Fact Sheet 1
Flood Planning Concepts

1. What is this fact sheet for?

This Fact Sheet explains the Flood Planning Concepts that are used in the flood management documents that Council produces. Flood definitions are defined in *NSW Floodplain Development Manual.* This Fact Sheet provides additional explanation on some of the key flood planning definitions and concepts.

2. Annual Exceedance Probability

An '***Annual Exceedance Probability***' (AEP) is the probability that a flood of a given or larger magnitude will occur within a period of one year.

For example, **a 1% *Annual Exceedance Probability*** (AEP) Flood means you have a 1-in-100 chance that a flood of that size (or larger) could occur in any one year. The 1% AEP, also known as the 1-in-100 year flood doesn't mean that if it floods one year, it will not flood for the next 99 years. Neither does it mean that if no flooding has occurred for 99 years that it will result in a flood the following year. For example, some parts of Australia have received two 100 year floods in one year.

Table 1 shows the probability of experiencing a given sized floor one or more times in a typical lifetime. For example there is a 19% chance that a 1 in 100 year flood could occur twice in your lifetime.

Probability of experiencing a given sized floor one or more times in an 80 year period

Annual exceedance probability (AEP) %	Approximate Average recurrence interval (ARI) (years)	At least once (%)	At least twice (%)
5	20	98.4	91.4
1	**100**	**55.3**	**19.1**

Source: Managing the Floodplain: a guide to best practice in flood risk management in Australia - Handbook 7 - Australian Emergency Management Handbook series

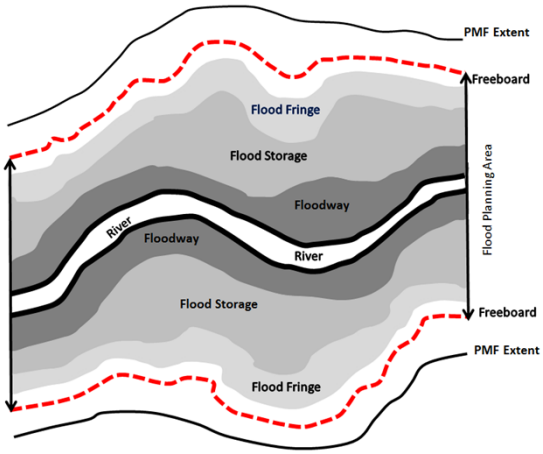
3. Severity of a flood

The severity of a flood event varies for different sized floods. Floods that occur more frequently often have lower water levels than less frequent floods. For example the 1 in 100 year flood will have higher water levels than a 1 in 20 years flood. The probability of a flood occurring and the severity of the flood are two different factors.

4. Probable Maximum Flood

The ***Probable Maximum Flood*** (PMF) is the largest flood that could conceivably occur at a particular location. It is usually based on a theoretical amount of rainfall (probable maximum precipitation) and is much greater than a 1% AEP flood. The land covered by a PMF is referred to as *Flood Prone Land*, or the *Floodplain* (see **Figure 1** and **Figure 2)**. The PMF is used by Councils and the NSW SES in disaster planning and emergencies.

Figure 1: Floodplain Aerial View



5. Flood Planning Levels and Freeboard

The flood planning level determines the area of land on which specific flood related development controls will be imposed. Clause 7.3 of the *Cessnock Local Environmental Plan 2011* (LEP) defines the **flood**

