City of Tigard

Tigard Triangle

STRATEGIC PLAN

DATE:	February 27, 2015
TO:	Cheryl Caines, City of Tigard Tom McGuire, City of Tigard Mike McCarthy, City of Tigard Lidwien Rahman, ODOT Doug Baumgartner, ODOT
FROM:	Scott Harmon, David Evans and Associates, Inc.
SUBJECT:	**OR-217 Off-Ramp Queuing Analysis**
PROJECT:	ODOT0000-0801 - **Tigard Triangle Strategic Redevelopment Plan**
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Introduction

This memorandum documents the queuing analysis completed to identify the potential transportation impacts associated with Recommended Land Use and Infrastructure Option (Recommended Option) for the Tigard Triangle Redevelopment Strategy. The queuing analysis has been completed because of the anticipated slight increase in net new trips produced in the study area by the Recommended Option. The queuing analysis will support a Multimodal Mixed-Use Area (MMA) designation should the City of Tigard and the Oregon Department of Transportation (ODOT) choose to seek an MMA.

Study Area

For the queuing analysis, five intersections were modeled in the vicinity of the project area, shown on Figure 1 and listed below:

- OR-99W at OR-217 Northbound Ramp Terminal
- OR-99W at OR-217 Southbound Ramp Terminal
- SW 72nd Avenue at OR-217 Northbound Ramp Terminal
- SW 72nd Avenue at SW Hunziker Street
- SW 72nd Avenue at OR-217 Southbound Ramp Terminal

2035 Tigard Triangle Trip Generation

Land use and trip generation assumptions for various land uses were summarized in detail in the Transportation Sensitivity Analysis Memorandum, (February 2015, under separate cover). Table 1 below lists the assumed land uses and the net new trips for the Recommend Option (Option 2, assuming a 30% mixed use reduction per Title 6 of Metro's Urban Growth Management Functional Plan):

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Figure 1
Project Study Area

Table 1: Recommended Option Assumptions

Recommend Option Assumption:	
Gross Buildable Area (sq. ft.)	8,487,764
Net Buildable Area (sq. ft.)	5,923,881
Potential New Dwelling Units	2,195
Potential General Commercial (sq. ft.)	0
Potential Office Floor Area (sq. ft.)	1,087,930
Potential Retail Mixed Use Flex Space Floor Area (sq. ft.)	240,275
PM Peak Hour Net New Trips	2,192
Daily Net New Trips	22,486

2035 Volume Development

The volume development methodology is a seven step process based on the methodology and procedures outlined in ODOT's Transportation Planning and Analysis Unit's (TPAU) Analysis Procedures Manual (APM) and NCHRP 255. The seven steps are summarized below:

1. Determine Existing Peak Hour
2. Seasonally Adjust Existing Traffic Counts
3. Determine Background Growth using Metro's Regional Travel Demand Model
4. Grow Existing Volumes to 2035 Background Volumes
5. Determine Trip Distribution for Tigard Triangle Zone Change
6. Apply Trip Distribution to Trips from Tigard Triangle Zone Change
7. Add Tigard Triangle Zone Change Trips to 2035 Background Volumes

A detailed explanation of each step is summarized in the memorandum titled 2035 Volume Development Methodology (attached for reference). Final 2035 traffic volumes are included in Table 2 below:

Table 2: 2035 with Tigard Triangle Recommended Option Traffic Volumes

Intersection:	OR-99W (E-W) @ 217 NB (N-S)	OR-99W (E-W) @ 217 SB (N-S)	SW 72nd Ave (N-S) @ 217 NB (E-W)	SW 72nd Ave (N-S) @ SW Hunziker St (E-W)	SW 72nd Ave (N-S) @ 217 SB (E-W)
Eastbound Left	0	0	0	100	25
Eastbound Thru	1,830	1,680	0	0	5
Eastbound Right	420	260	0	265	5
Westbound Left	0	60	385	0	120
Westbound Thru	1,860	2,045	0	0	5
Westbound Right	780	0	450	0	150
Northbound Left	245	0	0	165	5
Northbound Thru	0	0	675	1,095	1,085
Northbound Right	135	0	520	0	140
Southbound Left	0	570	435	0	335
Southbound Thru	0	5	1,000	915	820
Southbound Right	0	265	0	470	25
Total Entering Volume	**5,270**	**4,885**	**3,465**	**3,010**	**2,720**

The step by step volume development table is attached for reference.

Queuing Analysis

Once 2035 traffic volumes were developed, volumes were input into Synchro/SimTraffic version 9. Synchro and SimTraffic settings were entered according to Chapters 8 and Chapter 9 of the APM. Existing signal timing provided by ODOT Region 1 staff was used as a starting point for the analysis. Adjustments were made at the intersection of SW 72nd Avenue and the OR-217 northbound off-ramp to provide additional green time for the off-ramp movement. This adjustment was made to reduce the amount queuing that would occur on the off-ramp. Ten seeds were simulated for both the existing and adjusted signal timing. Results are based on the average of all 10 runs for both timing scenarios. Based on the direction of ODOT Region 1 staff, only queuing for OR-217 off-ramps is reported in this memorandum. Table 3 below includes the 2035 with Tigard Triangle Recommend Option 95th percentile queue lengths:

Table 3: 95th Percentile Queuing Results

Locaton	Existing Timing 95% Queue (ft.)	Adjusted Timing 95% Queue (ft.)
OR-99W @ 217 Northbound Off-Ramp		
Northbound Left	500	500
Northbound Right	175	175
OR-99W @ 217 Southbound Off-Ramp		
Southbound Left	350	350
Southbound Left/Thru	375	375
Southbound Right	175	175
SW 72nd Ave @ OR-217 Northbound Off-Ramp		
Westbound Left	>1,250*	600
Westbound Right	>1,250*	275
SW 72nd Ave @ OR-217 Southbound Off-Ramp		
Westbound Left/Thru	175	175
Westbound Right	150	125

* 95% queue extends past painted exit gore on collector-distributor system.

Synchro signal timing and SimTraffic queuing outputs are attached with additional details for reference.

Next Steps

With the completion of the queuing analysis summarized in Table 3 and based on direction from ODOT staff, the next steps are for ODOT staff to calculate the safe stopping sight distance and determine where queuing exceeds this distance. In instances where the 95th percentile queue exceeds the safe stopping sight distance, ODOT and City of Tigard staff will need to determine the appropriate mitigation to reduce the 95th percentile queue.

Initials: CMG

Attachments:
- Memorandum – 2035 Volume Development Methodology
- Memorandum – Transportation Sensitivity Analysis
- PM Turning Movement Volume Development
- Synchro Existing Signal Timing
- SimTraffic Existing Timing Queuing Outputs
- Synchro Adjusted Signal Timing
- SimTraffic Adjusted Timing Queuing Outputs

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