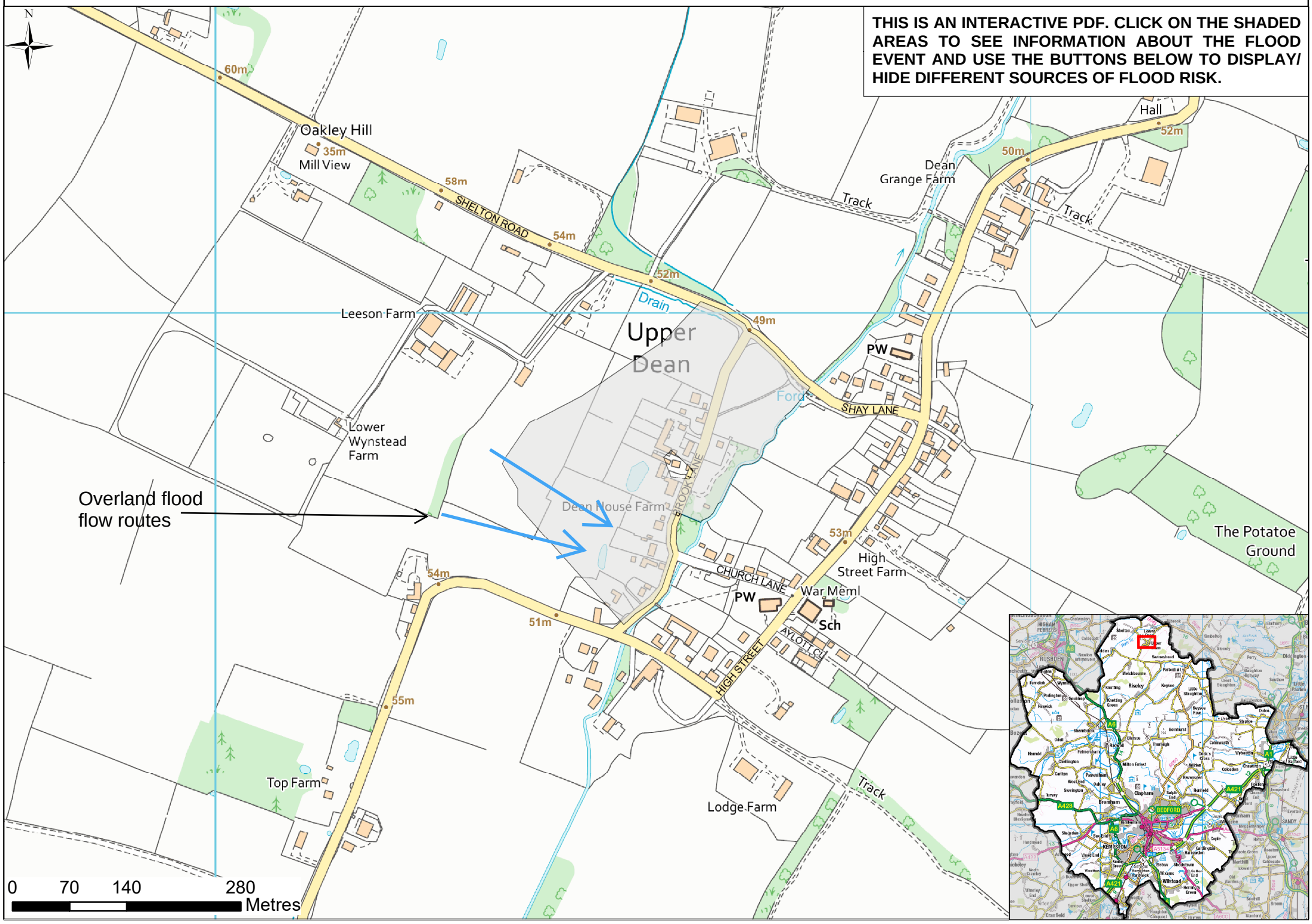
BEDFORD BOROUGH COUNCIL Section 19 Flood Investigation Report: Upper Dean

The village of Upper Dean 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.



