Flood Investigation Report

Locations: Various across Bedford Borough

Flood Event: December 2020

Date of Report: October 2021

Version: 1.0

Environment Directorate

CONTENTS

EXECUTIVE SUMMARY

This report has been produced in accordance with the duties placed upon Bedford Borough Council as a Lead Local Flood Authority, under Section 19 of the Flood and Water Management Act 2010 to investigate a flood event. The purpose of the flood investigation is to identify the reported impacts and likely causes of flooding, develop informed actions to reduce the risk of flooding in affected locations and/or increase the preparedness of communities for future flood events.

From the 23rd December to 26th December 2020 parts of the Borough experienced widespread and exceptional flooding to a level not reached since the Easter flooding of 1998. Flooding occurred from both surface water runoff and from the River Great Ouse. There were 65 properties reported as flooding internally at 27 different locations across the Borough.

The month leading up to the flooding saw an exceptionally high amount of rainfall and was the second wettest December across East Anglia since records began in 1981. Ground conditions were saturated and river levels were already high, with ditches and watercourses working at full capacity. On the 23rd to 24th December a further 20 – 30mm of rainfall fell, with some areas experiencing even more and recording greater than 50mm falling within a 24-hour period. As a result the catchment could not cope causing large volumes of overland flows and surface water flooding the majority of the villages to the north of Bedford within several hours.

Reports of flooding were received across the Borough from the 23rd to 26th December 2020. A dedicated 'Floodline' was set up by Bedford Borough Council to manage these calls from affected residents and communities for assistance and guidance. Information received from the Environment Agency during the incident was inconsistent, with key information provided on telemetric data and timings of river surges unreliable.

During the incident the Resilience team issued aquasacs to those most at risk of flooding and the vulnerable. Communities and the Community Flood Groups all pulled together and assisted those in need in at risk communities.

From the 28th December onwards, the Resilience Team, volunteers from the Council and the Police visited all the properties that had reported flooding and undertook a wider area impact assessment in order to assist residents with the recovery phase. Post-incident assistance was provided by the Council in the removal of damaged items, used sandbags/aquasacs, and rehoming.

Since the flood event the Resilience Team has proactively engaged with affected communities, building on previous good practice of establishing local Flood Groups, by working with the community support set up further Flood Groups over four locations, with more interest and support being shown in other locations.

Resilience needs to be built into the Borough to ensure we can reduce the impact of future flood events. The Resilience Team will continue to work with landowners to identify opportunities for improving land management and raising awareness of riparian responsibilities for maintaining ditches and watercourse. The flood investigations have highlighted the importance of Natural Flood Management (NFM) schemes, looking at holding water back in the upper catchment to reduce the flood risk downstream.

In total the flood investigations have identified 141 specific actions over short to long timeframes, which the Resilience Team alongside RMAs will work towards to manage and reduce the future flood risk of Bedford Borough Council.

1. INTRODUCTION

1.1. Background to investigation

As the Lead Local Flood Authority (LLFA) Bedford Borough Council, under Section 19 of the Flood and Water Management Act has a duty to investigate a flood event when considered appropriate and to the extent it deems necessary. The LLFA will identify the relevant Risk Management Authorities (RMAs) and record any actions which have been taken or they are proposing to action in response to the flood event. When an investigation is carried out under section 19 of the Act, the LLFA will publish the results of the investigation and notify any relevant risk management authorities.

The purpose of the flood investigation is to identify the reported impacts and likely causes of flooding, develop informed actions to reduce the risk of flooding in affected locations and/or increase the preparedness of communities for future flood events.

The flooding reported across the Borough was from both fluvial (river) and pluvial (surface water) sources, affecting residential, commercial, community, and educational properties. The Resilience Team commissioned a specialist consultant, AECOM, to support the investigation of reported internal flooding instances between 23rd and 26th December 2020.

1.2. Risk Management Authority Responsibilities

Table 1 shows RMAs responsible for managing the flood risk from different sources that the BBC investigation procedure applies to.

Flood Sources	Environment Agency	Lead Local Flood Authority (LLFA)	Drainage Authority	Water Company	Highway Authority
		Bedford BC	*Bedford IDB*	*Anglian Water*	*Bedford BC*
Main River	✓				
Surface Water		✓			
Surface Water (originating from the highway)					✓
Sewer flooding				✓	
Ordinary Watercourses		✓	✓		
Groundwater		✓			
Reservoirs	✓				

Owners of land adjoining, above or with a watercourse running through it are termed ‘riparian owners’ and have responsibilities to maintain and allow the free flow of water through their land.

