



Appendix H

**Level of Service
(LOS) Definitions**

APPENDIX H

LEVEL OF SERVICE (LOS) DEFINITIONS

Level of Service (LOS) is a qualitative measure of operating conditions within a traffic stream, and their perception by motorists and/or passengers. A LOS definition generally describes these conditions in terms of such factors as speed, travel time, freedom to maneuver, comfort and convenience, and safety.

LOS A on freeways describes primary free-flow operations. Average operating speeds at the free-flow speed generally prevail. Vehicles are almost unimpeded in their ability to maneuver within the traffic stream. On intersections LOS A describes operations with very low delay, up to 5 seconds per vehicle. This LOS occurs when progression is extremely favorable and most vehicles arrive during the green phase.

LOS B represents a reasonable free-flow, and speeds are generally maintained. The ability to maneuver within the traffic stream is only slightly restricted, and the general level of physical and psychological comfort provided to drivers is still high. For intersections, LOS B describes operations with delay greater than 5 and up to 15 seconds per vehicle. This level generally occurs with good progression, short cycle lengths, or both.

LOS C provides for flow with speeds still at or near the freeway flow speed of the freeway. Freedom to maneuver within the traffic stream is noticeably restricted at LOS C, and lane changes require more vigilance on the part of the driver. For intersections, LOS C describes operations with delay greater than 15 and up to 25 seconds per vehicle.

LOS D is the level at which speeds begin to decline slightly with increasing flows. In this range, density begins to deteriorate somewhat more quickly with increasing flow. Freedom to maneuver within the traffic stream is more noticeably limited, and the driver experiences reduced physical and psychological comfort levels. Even minor incidents can be expected to create queuing, because the traffic stream has little space to absorb disruptions. For intersections, LOS D describes operations with delay greater than 25 and up to 40 seconds per vehicle.

LOS E on freeways is the value that corresponds to the maximum flow rate, or capacity, on the facility. Operations in this level are volatile, because there are virtually no usable gaps in the traffic stream. For intersections, LOS E describes operations with delay greater than 40 and up to 60 seconds per vehicle.

LOS F on freeways represents a stop and go, low speed conditions with little or poor maneuverability. Speed and traffic flow may drop to zero and considerable delays occur. For intersections, LOS F describes operations with delay in excess of 60 seconds per vehicle. This level, considered by most drivers unacceptable often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of the intersection.

Levels of Service for different facilities can generally be categorized as follows:

<u>LOS</u>	<u>Demand/ Capacity Ratio</u>	<u>Congestion or Delay</u>	<u>Traffic Description</u>
<u>(Used for all freeways and expressways)</u>			
"F0"	1.01-1.25	Considerable 0-1 hour delay	Forced flow, heavy congestion, long queues form behind breakdown points, stop and go.
"F1"	1.26-1.35	Severe, 1-2 hour delay	Very heavy congestion, very long queues.
"F2"	1.36-1.45	Very severe 2-3 hour delay	Extremely heavy congestion, longer queues, more numerous breakdown points, longer stop periods.
"F3"	>1.46	Extremely severe 3+ hours of delay	Gridlock
<u>(Used for two and four lane freeways and expressways)</u>			
"A"	<.34	None	Free flow.
"B"	0.35-0.52	None	Free to stable flow, light to moderate volumes.
"C"	0.53-0.69	None to minimal	Stable flow, moderate volumes, freedom to maneuver noticeably restricted.
"D"	0.70-0.92	Minimal to substantial	Approaches unstable flow, heavy volumes, very limited freedom to maneuver.
"E"	0.93-1.00	Significant	Extremely unstable flow, maneuverability and psychological comfort extremely poor.
<u>(Used for conventional highways)</u>			
"B"	<0.45	None	Free to stable flow, light to moderate volumes
"C"	0.46-0.65	None to minimal	Stable flow, moderate volumes, freedom to maneuver noticeably restricted
"D"	0.66-0.85	Minimal to substantial	Approaches unstable flow, heavy volumes, very limited freedom to maneuver.
"E"	0.86-1.00	Significant	Extremely unstable flow, maneuverability and psychological comfort extremely poor.
"F"	>1.00	Considerable	Forced or breakdown. Delay measured in average flow travel speed (MPH). Signalized segments experience delays >60.0 seconds/vehicle.