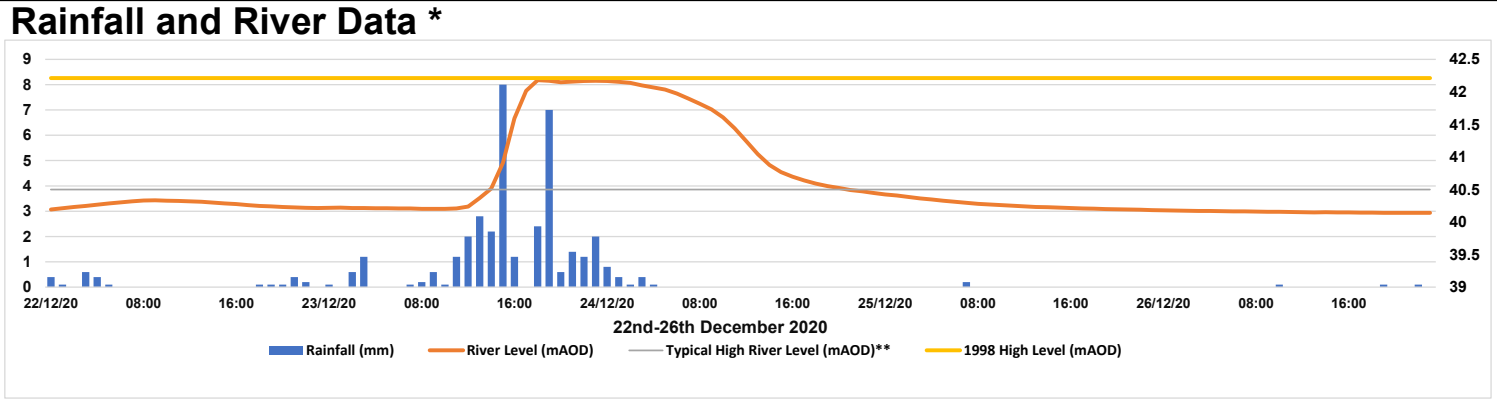
Legend

- Postcode Boundary
- **EA Flood Warning Areas**
  - Flood Warning Areas
- **Flood Map for Planning**
  - Flood Zone 3
  - Flood Zone 2
  - Areas benefitting from flood defences
- **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 *



*Rainfall and River data was obtained from the Environment Agency (May 2021)
**River levels below this level 90% of the time.

Rainfall and River Gauges

Nearest Rain Gauge	Thurleigh
Distance to Gauge	7.95 km
Nearest River Gauge	Covington
Distance to Gauge	2.32 km

Rainfall and River Data Interpretation

The graph identifies that the main rainfall event at the nearest rainfall gauge to Upper Dean occurred between 08:00 on December 23rd and 04:00 on December 24th. The total rainfall volume is recorded as 34.7mm with a peak rainfall intensity of 8mm/hour. This single event saw more than half of the 55mm of rainfall which is expected for the whole month of December on average.

A watercourse runs through Upper Dean, which discharges into the River Til approximately 1.6km further downstream at Lower Dean, where it becomes a Main River. The graph shows that the water levels in the River Til at the nearest gauge to Upper Dean rose above the 'typical high river level' at 14:00 on December 23rd and stayed above this level until 20:00 on December 24th. The 'typical high river level' at the nearest gauge station is identified as 40.5m 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 42.2m AOD, and the graph shows that the December 2020 river levels reached to just below the 1998 level between 17:00 on December 23rd and 02:00 on December 24th.

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SOURCE OF FLOODING: Watercourse / Overland Flow Routes

FLOOD EVENT & CAUSE

Two residential properties reported internal flooding on December 23rd. One property benefits from property flood resilience (PFR) measures, however the homeowner explained they were unable to deploy these due to staying away from the property. This resulted in flood water encroaching into the back room up to 50mm depth damaging carpets. The other property is understood to not benefit from PFR and reported flooding across the whole ground floor up to 200mm depth. Brook Lane and Shay Lane were reported to be impassable due to the floodwater. The Environment Agency Flood Warning was issued after the first residents in the area reported flooding.