1.3. Scale of Flood Event

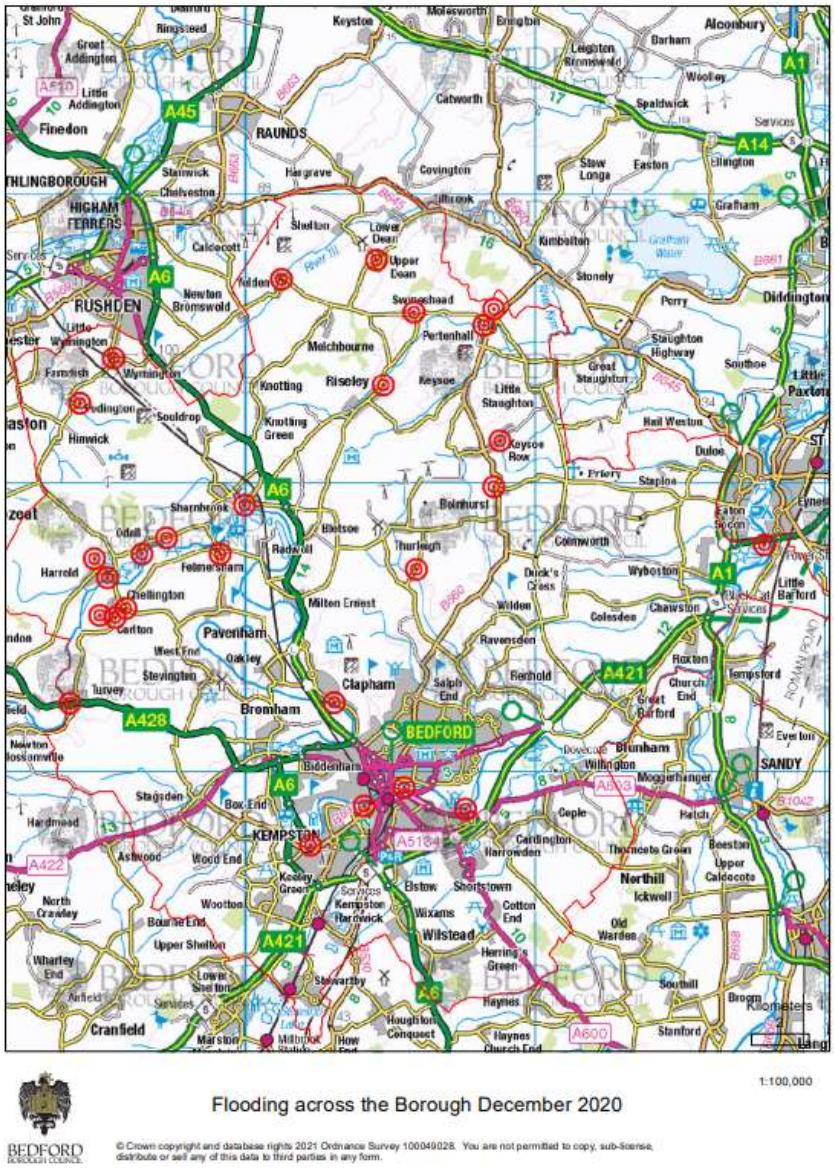
The Borough experienced widespread flooding between 23rd and 26th December 2020, with reports of internal property flooding at 27 locations. Figure 1.0 shows the widespread extent of the flooding that occurred across the Borough. A total of 27 investigations across 20 villages/towns have been undertaken with reports drafted for publication. Other areas are likely to have suffered external flooding; however, due to the volume and widespread reports of flooding, efforts have been focussed to those reporting internal flooding.

This report provides an overview of the flooding experienced across the Borough, the findings of the flood investigations, and next steps. The next steps have been combined into a table of recommendations and can be found in **Appendix 1**. Detailed flood investigation reports have been produced for each affected area. These contain further information on the findings from the investigation and the specific actions. These can be found in Appendices 2 – 27.

It is acknowledged that the extent and scale of the locality flooding that occurred in December 2020 goes beyond the remit of the section 19 report, which focusses on locations where properties were internally flooded as a result of flood waters; however there are many other communities, villages and Wards that were impacted across the Borough.

Furthermore, it is also acknowledged that roads, pathways, gardens and open spaces were also impacted by the flooding, including areas of Kingsbrook Ward (footpath access in the vicinity of Oasis Pool, Cardington Road, Goodmayes Close), areas of Castle Ward, areas of Newnham Ward, areas of Great Barford and parts of Bletsoe. These areas are by no means exhaustive, however highlight the access impacts presented by flood waters and/or discharge to local drainage systems/highway culverts and gullies.

Figure 1.0 Flooding locations across the Borough December 2020



1.4. Information sources

Information was gratefully received to aid in the flood investigations from the following:

- Bedford Borough Council Highways
- Bedfordshire Fire and Rescue Service (BFRS)
- Bedfordshire Local Resilience Forum (BLRF)
- The Environment Agency (EA)
- Members of the Public

Unfortunately, no information has been received from Anglian Water.

2. FLOOD EVENT

2.1. Impact of Flooding

The week preceding the 23rd December 2020 saw consistent rainfall across the catchment which the caused main river levels and other watercourses to increase. As a result, the Resilience Team and Highways Team were proactively monitoring the situation, in line with established procedures and practices, taking account of the prevailing conditions.

At the time Flood Alerts had already been issued by the Environment Agency and were in place for:

- Middle River Great Ouse in Milton Keynes, Bedford Borough and Central Bedfordshire
- Low lying roads between Harrold and Oakley in Bedfordshire

A teleconference for risk management authorities was held on the morning of the 23rd December 2020 to consider flood risk across the catchment which may or may not have been impacted. A Met Office Yellow Weather Warning had also been issued from 6am on the Wednesday 23rd to 6am Thurs 24th December.

Surface water flooding was reported across the Borough between 23rd December and the early hours of 24th December, and fluvial flooding was reported across the Borough between 23rd and 26th December.

The reports were primarily received by the Council, BFRS, and Anglian Water Services. The Council through the 'Floodline' service that was set up for the incident received 424 calls from the 23rd – 26th December 2020 and BFRS handled 120 calls in relation to the flood event. Table 2 identifies the areas with reports of internal flooding, with a total of 65 properties. It should be noted that some areas flooded from a combination of river, surface water, and groundwater sources.

