

You are to design a detention pond using the Bentley Pond Pack software. Instructions on how to download this software are at:

<http://www.caee.utexas.edu/prof/maidment/CE365KSpr15/Bentley/InstallBentleySoftware.pdf> A

tutorial in how to use this software is at:

<http://www.caee.utexas.edu/prof/maidment/CE365KSpr15/Bentley/PondPack.pdf>

The drainage area of the pond is 10 acres in area, the SCS curve number is 80, and the time of concentration is 30 minutes.

The design storm is a 10 year return period with a depth of precipitation of 4.5 inches and a duration of 2 hours. The design storm distribution is from Illinois State Water Survey Bulletin 70/71.

The pond has an elevation-area characteristics as given below.

Elevation-Area Data for Detention Pond

Elevation (ft)	Area (ac)	Elevation (ft)	Area (ac)
100	0.158	104	0.263
100.5	0.170	104.5	0.278
101	0.182	105	0.293
101.5	0.194	105.5	0.309
102	0.207	106	0.325
102.5	0.221	106.5	0.342
103	0.234	107	0.359
103.5	0.248		

The outlet structure has an orifice of 6 inches diameter and discharge coefficient 0.6, whose invert is at elevation 100 ft, the pond crest has a suppressed rectangular weir which is 15 feet in length whose base is at elevation 105 ft with weir coefficient is 2.6. The pond berm has a top elevation of 107 ft.

To be determined:

- (1) Determine the amount of runoff (in) and volume (acre-ft) from the watershed during this storm.
- (2) Compute the peak inflow and outflow for the pond under these conditions (cfs). What is the maximum water surface elevation (ft). What discharge is coming from the orifice at this elevation (cfs). What discharge is coming from the weir (cfs)?
- (3) Evaluate some design alternatives for the outlet structures for this pond. Can you reduce the outlet discharge for this storm without overtopping the pond embankment at elevation 107 ft?

Tip: If you have trouble setting up the Pond Pack program for this exercise, you can find a version of model with the data configured in it at:

<http://www.caee.utexas.edu/prof/maidment/CE365KSpr15/Assignment5/Assignment5Model.zip>