# CE 361

# In-Class Design Problem #3:
# Geometric Design (2)

For this exercise, you are to design a single-lane interchange ramp (so $R = R_v$) to connect two highways that intersect at a right angle as shown below (and as described in Example 3.18 on page 87). As in this example, the north-south highway is the existing highway and is at a constant grade at elevation 565.5 ft. The east-west highway new construction and is to be designed at a constant grade above the north-south highway with a bridge structure depth of 6ft to the roadway surface (you can determine the elevation of the east-west roadway using desirable AASHTO recommendations).

The ramp designed in Example 3.18 is for eastbound traffic going south. Using the same roads (elevations etc.), design a clover-leaf ramp for eastbound traffic going north. The ramp is to consist of a horizontal curve starting on the east-west highway with a *PC* starting at station 49+60. For this ramp, a 12 percent superelevation is to be used with a 30mi/h design speed. Determine:

- the length of the ramp
- minimum $M_s$ for horizontal curve sight distance
- a vertical alignment to connect the two highways (crest, constant grade section, sag) that starts at the *PC* and ends at the *PT* of the horizontal curve. Note that these curves are to be constructed in a jurisdiction that has **minimum vertical curve lengths equal to 3 times the design speed (in mi/h)**. See discussion above Table 3.2 on page 62 of the text.
- give stations and elevations of *PVC*'s, *PVI*'s, *PVT*'s, *PC* and *PT*