Table 2: Areas where properties suffered internal flooding (December 2020)

Area	Source of flooding	Affected Properties	Other Impacts
Bedford – Boating Lake	River Great Ouse	1 commercial, 1 educational	
Bedford – Priory Lake	River Great Ouse	1 commercial	
Bolnhurst	Surface Water	1 residential, 1 community	Road impassable - School Lane
Carlton Pavenham Road	Unnamed Ordinary Watercourse (tributary to River Great Ouse)	2 residential	Road impassable - Pavenham Road
Carlton The Causeway	Surface Water	2 residential	Road impassable - The Causeway
Carlton The Marsh	Surface Water	1 residential	Road impassable - Bridgeend
Clapham	River Great Ouse	4 residential, 1 commercial	Road impassable - High Street
Felmersham	Unnamed Ordinary Watercourse (tributary to River Great Ouse)	4 residential	Bridges impassable

Harrold – North	Unnamed Ordinary Watercourse (tributary to River Great Ouse)	1 residential	Road impassable - Carlton Road Bridges impassable
Harrold – South	River Great Ouse and tributary Ordinary Watercourses	4 residential	Road impassable - Carlton Road Bridges impassable
Kempston – Church Walk/High Street	Wood End Brook Ordinary Watercourse	5 residential	Road impassable - Water Lane and Church Walk
Kempston – Marina Court	River Great Ouse	9 residential	
Keysoe Row East	Surface Water	2 residential	
Odell – Great Ouse	River Great Ouse	3 residential	Road impassable - Horsefair Lane
Odell – High Street	Surface Water	1 residential	Road impassable - Horsefair Lane
Pertenhall – Pertenhall Brook	Pertenhall Brook	1 residential	
Pertenhall – Wood End Lane	Surface Water	1 residential	Road impassable - Wood End
Poddington	Unnamed Ordinary Watercourse (tributary to River Nene)	1 residential	Road impassable - Vicarage Lane
Riseley	Riseley Brook Surface Water	1 commercial	Road impassable - High Street
Sharnbrook	Sharn Brook Ordinary Watercourse (tributary to River Great Ouse)	2 residential	
Swineshead	Unnamed Ordinary Watercourse (tributary to Pertenhall Brook)	2 residential	Road impassable - High Street
Thurleigh	Surface Water	1 residential	
Turvey	River Great Ouse	2 residential, 1 commercial	Road impassable - Bridge Street
Upper Dean	Unnamed Ordinary Watercourse (tributary to River Til)	2 residential	Road impassable - Brook Lane and Shay Lane
Wyboston	River Great Ouse	1 commercial	
Wymington	Unnamed Ordinary Watercourse (tributary to River Nene)	1 commercial	Road impassable - Poddington Road
Yelden	River Till	5 residential	Road impassable - High Street

The affected residents and landowners reported flooding from overtopping Main Rivers, Ordinary Watercourses, ditches, overland flow routes and local drainage systems/highway culverts and gullies. Flood depths were reported to vary between 10mm and 1m across the ground floor, and up to waist height in the basement of one property. Residents reported damage to soft furnishings, personal belongings and equipment, with some explaining properties lost electricity.

Where residents were able to, they sought to protect their properties by deploying sandbags, aquasacs and flood barriers; digging ditches; pumping water away from properties; and clearing drainage systems. Makeshift means of defence such as towels and compost bags were also used to try to protect against water ingress.

Once receded, flood water left debris and siltation in affected areas including properties, roads, footways, local drainage systems, and watercourses. Property and asset owners have subsequently needed to undertake cleansing and additional maintenance works.

Residents at five affected properties used the rest centres that were established by the Council. Residents of one property were subsequently moved into a hotel, while others went to stay with family and friends. It should be noted that these are the only residents that reported temporarily moving out of their homes; however, it is suspected that many more evacuated following the advice provided from Risk Management Authorities (RMAs).

In addition to the impacts listed above, a number of other roads and bridges across the Borough (listed below) were reported to be impassable due the floodwater. Flooded roads and bridges hindered the Council's Highways and Resilience Teams, along with the Police from being able to access some locations quickly.

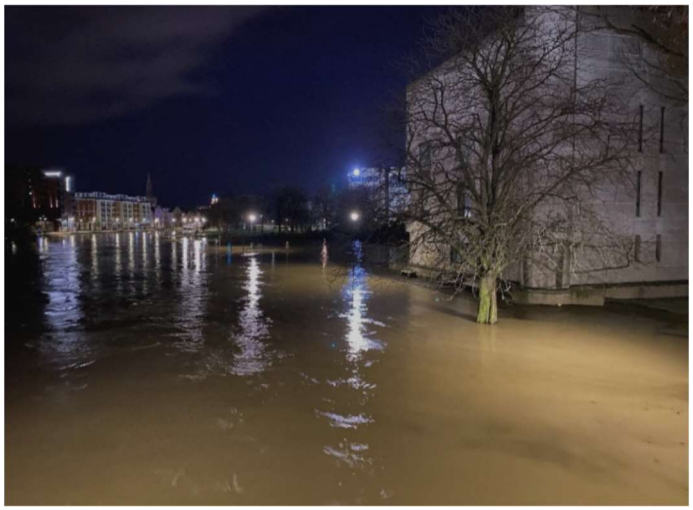
- High Street, Pavenham
- Hinwick Road, Hinwick
- High Street, Lower Dean
- Knotting Road, Melchbourne
- High Street, Great Barford
- Vicinity of Cardington Road (footpath access Oasis Pool, Goodmayes Close)
- Bridges reported to be impassable at Oakley and Radwell.

