Illustration of attenuation of flood inflow peaks by a dam with reference to the 1999 and 2011 events

Flood inflow volume as % of available flood storage compartment
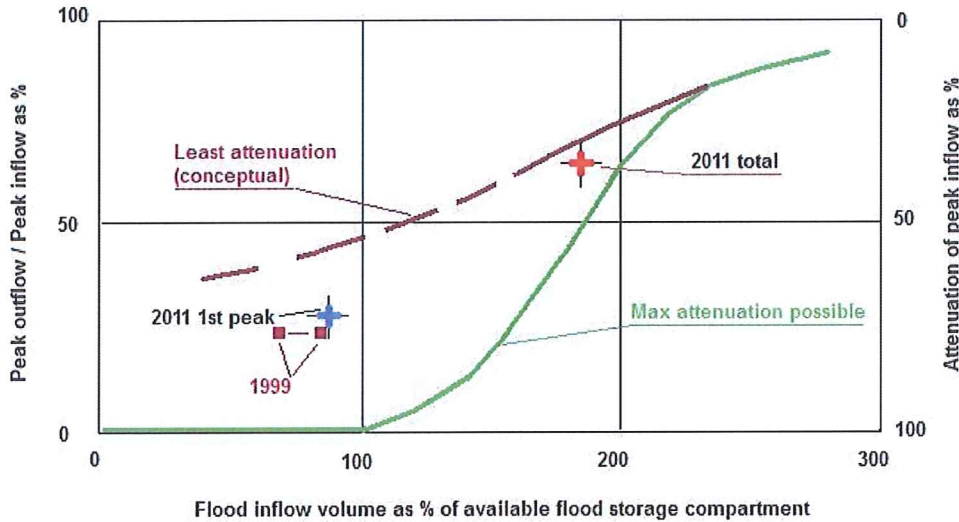
NOTE: This diagram is wholly "conceptual", except for the two data points for 2011 and the two for 1999

Notes

- The flood inflow volume is the most significant input variable; the peak inflow is a "secondary" input variable and its main importance is with respect to the potential flood heights associated with it.
- For dam inflow volumes less than the available flood storage compartment, it is certainly the case that zero outflow can be achieved by storing the whole of the flood inflow.
- Otherwise the curves are conceptual in general and do not represent any particular system, except for the two data points based on the Jan 2011 flood event and the two for the Feb 1999 flood event.
- In the 1999 event Wivenhoe Dam was at 72% of FSV at the start of the event. The peak outflow was controlled to 1800m³/s to be below the flow capacity of the Fernvale and Mt Crosby Bridges. The peak inflow was 7600 m³/s giving a ratio of 24% (attenuation 76%). The two plotted points are for a volume ratio of 69% (inflow vol/ total available volume for flood storage) and for a ratio of 85% (inflow vol/ designed volume for flood storage above FSL).
- If the dams had not been present, the peak flow at Wivenhoe would have been 8800 m³/s
- The region between the curve for "Max attenuation possible" and that for "Least attenuation" will depend on the dam operation strategy and procedure and on the shape of the flood inflow hydrograph - there may be other possible influences.
- The flood inflow volumes for the flood events shown on the illustration above are
    1999; 1228 GL (85% of Flood Storage Compartment)
    2011 total; 2650 GL (183% of Flood Storage Compartment)
    2011 first peak; 1265 GL (87% of Flood Storage Compartment)
    2011 second peak; 1385 GL (96% of Flood Storage Compartment)
- The division between the first and second peaks of 2011 has been taken at 02:00 on Jan 11, the time when the inflow rate was a "local" minimum at 3594 m3/s.
- By way of comparison, the flood inflow volumes in 1974 were 1410 GL (97% of Flood Storage Compartment)