

## **Traffic Operation Analysis of SR 520 WB East of the Floating Bridge**

WSDOT Urban Planning Office recently used VISSIM traffic simulation model to assess the potential traffic operation conditions of two different HOV lane usage scenarios in SR 520 westbound. The model covers the WB SR 520 from east of Bellevue Way to the east end of the Evergreen Point Bridge. Since the PM peak hour shows higher demand than AM peak, the analysis focused on analyzing the operations during the PM peak hour and shoulder peak hour. Two scenarios were analyzed:

- **What if the 3+ HOV lane is open to 2+ HOV in the PM peak period?**
- **What if the 3+ HOV lane is open to GP after the peak period?**

These two scenarios were compared to the existing conditions. The performance measures used in the comparison include queue, travel time, speed, delay, and queue dissipation time. Here is detail explanation of each of these measures and how they were calculated:

**Average vehicles in queue:** number of vehicles in slow moving platoon (under 15 mph) in all lanes.

**Average travel time:** this is the average travel time in minutes for all vehicles in all lanes (GP and HOV) from I-405 and the east end of the floating bridge.

**Speed,** this is average speed (mph) for vehicle in all lanes from Bellevue Way to the east end of the floating bridge.

**Throughput:** the total number of vehicles passing the east end of the floating bridge for the simulation period in vehicles/hour.

**Total person delay:** total hours of delay experienced by all travelers in SOV, HOV and buses during the respective simulation hour.

**Total transit person delay:** total hours of delay experienced by all bus riders during the respective simulation hour. This was calculated by using the number of bus riders and the speed differential between the existing condition (at 45 mph) and the two scenarios.

**Queue dissipation time:** the estimated time when queue is expected to disappear completely.

### **Summary of Findings:**

The simulation indicated that opening up the HOV 3+ lane to HOV 2 in the peak period would degrade the operation compare to the existing condition by almost all measures. The traffic operation would be even worse if the HOV lane is opened to GP traffic from 6:00 to 7:00 PM, immediately following the traditional peak period. The simulation results are summarized in the tables on the following page.

**What if the 3+ HOV lane is open to 2+ HOV in the PM peak period?**

<b>WB SR 520 Performance Measures (Bellevue Way to Evergreen Point Road)</b>			
<b>PM Peak Hour (5:00 - 6:00 PM)</b>			
	Existing Condition (HOV 3+)	HOV 2+	% Change
Average Number of Vehicles in Queue	2,100	2,400	14%
Average Travel Time ( <i>I-405 to Floating Br</i> in minutes)	16	17	6%
Speed (mph)	14	12.5	-11%
Throughput at East of Evergreen Point Bridge (vph)	3,700	3,700	0%
Total Person Delay (hr)	440	620	40%
Total Transit Person Delay (hr)	10	120	1100%
Queue Dissipation Time	8:00 PM	8:30 PM	-

**What if the 3+ HOV lane is open to GP after the peak period?**

<b>WB SR 520 Performance Measures (Bellevue Way to Evergreen Point Road)</b>			
<b>PM Peak Shoulder 6:00 - 7:00 PM</b>			
	Existing Condition (HOV 3+)	Open HOV Lane to All Traffic	% Change
Average Number of Vehicles in Queue	1,700	2,200	30%
Average Travel Time ( <i>I-405 to Floating Br</i> in minutes)	16	20	25%
Speed (mph)	14	10	-30%
Throughput at East of Evergreen Point Bridge (vph)	3,750	3,700	-1%
Total Person Delay (hr)	440	800	80%
Total Transit Person Delay (hr)	10	150	1400%
Queue Dissipation Time	8:00 PM	9:00 PM	-