Figures 2.0 to 4.0 below highlight some of the impact caused by the flooding across the Borough from both surface water and fluvial flooding.

Figure 2.0 Pavenham Road, Felmersham (left) and Rushden Road Wymington (right)

Figure 3.0 Carlton Road, Harrold left and right Horsefair Lane, Odell

Figure 4.0 Water Lane, Kempston (left) and right Borough Hall, Bedford (right)

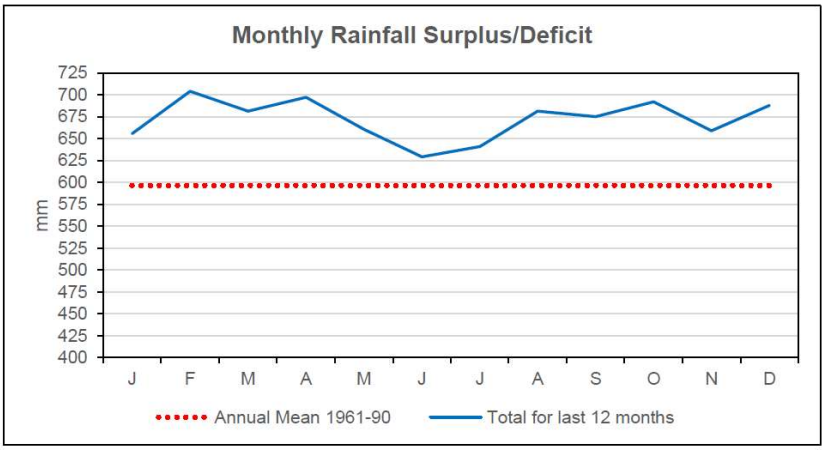


2.2. Cause of Flooding

December 2020 received an exceptionally high amount of rainfall and was the second wettest December across East Anglia since records began in 1981 (See figure 5.0). The

average rainfall across East Anglia in December 2020 was 108mm, which is 195% of the Long-Term Average[1]. This is the mean rainfall calculated from historic records.

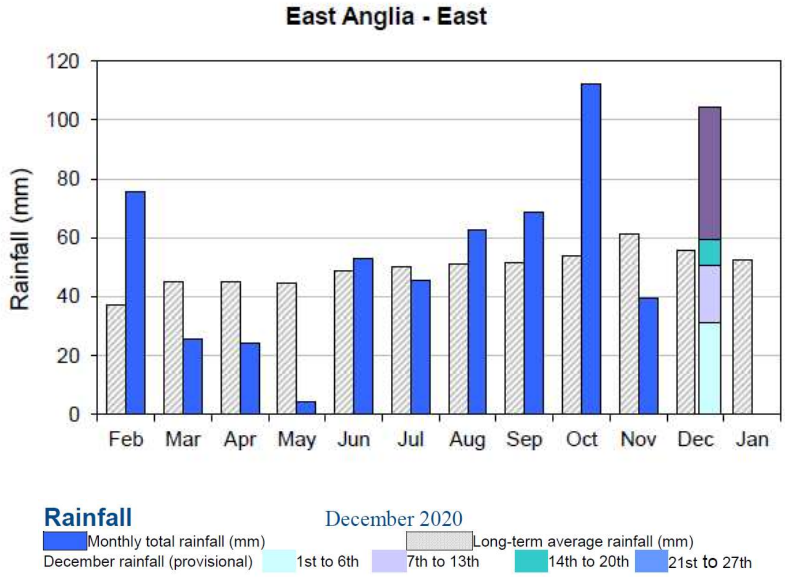
Figure 5.0 Rainfall from 2020 compared to annual mean 1961 - 1990



The three months preceding December also received a high amount of rainfall, calculated as 154% of the Long-Term Average (figure 6.0). This meant that by December 23rd, the ground was already saturated therefore rainfall was less able to infiltrate and more likely to form overland flow routes and run off into the surrounding drainage systems and watercourses.

The Great Ouse Catchment saw 20 – 30 mm of rainfall from 6am on the 23rd December to 6am on the 24th December, with some areas recording greater than 50mm falling within a 24hour period.

Figure 6.0 Monthly rainfall compared to long term average



In addition, the geology beneath parts of the Borough is classified as Secondary and Undifferentiated aquifers, which means there is the potential for elevated groundwater. It is thought that elevated groundwater contributed to the flooding experienced at some of the properties which reported water ingress into the basement.

[1] Environment Agency, 2020. Great Ouse Catchment – December 2020 Flooding Factsheet.

2.2.1. Fluvial

Fluvial flooding (or river flooding) occurs when the water level in a Main River or Ordinary Watercourse rises and overflows onto the neighbouring land. The combination of saturated ground and heavy rainfall experienced across the Borough, contributed to water levels rising in Main Rivers and Ordinary Watercourses leading to the overtopping of their banks. Generally, water overtopped at points where the capacity is restricted, for example by a culvert or meander in the watercourse. Some maintenance issues were reported with culvert trash screens and local watercourses. It is considered that the heavy rainfall and saturated ground conditions were such, that the capacity of the watercourses would have been exceeded in the majority of locations regardless of the state of maintenance.

The reported flood mechanisms in many of the affected areas are consistent with the Environment Agency Flood Map for Planning, which identifies areas at risk of river flooding across the Borough.

The mapping shows that many of the affected properties are located within Flood Zones 2 and 3, which means the annual chance of river flooding is predicted to be between 0.1% and 1% (Flood Zone 2), or greater than 1% (Flood Zone 3).

