

Flood evacuation options for a major Australian CBD

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The NSW State Government and the City of Parramatta Council have identified Parramatta CBD as a key growth centre for large-scale commercial and residential development. One of the main constraints to development in Parramatta CBD is the risk of flash flooding from the Parramatta River and its tributaries, which make planning flood emergency responses difficult.

The aim of this study was to identify the most suitable flood emergency response strategy for Parramatta CBD, under existing and future population and employment conditions. This was achieved by comparing three possible evacuation strategies: (1) by vehicle at street level, (2) on foot using a network of elevated walkways, and (3) Shelter In Place.

The analysis was performed using different flood events (20 year ARI, 100 year ARI, PMF), different scenarios for current and future growth (year 2016, year 2036 and year 2056), and the different times of the day at which a flood emergency response may be necessary (Midnight, Midday, PM Peak).

The total evacuation time for each strategy was calculated using flood evacuation models, including the NSW SES Timeline Evacuation Model. The simulations addressed 24 “worst-case” scenarios. Evacuees included residents, workers and visitors, who were assigned a different location within the CBD depending on time of the day and distribution of residential, commercial and recreational spaces.

Using Multi-Criteria Analysis (MCA), the evacuation strategies were compared against evaluation criteria such as effectiveness, difficulty of implementation, risks associated with the strategy, impacts on the urban landscape, costs, and load on emergency services. In summary of all the available evacuation methods, the study found that for the Parramatta CBD, shelter in place was the most appropriate solution.