



Flood Control District of Maricopa County

INTEROFFICE MEMORANDUM

Date: September 24, 2010

To: Bing Zhao, PhD, PE, Engineering Application Development and River Mechanics Branch Manager, Engineering Division

From: J. Rafael Pacheco, PhD, Engineering Application Development and River Mechanics Branch, Engineering Division

CC: Richard Waskowsky, MS, EIT, Engineering Application Development and River Mechanics Branch, Engineering Division

Subject: H3 Alluvial Fan Wittmann Area FLO-2D Model for different inflow hydrographs.

I was asked to run 24-hour Wittmann FLO-2D input data from PACE (H3 Alluvial Fan Wittmann Area FLO-2D Study April 2010) without rain or sediment for different inflow hydrographs. The original files were provided by PACE (see reference above) and changes were made by me as outlined in this memorandum. The input data files were run under FLO-2D[®] Flood Routing Model Version 2007.06 (executable flo.exe compiled on date 3/6/2008). The input data, the results, and this memorandum can be found in the attached CD.

A summary of the modifications is shown below:

1. The northernmost hydrograph was scaled from its maximum value of $Q=9,687$ cfs to create (6) six different runs with different hydrographs whose maximum values ranged from $Q=3,000$ cfs to $Q=8,000$ cfs in increments of 1,000 cfs. The excel file is also included in the CD.
2. For all the runs, the sediment supply and rain were turned off and only the 'scaled' hydrographs remained in place.
3. I performed seven (7) sets of runs and the maximum flow depths and other results are included in the CD. The shape files for maximum flow depth were also generated by using software Mapper from FLO-2D.
4. For purpose of showing the results, I created 7 figures of the maximum flow depth for the 'original' hydrograph and the other scaled hydrographs. The figures showing flow depths greater than or equal to 0.5 feet are shown below and the TIFF files were also included in the CD.

5. The inundated area (in square miles) for each of the 7 runs was also estimated by using ArcMap. Each of the shapefiles for the maximum flow depth was imported into ArcMap. With the ArcMap's Query, grids with maximum flow depth greater than or equal to 0.5 feet were selected. The number of grids for the selected grids can be found in ArcMap's Attribute Table. Since each grid has an area 50 ft by 50 ft, the inundation area can be estimated by multiplying the number of grids with 2500 sq. ft. The inundated area versus peak flow rates for the 7 runs can be found in Figure 8 below.

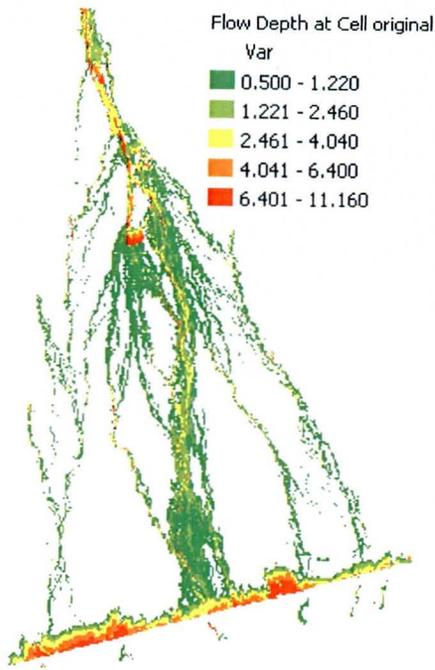


Figure 1: Flow depth $Q_{\max} = 9,687\text{cfs}$ (original hydrograph used in PACE).

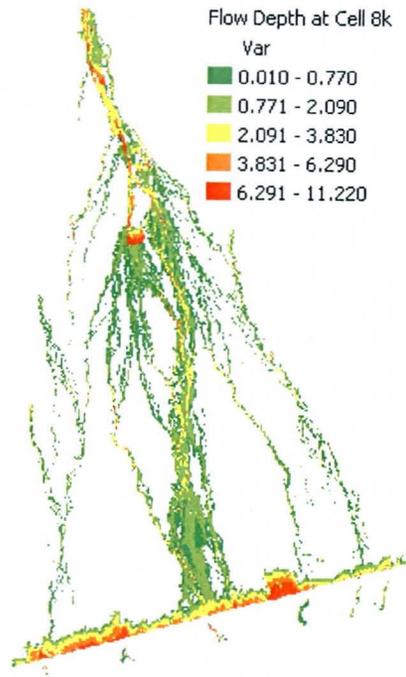


Figure 2: Flow depth $Q_{\max}=8,000$ cfs.

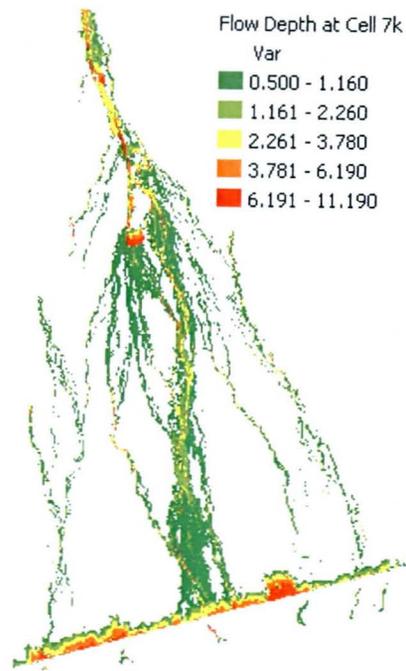


Figure 3: Flow depth $Q_{\max}=7,000$ cfs.