The mapping is a useful visual tool to identify areas at risk of river flooding: https://flood-map-for-planning.service.gov.uk/. The Environment Agency is currently in the process of calculating the return period of the December 2020 floods, which will be a useful reference point to understand the magnitude of this event.

2.2.2. Surface Water

Surface water flooding occurs when natural and engineered systems lack capacity to manage the volume or intensity of rainfall. Surface water flooding can occur during high intensity rainfall events which overwhelm the local surface water drainage systems, or during lower intensity but longer duration events where saturated ground conditions prevent infiltration. The flood water is then conveyed via overland flow routes dictated by the local topography and contributes to overwhelming the capacity of local drainage ditches and drainage features.

The affected areas are located in rural locations surrounded by farmland and fields. The combination of saturated ground and heavy rainfall formed overland flood flow routes within the nearby fields, following the local topography. The heavy rainfall and overland flow routes then overwhelmed the capacity of drainage ditches within fields and adjacent to highways. Some drainage ditches were reported to be in need to maintenance, which means that their capacity was compromised prior to the flood event, exacerbating the flooding experienced.

The heavy rainfall and overland flow routes also overwhelmed the capacity of local highway drainage features, including culverts beneath roads, gullies, and sewers. Some drainage features were reported to be blocked, including trash screens and gullies, which further contributed to the flooding. However, it is again considered that the heavy rainfall and saturated ground conditions were such that the capacity of the ditches and local drainage features would have been exceeded regardless of the state of maintenance.

With high levels in Ordinary Watercourses and Main Rivers there was an impact whereby ditches and drainage systems were unable to discharge freely, which increased water levels upstream in the drainage networks and contributed to the flooding experienced.

The reported flood mechanisms in many of the affected areas are consistent with the Environment Agency Flood Risk from Surface Water mapping, which identifies the potential areas of ponding and flood flow routes that are expected to occur during rainfall events.

The mapping is a useful visual tool to identify areas at risk, although this is produced nationally so does not always correctly represent the local nuances in topography and drainage systems. This can be obtained through the following link: www.flood-warning-information.service.gov.uk/long-term-flood-risk

3. FLOOD ALERTS AND WARNINGS

Many areas affected by fluvial (river) flooding are located within Environment Agency Flood Warning and Alert areas. Environment Agency Flood Warnings/Alerts are issued by phone, email or text message to people who have signed up to get warnings if a flood event is predicted.

There are three levels of flood warning:

- **Flood Alert** – *Prepare*: Prepare a bag that includes medicines and insurance documents. Check Flood Warnings.
- **Flood Warning** – *Act*: Turn off gas, water and electricity. Move things upstairs or to safety. Move family, pets and car to safety.
- **Severe Flood Warning** – *Survive*: Call 999 if in immediate danger. Follow advice from emergency services. Keep yourself and your family safe.

The Environment Agency issued Flood Alerts, Flood Warnings across the Borough and Bedford was issued a Serve Flood Warning at 01:57am on 26th December 2020.

Upon receipt of a Flood Warning, residents are advised to evacuate. Table 3 identifies the time of flooding at each area affected by fluvial (river) flooding where available, compared with the time that the Flood Warning issued.

Table 3: Environment Agency Flood Alerts and Warnings Issued

Area	Flood Date & Time (where known)	Flood Warning/Alert
Turvey	24/12/2020 evening	– 22/12/2020 08:57: Flood Alert Middle River Great Ouse in Milton Keynes, Bedford Borough, and Central Bedfordshire – 24/12/2020 18:27: Flood Warning River Great Ouse at Turvey
Odell	24/12/2020 – 25/12/2020	– 22/12/2020 08:57: Flood Alert Middle River Great Ouse in Milton Keynes, Bedford Borough, and Central Bedfordshire – 24/12/2020 13:48: Flood Warning River Great Ouse at Odell
Clapham	Unknown	– 22/12/2020 08:57: Flood Alert Middle River Great Ouse in Milton Keynes, Bedford Borough, and Central Bedfordshire – 25/12/2020 05:46: Flood Warning River Great Ouse at Oakley and Clapham
Kempston	25/12/2020 afternoon	– 25/12/2020 05:46: Flood Warning Low Lying areas close to the River Great Ouse at Kempston
Bedford – Boating Lake	25/12/2020	– 22/12/2020 08:57: Flood Alert Middle River Great Ouse in Milton Keynes, Bedford Borough, and Central Bedfordshire – 25/12/2020 15:09: Flood Warning Low lying areas close to the River Great Ouse at Bedford.
Bedford – Priory Lake	25/12/2020	– 22/12/2020 08:57: Flood Alert Middle River Great Ouse in Milton Keynes, Bedford Borough, and Central Bedfordshire – 25/12/2020 05:46: Flood Warning Low Lying areas close to the River Great Ouse at Kempston
Wyboston	25/12/2020	– 24/12/2020 04:44: Flood Alert Lower River Great Ouse – Not issued: Flood Warning River Great Ouse at St Neots, Little Paxton and The Offords.
Yelden	23/12/2020	– 23/12/2020 14:48: Flood Alert River Kym in Cambridgeshire and Riseley Brook in Bedford Borough