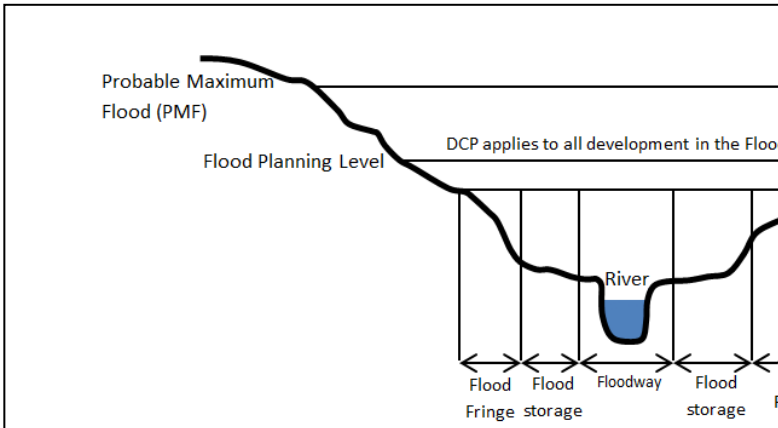


Figure 2: Cross Section through floodplain – hydraulic categories within flo

planning level as the level of the 1:100 ARI (average recurrent interval) flood event plus 0.5m freeboard. The exception to this is the Branxton catchment which has a freeboard of 0.7m to allow for uncertainty and variation in levels produced by studies completed in the Branxton area. The freeboard of 0.7 is also in line with calibrated Historic 1955 Flood level.

The purpose of a freeboard is to cater for uncertainties in the estimation of flood levels across the floodplain due to wave action, localised hydraulic behaviour such as eddies and embankment or levee settlement. Freeboard also allows for some of the uncertainties associated with estimating climate change impacts to be considered.

The Flood Planning Level, showing a 1% AEP plus the freeboard is illustrated at **Figure 2**.

6. Hydraulic categories

Hydraulic categories identify the potential impact of development activity on flood behavior. The Floodplain Development Manual 2005 recognises three hydraulic categories of flood prone land, being floodway, flood storage and flood fringe. These hydraulic categories are identified in **Figure 1** and **Figure 2**.

7. Hazard categories

Hazard categories identify the potential impact of flooding on development and people. The Australian Rainfall and Runoff Guidelines 2016 identify six hazard (Figure 3). Hazard Classifications range from H1 to H6 and can be used to determine the types of development that are suitable in each hazard classification see **Figure 3.**

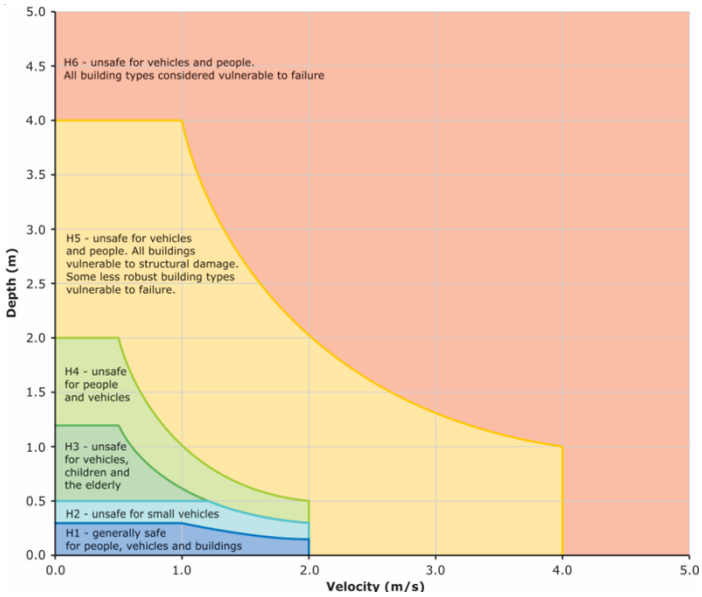


Figure 3: Hazard Classifications from the Australian Rainfall and Runoff Guidelines

Useful Links

- *NSW Floodplain Development Manual 2005* *http://www.environment.nsw.gov.au/floodplains/manual.htm*
- *NSW SES information on how to be safe during a flood* *http://www.floodsafe.com.au*
- *Real time local rainfall & water levels* *http://www.water.nsw.gov.au/realtime-data*
- *Council's local flood information* *www.cessnock.nsw.gov.ai*