CE 413 Homework IV

Problem 1

Specify the size of a box culvert that must carry a maximum flow of 100 cfs with no more than 3 feet of water above the culvert crown. The culvert is 200 feet long, made of precast concrete, with 45° wingwalls, square edged at the crown with a slope of 0.7%. The worst case of backwater will be water 2 feet above the crown at exit. The orifice coefficient of the culvert under orifice flow conditions is 0.85.

Problem 2

Class text problem 7.39 in English units.

Problem 3

Rework the online reading Ex. ~~7.6~~ **7.7** for Carbondale, Illinois.

Problem 4

Rework the class example prismatic stage-volume fit for horizontal to vertical slope of 2:1.

Problem 5

Use the modified rational method to size a detention basin for the watershed described in Class handout text Example 7.6. Design should be based on the 10 year I-D-F expression:

$$i = 2.932 \, T^{0.1639}/(D + 0.5403)$$

for D in hr and a maximum outflow of 15 cfs.