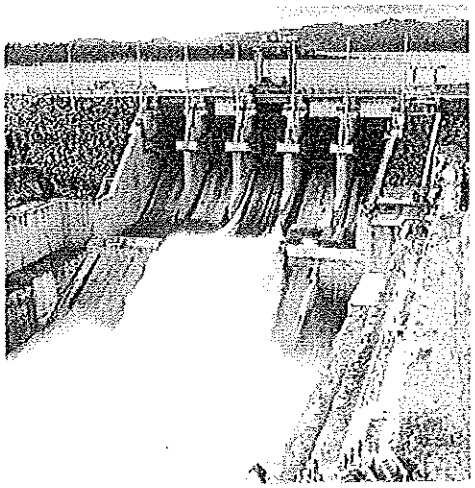
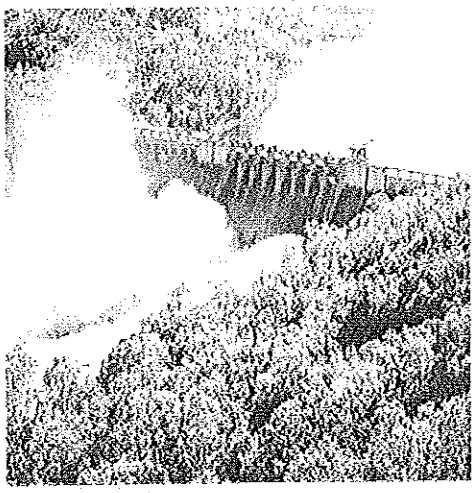
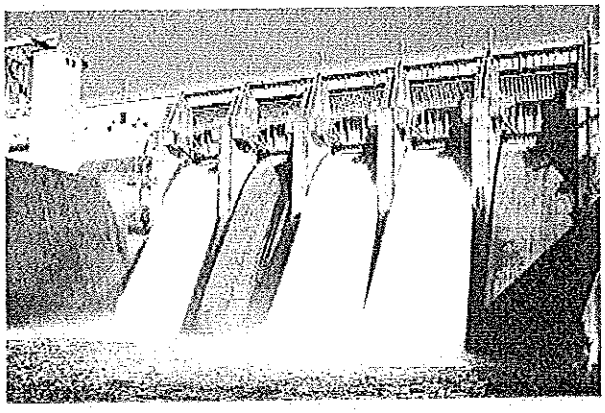
OCTOBER 1994



BRISBANE RIVER AND PINE RIVER FLOOD STUDY :
Report No. 24a





BRISBANE RIVER SYSTEM HYDRAULIC MODEL REPORT VOLUME I

Wivenhoe Dam
Dam Failure Analysis

South East Queensland
WATER BOARD

NATURAL RESOURCES

BRISBANE AND PINE RIVER FLOOD STUDIES

BRISBANE RIVER SYSTEM
WIVENHOE DAM - MORETON BAY
HYDRAULIC MODEL

REPORT ON
WIVENHOE DAM
DAM FAILURE ANALYSIS

VOLUME I

MAIN REPORT

Report By

John Ruffini
Robert Ayre
Peter Allen

Table 3.1
Wivenhoe Dam Design Flood Estimates
Storm Centred over Brisbane River Catchment
above Wivenhoe Dam

ARI (Years)	Storm Duration (Hrs)	Peak Inflow (m^3/s)	Peak Outflow (m^3/s)	Flood Volume (ML)	Peak Lake Level (m AHD)
10	72	3 630	2 900	861570	68.18
20	72	4 980	3 330	1128590	70.58
50	72	7 240	3 450	1405480	72.83
100	72	9 080	6 810	1860400	74.48
200	48	11 110	7 640	1822840	74.84
500	48	12 580	9 130	2104520	75.50
1000	48	13 820	9 970	2336350	75.99
10000	48	20 770	13 490	3593000	78.61
100000	48	30 670	25 040	5333920	81.28*
100000	120a	26 680	24 730	7225670	81.25*

Notes: * Indicates that the embankment crest (EL 79.15 m AHD) is overtopped.

a Refers to a particular 120 hour design rainfall temporal pattern recommended by the Bureau of Meteorology.

A range of design flood hydrographs are presented in Figures 3.1 to 3.8, (Refer Appendix A, Volume II). These plots show the estimated outflow from Wivenhoe Dam assuming it is operated in accordance with the existing normal gate operation procedure. Also shown on the plots are estimates of the concurrent flooding from adjacent catchments. (Refer to Section 3.2.2 for details and in particular to Figures 3.9A and 3.9B which shows the arrangement of the adjacent catchments).

It can be seen from Table 3.1 that the estimated extreme floods are of sufficient magnitude to cause the reservoir level within Wivenhoe Dam to exceed the embankment crest level of the dam. Earth and rockfill embankment dams, when subject to continuous overtopping flow will normally fail, depending upon the duration of the flow and the likely extent of scouring of the crest. The Imminent Failure Flood (IFF), for Wivenhoe Dam has therefore been assessed as the flood event which when routed through the storage under existing storage operation procedures just threatens to overtop the embankment.

The estimated magnitude of the rainfall depth associated with the IFF for Wivenhoe Dam is 75% of the probable maximum precipitation (PMP). This rainfall depth has an average recurrence interval (ARI) of approximately 14 300 years.

The peak inflow associated with the IFF of Wivenhoe Dam is estimated to be 21 990 m^3/s whilst the resultant peak outflow