

- 1) A four-lane freeway (two lanes in each direction) is located in mountainous terrain with 11-ft lane, a 5-ft right-side shoulder, interchange spacing of one every 10 miles, and a 60 mi/h base free-flow speed. During the peak hour there are 12% large trucks and 6% recreational vehicles. PHF is 0.88 and the driver population adjustment is determined to be 0.9. The freeway currently operates at capacity during the peak-hour. If an additional 11-ft lane is added (in each direction), and all factors are the same, what will be the current LOS and LOS after adding the lane.
- 2) A multilane highway has four lanes (two lanes in each direction) and a measured free-flow speed of 55 mi/h. One upgrade is 5% and is 0.62 mi long. Currently trucks are not permitted on the highway, but there are 2% buses (no recreational vehicles) in the directional peak-hour volume of 1900 vehicles (the peak-hour factor is 0.80). Local authorities are considering allowing trucks on this upgrade. If this is done, they estimate that 150 large trucks will use the highway during the peak hour. What would be the level of service before and after the trucks are allowed (assuming the driver population adjustment to be 1.0 before and 0.97 after)?
- 3) A four-lane freeway (two lanes in each direction) operates at capacity during the peak hour. It has 11-ft lanes, 4-ft shoulders, and there are three ramps within three miles upstream of the segment midpoint and four ramps within three miles downstream of the segment midpoint. The freeway has only regular users, there are 8% large trucks and buses (no recreational vehicles), and it is on rolling terrain with a peak-hour factor of 0.85. It is known that 12% of the AADT occurs in the peak hour and that the directional factor is 0.6. What is the freeway's AADT?