CE 365K Hydraulic Engineering Design **Spring 2015**

Assignment 1
Open Channel Design using FlowMaster

The solution to this homework should be posted in pdf format to the Canvas web site for this class under Assignment 1 by Tuesday Feb 3.

It is assumed for this tutorial that you have installed the Bentley FlowMaster program on your own computer as described at: http://www.caee.utexas.edu/prof/maidment/CE365KSpr15/Bentley/InstallBentleySoftware.pdf You may also use the FlowMaster program installed in ECJ 3.402.

1. Use the FlowMaster tutorial at: http://www.caee.utexas.edu/prof/maidment/CE365KSpr15/Bentley/FlowMaster.pdf to solve for the discharge in a rectangular channel of 0.5m width, 0.3m normal depth, roughness 0.013 for concrete, and of slope 0.05. Include in your solution:

(a) A screen capture of the **Worksheet** (as on p.5 of the instructions)

(b) A screen capture of the **Rating Curve** (as on p.6 of the instructions)

(c) A screen capture of the **Cross Section** (as on p.7 of the instructions)

Close the program and save your worksheet.

2. Use hand computation to replicate the Flow Area, Wetted Perimeter, Hydraulic Radius, Critical Depth, Velocity, Velocity Head, Specific Energy and Froude Number for the flow conditions in Problem 1.

3. Now suppose we change to US units. Open the Flowmaster program and create a new Worksheet. Change the default settings to US units. Suppose we have a longitudinal slope of 0.05, roughness of 0.013, normal depth of 3ft, and we want to design a trapezoidal channel with 3H:1V side slopes that will convey a discharge of 2000cfs. Determine the required bottom width (ft). Show a screen capture of the resulting **Cross Section** in your solution. What is the Froude Number for this solution? Is this Supercritical or Subcritical flow?

4. Change the slope in #3 to 0.001 and the normal depth to 6 ft, and resolve for the new bottom width (ft) of a trapezoidal channel. Show a screen capture of the resulting **Cross Section** in your solution. What is the Froude Number for this solution? Is this Supercritical or Subcritical flow?