		– 23/12/2020 16:57: Flood Warning River Till at Yelden, Upper Dean and Lower Dean
Riseley	23/12/2020	– 23/12/2020 14:48: Flood Alert River Kym in Cambridgeshire and Riseley Brook in Bedford Borough – 23/12/2020 19:04: Flood Warning Riseley Brook at Riseley and Pertenhall
Pertenhall	23/12/2020	– 23/12/2020 14:48: Flood Alert River Kym in Cambridgeshire and Riseley Brook in Bedford Borough – 23/12/2020 19:04: Flood Warning Riseley Brook at Riseley and Pertenhall
Harrold	23/12/2020 - 25/12/2020	– 22/12/2020 08:57: Flood Alert Middle River Great Ouse in Milton Keynes, Bedford Borough, and Central Bedfordshire – Not issued: Flood Warning River Great Ouse at Harrold
Sharnbrook	23/12/2020	– 12/2020 08:57: Flood Alert Middle River Great Ouse in Milton Keynes, Bedford Borough, and Central Bedfordshire – 24/12/2020 21:11: Flood Warning River Great Ouse at Felmersham, Sharnbrook, Bletsoe, Pavenham, and Milton Ernest
Carlton – Pavenham Road	23/12/2020	Not in flood warning area
Felmersham	23/12/2020	Not in flood warning area
Upper Dean	23/12/2020	– 23/12/2020 14:48: Flood Alert River Kym in Cambridgeshire and Riseley Brook in Bedford Borough – 23/12/2020 16:57: Flood Warning River Til at Yelden, Upper Dean, and Lower Dean
Wymington	23/12/2020	Not in a flood warning area
Podington	23/12/2020	Not in a flood warning area
Swineshead	23/12/2020	Not in a flood warning area

It would appear that across the Borough there were several instances where the Flood Warnings were issued shortly before or after flooding, leaving insufficient time for residents/landowners to prepare and/or evacuate. It was noted from the post-incident reviews that a Flood Warning was not issued at all in Harrold or Wyboston. As a result, this brought concern and anxiety to the residents affected.

The information that was being received from the EA during the event was variable and inconsistent. Changes in the timings of the surges or peaks expected along the Great River Ouse changed considerably during the event, resulting in information that the Council, Emergency Services and residents were using was inaccurate, again leading to concern and panic within communities. This made it very difficult for the Council to manage the expectations of the public and the Council's own response.

In lieu of timely Flood Warnings, Police volunteers and the Resilience Team undertook a mass leaflet drop of approximately 1,300 leaflets on December 24th to warn residents of the likely imminent flooding. Again due to the inconsistent information being received by the EA this information did not allow enough warning for those residents affected by the flooding.

Areas affected by surface water flooding are generally not covered by a flood warning or alert areas due to difficulty of predicting when flooding will occur. This is a challenge nationally, not just for the communities across Bedford Borough.

4. RISK MANAGEMENT AUTHORITY RESPONSE

The week preceding 23rd December 2020 had seen above average rainfall across the Borough which had caused Main River and ordinary watercourse water levels to rise. As a result, the Resilience and Highways Teams were proactively monitoring potential flood locations. This action included the Resilience Team linking in with rural communities, liaising with residents and Community Flood Groups, assessing the risks to people and property, and advising on implementation of road closures on safety grounds.

A telephone conference for RMAs was held on the 23rd December 2020 to consider flood risk across the catchment, following the Yellow Weather Warning issued by the Met Office. LLFA officers communicated with existing Community Flood Groups in Riseley, Clapham, and Yelden. Following the receipt of flooding reports from members of the public and continued monitoring from the Resilience Team, the Council took action to manage the imminent dangers, undertake immediate works where able, provide advice to those affected, and identify the ongoing needs of the communities.

The Bedfordshire Local Resilience Forum (BLRF) at the request of Bedford Borough Council initiated a Tactical Coordinating Group (TCG) on 24th December 2020 to coordinate the response, with representation from the relevant agencies including:

- Bedford Borough Council – Resilience and Highways teams
- Environment Agency
- Met Office
- BFRS
- Bedfordshire Police

The Bedfordshire Local Emergency Volunteers Executive Committee (BLEVEC) was called in to assist BLRF and the LLFA officers wider response team. The BLEVEC is the voluntary sector of the Bedfordshire Local Resilience Forum (BLRF), 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.

The Resilience Team monitored and assessed locations throughout the Borough based upon reported conditions and predicted weather forecast. In collaboration with the Highways Team and volunteers, the Resilience Team visited affected areas to provide assistance on the ground and issue aquasacs/sandbags as appropriate. Requests for aquasacs/sandbags were assessed and issued to those most vulnerable and those at most imminent risk of flooding. With support from BLEVEC, aquasacs were also deployed across the Borough to those areas most in need.

The BFRS responded to reports of flooding from residents, provided flooding advice, visited affected properties to provide assistance, deployed pumps to protect roads and properties where able, and assisted in the rescue of stranded people.

The Environment Agency report to have mobilised staff to flood affected areas, although a visible presence was not possible due to the EA's limited resources over the Christmas period and COVID-19 concerns. It was reported to the Council by members of the public that no EA staff/response teams had been seen on the ground throughout the flood event. This brought concern from members of the public who needed reassurance, support and advice from the EA during such an emotional and difficult time.

4.1. Emergency Assistance Centres

Bedford Borough Council stood up Emergency Assistance Centres at Riseley, Turvey, Bromham and Bedford International Athletics Stadium on 23rd, 24th and 25th December respectively to provide shelter and assistance for people that may be evacuated whilst considering the social distancing restrictions of COVID 19. The Resilience Team along with the Council's Flood Response Team and BLEVEC helped to resource these rest centres to support isolated communities and evacuated members of the public, providing shelter, meals and water.

