

**Appendix A**  
**Traffic Analysis Methodology**

A brief overview of traffic analysis methodologies and concepts used in this analysis is presented in this section. Street system operating conditions are typically described in terms of “level of service.” Level of service is a report-card scale used to indicate the traffic flow on roadway segments and at intersections. Level of service (LOS) ranges from LOS A (free flow, little congestion) to LOS F (forced flow, extreme congestion).

**Intersection Capacity**

The analysis of peak hour intersection performance was conducted using the Synchro analysis software program, which uses methodologies defined in the 2000 Highway Capacity Manual (HCM) to calculate results. LOS for intersections is determined by control delay. Control delay is defined as the total elapsed time from when a vehicle stops at the end of a queue to the time the vehicle departs from the stop line. The total elapsed time includes the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position; including deceleration of vehicles from free-flow speed to the speed of vehicles in the queue. The HCM LOS for the range of delay by seconds for unsignalized and signalized intersections is described in Table I.

Table I  
Unsignalized and Signalized Intersection Level of Service (HCM 2000)

Level of Service	Unsignalized	Signalized
	Average Control Delay (seconds/vehicle)	Average Control Delay (seconds/vehicle)
A	0-10	0-10
B	> 10-15	> 10-20
C	> 15-25	> 20-35
D	> 25-35	> 35-55
E	> 35-50	> 55-80
F	>50	> 80

Source: Highway Capacity Manual 2000.

**Signalized Intersections**

The HCM analysis methodology for evaluating signalized intersections is based on the “operational analysis” procedure. This technique uses 1,900 passenger cars per hour of green per lane (pcphgpl) as the maximum saturation flow of a single lane at an intersection. This saturation flow rate is adjusted to account for lane width, on-street parking, conflicting pedestrian flow, traffic composition, (e.g., the percentage of vehicles that are trucks) and shared lane movements (e.g., through and right-turn movements from the same lane). Average control delay is calculated by taking a volume-weighted average of all the delays for all vehicles entering the intersection.

**Level of Service (LOS) Definitions**

The concept of LOS is defined as a qualitative measure describing operational conditions within a traffic stream, and the motorist's and/or passengers' perception of operations. A LOS definition generally describes these conditions in terms of such factors as speed, travel time, freedom to maneuver, comfort, convenience, and safety. Levels of service for freeway segments can generally be categorized as shown in the table above.