The affected properties are located off Brook Lane, which follows the alignment of the watercourse (tributary to the River Til which runs through Upper Dean) along its western bank. Both properties are located in Environment Agency Flood Zone 3[1], which means that the chance of river flooding is greater than 1% in any given year. The upstream catchment of the watercourse is significant, comprising more than 1000ha[2]. The watercourse crosses beneath Brook Lane/High Street, Church Lane, and Shay Lane, which restrict the capacity of the watercourse such that water is likely to back up at these points.

The Environment Agency Flood Risk from Surface Water map[3] identifies flood flow routes flowing towards the affected properties from the fields to the west, which is thought to have contributed to the flooding experienced. In addition, Brook Lane has little formal drainage which means that water from the fields to the west and from the overtopped watercourse is unlikely to have drained away efficiently.

December 2020 was a very wet month with an average rainfall of 108mm across East Anglia, which is 95% higher than the December average[4]. The three months leading up to December also saw higher than average rainfall such that by December 23rd 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 Upper Dean watercourse and form overland flood flow routes. This prolonged period of heavy rainfall and saturated ground conditions also meant that river levels in the River Til were elevated, which would have prevented the watercourse from discharging freely. In conclusion, it is thought that the heavy rainfall and saturated ground conditions contributed to the watercourse overtopping its banks and forming flood flow routes from the adjacent fields.

FLOOD WARNINGS & IMMEDIATE RESPONSE

- **23/12/2020 14:48**: Environment Agency Flood Alert River Kym (known as the River Til in its upper reaches) in Cambridgeshire and Riseley Brook in Bedford Borough issued.
- **23/12/2020 15:10 – 15:15**: Fire service provided flooding advice to residents and attended to assess affected property.
- **23/12/2020 16:57**: Environment Agency Flood Warning River Til at Yelden, Upper Dean and Lower Dean issued.
- **23/12/2020**: Lead Local Flood Authority (LLFA), Bedford Highways, and Bedfordshire Local Emergency Volunteers Executive Committee[5] (BLEVEC) assist on the ground.
- **25/12/2020 14:30**: Flooding experienced in the wider area declared a major incident by Bedford Borough Council.
- **27/12/2020 00:04**: Fire service provided flooding advice to residents.
- **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
Medium term (6-12 months)	Liaise with landowners to set a suitable inspection and maintenance regime for the Upper Dean watercourse.	Lead Local Flood Authority / Riparian Owners
Medium term (6-12 months)	Undertake a capacity check at the watercourse crossings within Upper Dean to identify potential for improvements.	Lead Local Flood Authority
Medium term (6-12 months)	Investigate improvements to the Flood Warning system. This warning is already included as medium priority in the Flood Warning Improvement Plan.	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). The community flood plan should enable property flood defences to be erected for residents who unable at a time of a flood.	Lead Local Flood Authority
Long term (2-4 years)	Investigate the potential for Natural Flood Management (NFM) scheme in the form of a flood storage area upstream of Upper Dean to hold back floodwater. The NFM scheme should take a catchment-wide approach, with the potential to benefit other villages both up and downstream of Upper Dean.	Lead Local Flood Authority

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[1] Environment Agency Flood Map for Planning, https://flood-map-for-planning.service.gov.uk/, [accessed June 2021].
[2] Flood Estimation Handbook (FEH) web service, https://fehweb.ceh.ac.uk/, [accessed June 2021].
[3] Environment Agency Flood Risk from Surface Water map, https://flood-warning-information.service.gov.uk/, [accessed June 2021].
[4] Environment Agency, December 2020 Flooding Great Ouse Catchment Summary.
[5] BLEVEC is the voluntary sector of the Bedfordshire Local Resilience Forum, consisting of the Bedfordshire Community Emergency Response Team (CERT) and other organisations such as Midshires Search and Rescue, the British Red Cross, Beds and Cambs 4x4 Recovery, and the Royal Voluntary Service.