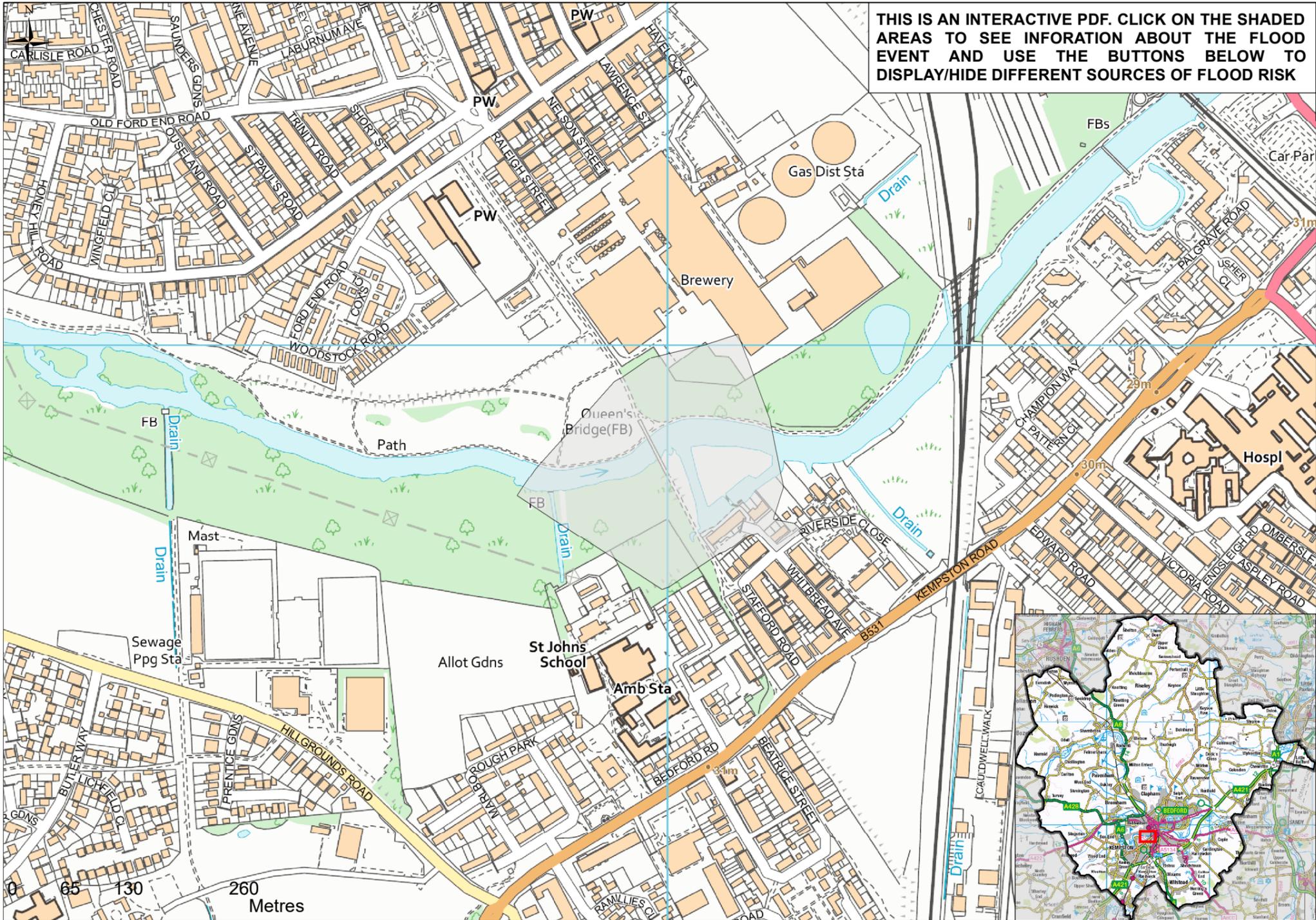


The Marina Court area in the town of Kempston suffered flooding in December 2020. Under the Flood and Water Management Act 2010, Bedford Borough Council as the Lead Local Flood Authority (LLFA) has the duty to investigate the flood event. The scope of this flood investigation is to identify the source, cause and impact of flooding from available information; identify actions completed by relevant Risk Management Authorities (RMAs) in response to the flood event; and consider actions to better understand and manage the risk of flooding in the affected area.



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Legend

- Postcode Boundary
- EA Flood Warning Areas
- Flood Warning Areas
- Areas benefitting from flood defences

Flood Map for Planning

- Flood Zone 3
- Flood Zone 2

Risk of Flooding from Surface Water

- High risk of flooding (3.3% AEP)
- Medium risk of flooding (1% AEP)
- Low risk of flooding (0.1% AEP)

