

Stratfield Mortimer Neighbourhood Plan – Flood Risk Management

Notes on selection of design rainfall amounts

Rainfall records have been kept in the Mortimer area since 1862, and an unbroken daily record is available back to 1910. Since 1910, the highest 24 hour rainfall total recorded within a 'rainfall day' (0900-0900 GMT) has been 66.3 mm on 18 August 2011, of which 66.1 mm fell in 8 hours. (Unusually, this event was not associated with heavy thunderstorms.) On 20 July 2007, 81.1 mm fell in 15 hours, split over two rainfall days, in heavy thundery rain: this event resulted in considerable flood damage within the district. Based on simple statistical analysis this 24 hour fall has a return period of the order of 1:50 to 1:70 years.

Simple statistical analysis and review of the daily (rainfall day) data suggests a 24 hour 1:100 year rainfall event would be somewhat in excess of 100 mm. i.e. about 25% higher than the July 2007 event. This may be on the low side. It should be noted that the 2007 annual maximum precipitation based solely on rainfall day data is 55.3 mm due to fact the storm was split across two rainfall days.

Since April 1987, sub-daily rainfall records are available for a Met Office registered rainfall site within the village. Over this period the maximum 15 minute, 30 minute, 1 hr, and 3 hour falls have been as follows (updated to July 2026):

Time period	Measured rainfall (mm)	Date
15 min	21.9	18/07/2017
30 min	31.9	18/07/2017
1 hr	37.1	18/07/2017
3 hr	60.7	20/07/2007
24 hr	81.1	19-20/07/2007

Similar analysis applied to the post-1987 dataset of hourly data suggests the estimated 1:100 year return period of a 24 hour fall (over any consecutive 24 hour period) is 121 mm. Based on other data and information available (see below) this seems to be a reasonable estimate.

The DEFRA/Environment Agency Extreme Rainfall and Flood Event Recognition R&D Technical Report: FD2201, 2022, Extreme Rainfall and Flood Recognition Report contains a Table 2 which suggests 1:100 year maximum falls for durations of 1 hr or less and for periods greater than 1 hour. The table has three categories depending on long term average annual rainfall (AAR), namely 500-1400 mm, 1400-2800 mm and greater than 2800 mm. Mortimer (AAR 708 mm) falls into the first category where the 1:100 year 24 hr rainfall is 100 mm. However, the report states since most "extreme" rainfalls occur over lowland Britain, it was decided to use the middle range of AAR in Table 1 as a definition of the lower limit of extreme rainfalls. If this were the case the 1:100 year rainfall suggested for design purposes would be 150 mm, which is significantly higher than that suggested by a simple analysis of the Mortimer data since 1910. According to the DEFRA/Environment Agency Report, 1:100 year return periods for 15, 30 and 60 minute stated amounts for the middle category are 45 mm, 62 mm and 79

mm respectively. These represent roughly twice the highest measured falls in Mortimer over the most recent near 40 year period.

An alternative approach is suggested by recent research (Lavers et al. (2025)), whereby in Europe the greatest 1:100 year 24 hour rainfall is likely to amount to 3 to 4 times the long term annual average 24 hour fall. For Mortimer, where the average highest 24 hour fall (any 24 hour period) since 1993 has been 39.9 mm, this would suggest a 1:100 year fall between 120 and 160 mm, say 140 mm.

Other data has been taken into consideration when suggesting design rainfall amounts. Webb (1987) noted that the highest 24 hour 'rainday' rainfall amount recorded in Berkshire between 1865 and 1985 was 107.7 mm in Maidenhead on 12 July 1901 (notably, about 89 mm of this fell in 2 hours – Jackson, 1974). This Berkshire county record was surpassed by a rainday fall of 136.5 mm at East Shefford during the aforesaid extreme event of 19/20 July 2007. During the same event Manor Farm Pumping Station in Reading recorded 20 mm, 24.6 mm, 28.8 mm in 15, 30 and 60 minutes respectively, and 62.4 mm in 3 hours (Prior and Beswick, 2007). The equivalent amounts in Mortimer on that day were 14.5 mm in 15 min, 21.0 mm in 30 min, 30.2 mm in 60 min and 58.3 mm in 3 hours (Burt, 2008).

Based on the foregoing it is felt that for design purposes a reasonable estimate of the maximum 24 hour rainfall with a return period of 1:100 years would be approximately 140 mm (5.8 mm/hr). Estimates for shorter duration rainfall amounts have been based on comparisons mainly with the July 2007 and July 2017 storms for Mortimer and other nearby rainfall records back to 1910.

Time period	1:100 year rainfall (mm)	1:100 year rainfall (mm/hr)
15 min	38	151
30 min	55	110
1 hr	64	64
3 hr	105	35
24 hr	140	6

It has to be noted that, even though statistics are essential when analysing natural meteorological and hydrological events, they can be difficult to interpret. For example, the inference that any particular event has a return period of (say) 50 years, years, does not rule out the possibility of two or more such events occurring within a year, a month or even a week. Equally, such events might not occur at any one location within 250 years or more.

As is common practice these days when designing flood protection works a 40% allowance should be made for climate change and variability. It is believed that this is currently a more than adequate safety factor. As a word of caution it should be noted that 100 year rainfall amounts coupled with a climate change allowance of 40% could arguably have a significant impact on development costs.

The flood protection and management works should be designed, implemented and managed in accordance with current good practice including the West Berkshire Sustainable Drainage

Systems Supplementary (SuDS) Planning Document December 2018 and the SuDS Manual published by CIRIA (Construction Industry Research Information Association).

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