CE 466 / 566 Highway Geometric Design
Homework 4
Due Thursday, March 5, 2009

The purpose of this assignment is to familiarize you with basic CAD skills with roadway surfaces and alignments, and to work with these alignments. It will also require that you remember and exercise your knowledge of sight distance requirements.

Included with this homework is a zipped text file (OG.zip). The text files contains topographic points (OG_pts.txt) for the segment of Orange Grove between Oracle and Skyline. In the RTA plan, this roadway is scheduled to be widened from 2 lanes to 4 lanes. We are not given a design speed, but it may be useful to consider that this roadway will be classified as an arterial in the future – so you will have to select a possible future design speed (at least 45 mph).

In this assignment, do the following:

1. Select a design speed for the roadway widening. Determine the stopping sight distance (SSD) required for this design speed. Note that it is not unreasonable to assume a grade (G) of zero when calculating SSD in a vertical curve.
2. Bring the topographic files (points) into InRoads or Civil3D. Generate a digital terrain model (DTM) or surface from these data.
3. Identify the current horizontal alignment in InRoads or Civil3D. This is provided in a separate alignment file for each software tool.
4. Generate a vertical profile, then identify the current vertical alignment.
5. Using the profile and the vertical alignment, identify the stopping sight distance in all vertical curves. This can generally be done directly through the annotation of the vertical curves.
6. Identify any parts of the vertical alignment where the ***currently available*** SSD is ***less*** than the required SSD, for your selected design speed (see question 1).
7. Adjust your vertical alignment to accommodate the necessary SSD.

Your homework submission should include the following:

(a) A brief paragraph describing your chosen design speed and the resulting SSD (from question 1).

(b) A paragraph or more describing the location and changes you made in your vertical alignment in order to accommodate your new SSD (from questions 6 and 7).

(c) A copy of the ***existing*** horizontal and vertical alignment, in a MicroStation or AutoCAD file, submitted electronically.

(d) A copy of your ***proposed*** vertical alignment, in a MicroStation or AutoCAD file, submitted electronically. This can be part of the same file submitted for part (c).

Note: Separate PDF files with this assignment give instructions on using InRoads or Civil3D to complete this assignment. This material will also be covered in the tutorial sessions.