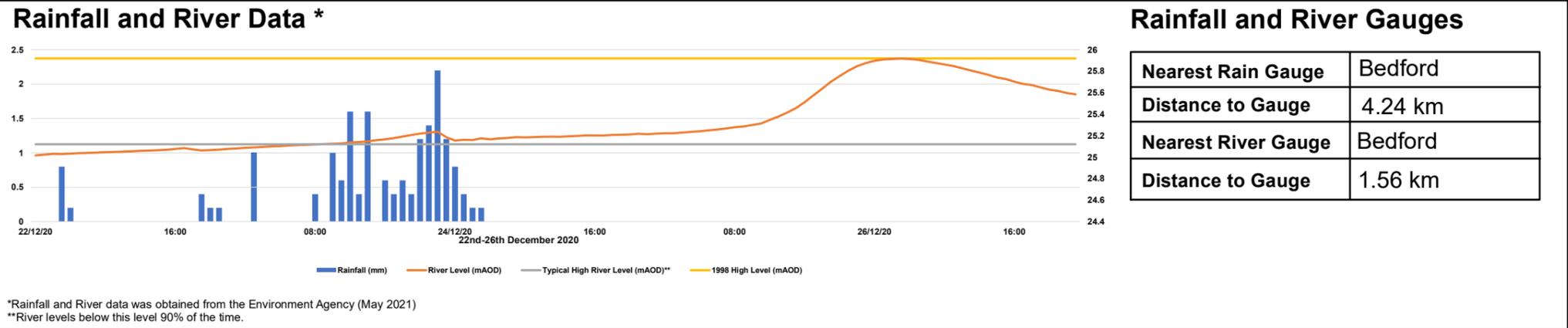
CLICK ON THESE BUTTONS

FLOOD MAP FOR PLANNING

RISK OF FLOODING FROM SURFACE WATER

FLOOD WARNING AREAS

BACKGROUND MAP



Rainfall and River Data Interpretation

The graph identifies that the main rainfall event at the nearest rainfall gauge to the Marina Court area in Kempston occurred between 19:00 on December 23rd and 03:00 on December 24th. The total rainfall volume is recorded as 17mm with a peak rainfall intensity of 2.2mm/hour. This single event saw a third of the 55mm of rainfall which is expected for the whole month of December on average.

The graph also shows that the river levels in the Great Ouse at the gauge closest to the Marina Court area in Kempston were elevated above the 'typical high river level' from 12:00 on December 23rd and stayed above this level until beyond December 26th. The 'typical high river level' at the nearest gauge station is identified as 25.1m Above Ordnance Datum (AOD). River levels above this are only expected to be recorded 5% of the time. For context, the 1998 peak flood level is included, which was recorded as 25.9m AOD, and the graph shows that the December 2020 river levels reached the 1998 level at 02:00 on December 26th.

SOURCE OF FLOODING: Main River (Fluvial)

FLOOD EVENT & CAUSE

Nine residential properties located off Marina Court reported internal flooding from the River Great Ouse overtopping its banks in the afternoon of December 25th, with flood depths of up to 1m on the ground floor causing significant damage to furniture. The electricity was reported to have been turned off for the affected areas in the house. The majority of residents reported that they remained within the house for the clean-up whilst some left to stay elsewhere. The properties are located in Environment Agency Flood Zone 3¹, which means that the chance of river flooding is greater than 1% in any given year. A search of local planning records identified a historic application for 'flood dam boards'. It is not clear whether there are existing flood defence measures in the immediate vicinity of the affected properties nor how/if the 'flood dam boards' operate.

December 2020 was a very wet month with an average rainfall of 108mm across East Anglia, which is 95% higher than the December average². The three months leading up to December also saw higher than average rainfall such that by December 25th the ground was already saturated. This, combined with the rainfall recorded during the dates in question, meant that surface water was less able to infiltrate into the ground and more likely to run off into the River Great Ouse, raising its levels. In conclusion, it is thought that this prolonged period of heavy rainfall and saturated ground conditions contributed to the River Great Ouse overtopping its banks.

FLOOD WARNINGS & IMMEDIATE RESPONSE

- **22/12/2020 08:57:** Environment Agency Flood Alert Middle River Great Ouse in Milton Keynes, Bedford Borough and Central Bedfordshire issued.
- **24/12/2020 evening:** Police volunteers mass leaflet drop to warn residents of likely flooding.
- **25/12/2020 05:46:** Environment Agency Flood Warning Low Lying Areas Close to the River Great Ouse at Kempston issued.
- **25/12/2020:** Lead Local Flood Authority (LLFA) visit to provide assistance on the ground.
- **25/12/2020 21:25:** Fire service provided flooding advice to residents.
- **25/12/2020 14:30:** Flooding experienced in the wider area declared a major incident by Bedford Borough Council.
- **28/12/2020:** LLFA, Bedford Flood Response Team, and volunteers from the Council visited properties to carry out impact assessment to help with recovery and clean up.

ACTIONS

Timescale	Action	Responsible Party
Inspections short term (1-6 months) Remedial works as required	Inspect Main River assets (sluices, weirs, gates, locks and river banks) and identify the requirement for remedial works. Over 5,000 checks are already complete across East Anglia (95% of relevant assets), with 22 assets identified as being in need of remedial works in the wider area ³ .	Environment Agency
Medium term (6-12 months)	Investigate existing flood defence measures in the area where present, to understand their condition and operation. Depending on the findings, a new flood alleviation scheme or replacement defence measures may be required. The LLFA and residents should be informed of the findings.	Environment Agency
Medium term (6-12 months)	Investigate the potential benefits and local appetite for a community flood group. The flood group should enable access to flood kits, flood action plans, and information about flood warnings/alerts and Property Flood Resilience (PFR).	Lead Local Flood Authority

ORIGINATED: Nora Balboni CEng C.WEM MCIWEM, Senior Engineer, 21/07/2021

CHECKED/VERIFIED: Matt Tandy C.WEM MCIWEM MInstLM, Principal Engineer, 23/07/2021



¹ Environment Agency Flood Map for Planning, <https://flood-map-for-planning.service.gov.uk/>, [accessed June 2021].

² Environment Agency, December 2020 Flooding Great Ouse Catchment Summary.

³ Environment Agency, May 2021. Harrold Winter Flooding Briefing.