for these movements.

**Table D-2. Summary of 2030 Intersection Queuing**

	Existing Storage (ft)	2030 Queue (ft)
<b>Signalized Intersection</b>		
Oregon 99E @ Liberty/1st Street		
<i>Southbound Right</i>	275	170
<i>Eastbound Left</i>	215	960
<b>Unsignalized Intersection/Critical Movement</b>		
Airport Road @ Ehlen Road		
<i>Southbound</i>	*	325
Oregon 99E @ 2nd Street		
<i>Eastbound</i>	*	25
Oregon 99E @ Main Street		
<i>Eastbound</i>	*	25
<i>Westbound</i>	*	25
Oregon 99E @ Bob's Avenue		
<i>Westbound</i>	*	25
<i>Eastbound</i>	*	25
Oregon 99E @ Ottaway Road		
<i>Eastbound</i>	*	275
<i>Westbound</i>	*	50

Notes:

- (1) Signalized intersections Estimated using Synchro.
- (2) Estimated using Two-Minute Rule.
- (3) \* Single approach lane

## 1.2 FUTURE (2030) MITIGATED TRAFFIC OPERATIONS

The Synchro traffic simulation model developed specifically for the study area intersections was used to assess traffic operations with forecasted 30th highest hourly traffic volumes (30 HV) in 2030. This assessment, along with signal and turn warrant analysis, resulted in several intersections requiring improvements to accommodate future traffic growth and obtain operational standards.

Table D-3 summarizes the results of 2030 traffic operational analysis for the 30 HV at the study area intersections with and without improvements. Data in this table includes the overall intersection V/C ratios, average intersection delay, and intersection LOS. V/C ratios above 1.0 are useful indicators of potential concerns such as sub-optimal signal timing, inadequate turn lane storage, or overall intersection saturation. With the addition of mitigation listed in Table D-3, the key study intersections will achieve acceptable standards.

**Table D-3. 2030 No-Build and Mitigated Traffic Operations Analysis Results**

	2030 No Build			2030 Mitigated		
	V/C Ratio	Critical Delay (sec/vehicle)	Critical LOS	V/C Ratio	Critical Delay (sec/vehicle)	Critical LOS
<b>Signalized Intersection/Critical Movement</b>						
Oregon 99E @ Liberty/1st Street	1.19	>150.0	F	0.84	111.5	C
<i>Eastbound Left</i>	1.43	>150.0	F	0.91	59.2	E
<b>Unsignalized Intersection / Critical Movement</b>						
Airport Road @ Ehlen Road	Signalize and add southbound left turn lane and westbound right turn lane,					
<i>Eastbound</i>	0.03	0.9	A	0.74	11.1	B
<i>Southbound</i>	1.22	1.22	F	0.65	41.2	A
Oregon 99E @ 2nd Street	No Change					
<i>Eastbound</i>	0.13	28.9	D	0.13	28.9	D
<i>Southbound Thru-Right</i>	0.64	0.0	A	0.64	0.0	A
<i>Westbound</i>	0.11	24.1	C	0.11	24.1	C
Oregon 99E @ Main Street	No Change					
<i>Eastbound</i>	0.44	28.3	C	0.44	28.3	C
<i>Southbound Thru-Right</i>	0.57	0.0	A	0.57	0.0	A
<i>Westbound</i>	0.17	25.4	D	0.17	25.4	D
Oregon 99E @ Bob's Avenue	Add southbound left turn lane					
<i>Westbound</i>	0.55	100.4	F	0.16	22.0	C
<i>Eastbound</i>	0.43	87.8	F	0.13	22.3	C
Oregon 99E @ Ottaway Road	Signalize and add northbound/southbound left turn lanes, left and right turn lanes on eastbound approach, and left on westbound approach					
<i>Eastbound</i>	1.16	>150.0	F	0.75	11.6	D
<i>Westbound</i>	1.99	>150.0	F	0.32	29.9	C

Notes:

- (1) V/C ratio is a ratio between traffic volumes and the roadway or intersection's capacity.
- (2) LOS means intersection level of service.
- (3) "Critical Delay" and "Critical LOS" refer to the delay or LOS experienced for the specific intersection traffic movement listed.
- (4) Shading indicates failure to meet existing County or State V/C standards, as appropriate.

ODOT uses Signal Warrants 1, Case A and Case B, from the Manual on Uniform Traffic Control Devices (MUTCD), which deal primarily with high volumes on the intersecting minor street and high volumes on the major-street. The unsignalized intersections were evaluated for preliminary signal warrants using the minimum vehicular traffic and interruption of continuous flow warrants, Case A and Case B, respectively.

The analysis indicated that the intersection of Ottaway Road and Oregon 99E would meet Case B preliminary warrants for the major street at 100% of signal warrants. A signal was assumed as mitigation at this intersection in addition to turn lane improvements. Meeting preliminary warrants is necessary to install a signal on state highways, but it does not mean a signal should be recommended or guarantee its installation. Considerations to be evaluated include safety concerns, alternatives to signalization, signal systems, delay, queuing, bike and pedestrian needs, railroads, access, consistency with local plans, and local agency support. Before a signal can be installed, a field warrant analysis is conducted by the Region. If warrants are met, the State Traffic Engineer will make the final decision on the installation of a signal. Roundabouts may also be considered as an intersection traffic control treatment instead of signalization.

The intersection of Ehlen Road and Airport Road is under the jurisdiction of Marion County. ODOT analysis procedures (which are consistent with County procedures) were applied to this intersection and the results indicated that a southbound left and westbound right turn lane were warranted. The intersection did not meet ODOT or County preliminary signal warrants. However, even with the addition of the turn lanes, the southbound left turn movement would experience a delay of 110.0 seconds, a 1.05 V/C, and an LOS F in 2030. The addition of a signal at the intersection would achieve acceptable operations and was included as an improvement project.