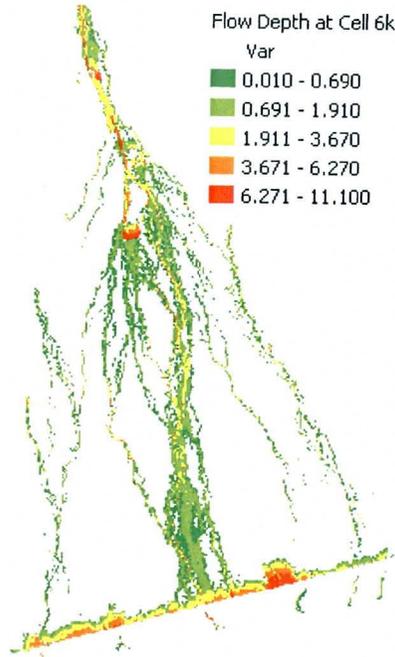


Figure 4: Flow depth $Q_{\max}=6,000$ cfs.

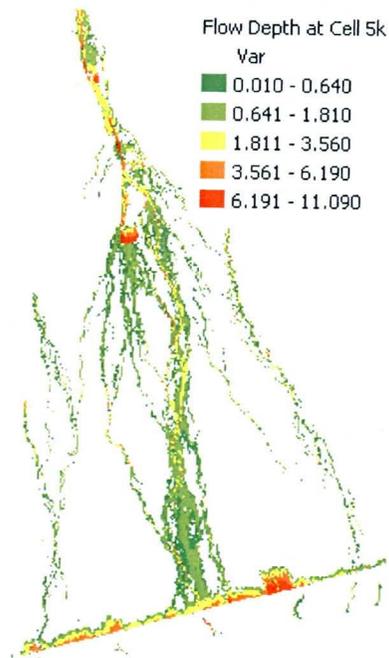


Figure 5: Flow depth $Q_{\max}=5,000$ cfs.

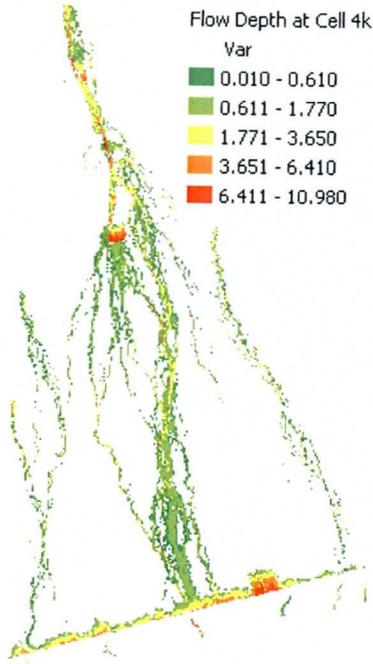


Figure 6: Flow depth $Q_{\max}=4,000$ cfs.

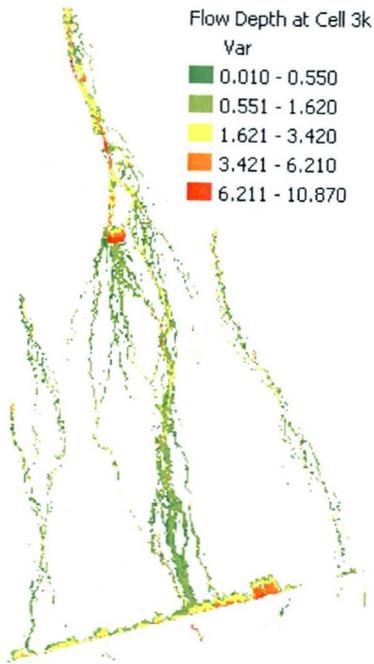


Figure 7: Flow depth $Q_{\max}=3,000$ cfs.

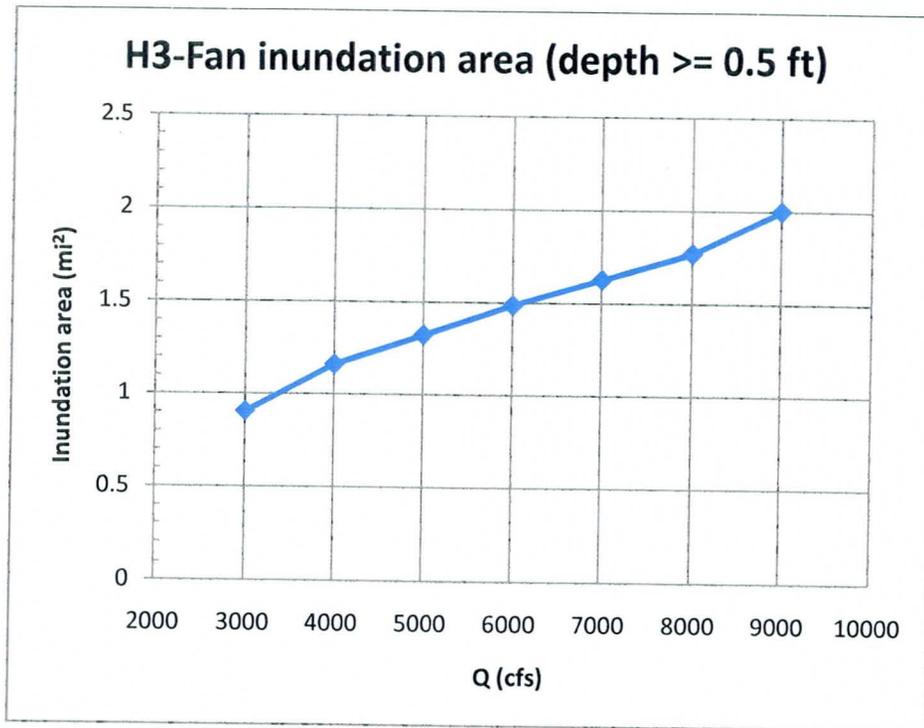


Figure 8: Inundation area for depths greater than or equal to 0.5 ft, as function of Q_{\max} .