4.2. Major Incident

Once the widespread and severe nature of the flooding had been established, the event was declared a 'major incident' on 25th December. This declaration was a key trigger point for the enactment of the Multi-Agency Flood Plan and escalation of a coordinated response from the Local Resilience Forum.

4.3. Recovery

From the 27th December onwards, the Resilience Team continued to monitor and assess locations throughout the Borough based upon reported conditions and predicted weather forecast. The Resilience Team, volunteers from the Council and the Police then visited all the properties that had reported flooding and undertook a wider area impact assessment in order to help residents with the recovery phase. Again, it was noted that there was a lack of EA support and visibility within communities post-flooding incident.

Assistance was provided by the Council in the removal of damaged items, used sandbags/aquasacs, and rehoming. Information was also fed back into the Council regarding the condition of the roads and infrastructure that had been affected by the flooding.

The recovery for homeowners to date is still on going and many homeowners are still dealing with the devastating impact the floods caused to their property. Some residents are still not living in their properties and continue to live the upheaval and long drying out process.

Debrief meetings have been held with Risk Management Authorities and through Local Resilience Forum to better understand the event the occurred and how improvements can be brought forward to better prepare, manage and coordinate in the future. In addition to also understand different RMAs roles during a flood event and when dealing with any such incident.

Debrief meetings have also been held with the community flood groups and immense praise has been given to the dedication and resilience of the groups and the part they played over the Christmas period.

4.4. Recovery across the RMA's

Since Christmas 2020 the Resilience Team have been working with RMA's to identify what works are required across the Borough. The EA have identified recommendations and actions which are summarised below. Some actions are specific to individual locations and others are more general actions across the Great Ouse Catchment.

- Across the Great Ouse the EA will be inspecting Main River assets (sluices, weirs, gates, locks and river banks) and identifying 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.
- The EA will also be investigating the need for improvements to the Flood Warning system and will prioritising locations to be included within the EA's Flood Warning Improvement Plan. The Council has also asked the EA to identify why those locations that were affected by the flooding did not receive the Flood Warning.
- In some locations the Council will be working with the EA as they investigate the potential for a new flood alleviation schemes or defence measures to reduce the risk of flooding and/or increase resilience of the affected properties along the River Great Ouse.

The Resilience Team has also been working very closely with Highways, to identify where blockages and defects are apparent and develop better working practices and maintenance regimes that can ensure flood risk is better managed across the Borough. Works include investigating current drainage, unblocking gullies, culverts and trash grills and identify schemes to includes within the Capital works programme.

5. NEXT STEPS/RECOMMENDATIONS

The Resilience Team has proactively engaged with affected communities since the flood incident, building on previous good practice of establishing local Flood Liaison Groups, by working with the community support set up further Flood Liaison Groups over four locations, with more interest and support being shown in other locations.

These Flood Groups have worked with the Council to create Community Flood Plans outlining actions to take before, during and after flooding. They have also been equipped with a 'flood kit' to help assist with the response to flooding including aquasacs, radios, torches and basic Personal Protective Equipment (PPE). Aquasac training with the Fire Service has been put on, tabletop exercises have been organised with the new groups and Flood Debriefs have been held with the existing Flood Liaison Groups. Other Flood Liaison Groups are at different stages of creation.

The flood investigations have highlighted the need for the Environment Agency to investigate and improve the Flood Warning service. The Environment Agency has already identified several Flood Warning areas that require updates and improvements in order to make them more accurate and issue more timely warnings.

In tandem with the improvements to the Flood Warning system, the Resilience Team will work the Environment Agency to increase the awareness of the system to promote to communities across the Borough to sign up and receive the warnings. In addition, the Resilience Team will consider schemes to incorporate warning systems for Ordinary Watercourses that have caused fluvial (river) flooding across the Borough.

The flood investigations have also highlighted flood mechanisms associated with land use practices and the maintenance of drainage systems. The Resilience Team will work with landowners to identify opportunities for improving land management and raising awareness of riparian responsibilities for maintaining ditches and watercourses. This will be coordinated with the Highways Team to maintain culverts/bridges and seek opportunities for highway drainage improvements where appropriate. This will ensure drainage systems have the best opportunity to manage future rainfall events and reduce the frequency and impact of flooding.

The flood investigations have also identified several areas that could benefit from Natural Flood Management (NFM) schemes to strategically hold back floodwater upstream and reduce flood risk downstream. The feasibility study for the first of these schemes is currently being assessed, which would act as a pilot scheme for future NFM schemes across the Borough.

The flood investigations have identified 141 specific actions over short, medium and longer-term timeframes, as detailed in the individual Section 19 reports based on locations impacted within the Borough. Some of these actions may require bids for funding from external sources and collaborative working between partner organisations. Due to the number and complexity of the actions, these will be prioritised reflecting the resources available and known flood risk.

The Resilience Team will continue to track progress and update the actions as appropriate. These recommendations can be found in **Appendix 1**.

6. APPENDICES

1. Summary of Actions as a result of the Flood Investigation reports
2. S19 - Bedford Boating Lake
3. S19 - Bedford Priory Lake
4. S19 - Bolnhurst
5. S19 - Carlton, Pavenham Road
6. S19 - Carlton, The Causeway
7. S19 - Carlton, The Marsh
8. S19 - Clapham
9. S19 - Felmersham
10. S19 - Harrold, North
11. S19 - Harrold, South
12. S19 - Kempston, Church Walk/High Street
13. S19 - Kempston Marina Court
14. S19 - Keysoe Row East
15. S19 - Odell
16. S19 - Pertenhall, Pertenhall Brook
17. S19 - Pertenhall, Wood End Lane
18. S19 - Poddington
19. S19 - Riseley
20. S19 - Shanrbrook
21. S19 - Swineshead
22. S19 - Thurleigh
23. S19 - Turvey
24. S19 - Upper Dean
25. S19 - Wyboston
26. S19 - Wyminton
27. S19 - Yelden

Appendix 1

Summary of Actions as a result of the Flood Investigation reports

	Area	Timescale	Activity	Responsible Party	RAG Rating
1	Bolnhurst	Complete	Investigate highway drainage in the area and clear any blockages. A blocked gully on School Lane opposite the old School House was cleared in February 2021.	Bedford Highways	
2		Short term (action started)	Liaise with the landowner to regrade the ditch immediately south of School Lane (ditch 2 on map annotation) and investigate the pipe connection to the north ditch system. Liaise with landowners of ditch 3 to understand that the ditch is running at full capacity and free from blockages.	Lead Local Flood Authority / Riparian Owner	
3		Short term (action started)	Investigate the potential to divert the surface water flow route from School Lane into a soakaway. The soil characteristics are currently being assessed.	Bedford Highways	
4		Short term (1-6 months)	Liaise with the landowner to ensure the ditch leading to Kimbolton Road (ditch 4 on map annotation) is maintained, agreeing a suitable inspection and maintenance regime as necessary. Investigate the discharge of this ditch and consider improvements as appropriate.	Lead Local Flood Authority / Riparian Owner	
5		Medium term (6-12 months)	Investigate the condition and levels of the potential damaged pipe connection between School Lane and the ditch system to the north to understand if there would be any benefit in re-instating it.	Bedford Highways / Landowner	
3		Medium term (6-12 months)	Investigate the benefit of resizing the ditch to the south of School Lane to maximise the amount of water held upstream. Liaise with landowners to discuss findings and agree next steps.	Lead Local Flood Authority	
7	Carlton The Marsh	Complete	Clear the trash grill and agree a suitable maintenance regime with the Lead Local Flood Authority.	Riparian Owner	
8		Complete	Set up 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	
9		Ongoing	Continued engagement with and support of the community flood group.	Lead Local Flood Authority	
10		Medium term (action started)	Liaison with the landowner to construct a bund along the southern end of the properties facing The Marsh to divert water to an existing ditch to the west.	Lead Local Flood Authority / Riparian Owner	

11	Harrold North	Complete	Investigate the highway drainage in the area and clear any blockages. This was completed around Orchard Lane in January 2021.	Bedford Highways	
12		Complete	Set up a community flood group. The flood kit has now been issued and a flood plan has been written.	Lead Local Flood Authority	
13		Ongoing	Continued engagement with and support of the community flood group. The flood group should enable access to the flood kits, flood action plans, and information about flood warnings/alerts and Property Flood Resilience (PFR).	Lead Local Flood Authority	
14		Short-term (1-6 months)	Investigate who is responsible for the watercourse to the north of Wood Road and undertake maintenance to maximise its capacity.	Lead Local Flood Authority/ Riparian owner	
15		Short-term (1-6 months)	Investigate who is responsible for the maintenance of the flood channel and establish an appropriate maintenance regime to ensure it retains its capacity.	Lead Local Flood Authority	
16		Long term (2-4 years)	Assess the potential for a capital scheme and the benefit/implications of: - adding a second pipe beneath the road to the north of Wood Road to increase the capacity of the watercourse crossing; - works to the diverter at Wood Road to encourage flood flows eastwards into the flood channel rather than overtopping onto Wood Road; and - constructing an outflow from the flood channel into Tustings Lake	Lead Local Flood Authority	
17		Long-term (2-4 years)	Investigate the potential benefits of a flood warning system for the watercourse to the north of Harrold.	Lead Local Flood Authority	
18	Poddington	Short term (1-6 months)	Liaise with the landowner to ensure watercourses are kept clear, setting a suitable inspection and maintenance regime as necessary.	Lead Local Flood Authority / Riparian Owner	
19		Medium term (6-12 months)	Investigate the condition of the culvert beneath High Street to set a suitable inspection and maintenance regime. Undertake an assessment of the culvert's capacity.	Bedford Highways	
20		Medium term (6-12 months)	Investigate the influence of downstream river levels and the culvert on the flood level in the vicinity of Vicarage Lane. Outputs to inform whether localised works or a capital scheme are more suitable.	Lead Local Flood Authority / Environment Agency	
21		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	

22		Long-term (2-4 years)	Investigate the potential benefits of a flood warning system in watercourse 2 upstream of Poddington.	Lead Local Flood Authority	
23		Long term (2-4 years)	Investigate the potential for Natural Flood Management (NFM) in the form of a flood storage area to decrease the amount of water entering the village in a flood event.	Lead Local Flood Authority / Riparian Owner	
24	**Turvey**	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.	Environment Agency	
25		Short term (1-6 months)	Investigate the river crossing beneath Mill Lane to understand if there are any constrictions to the river flow. Liaise with landowners to discuss findings and agree next steps.	Environment Agency / Riparian owner	
26		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	
27		Medium term (6-12 months)	Investigate the suitability of flood protection measures for affected properties (e.g. tanking of basements, etc.)	Homeowner / Landowner	
28		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	
29	**Bedford Boating Lake**	Complete	Investigate the need for improvements to the Flood Warning system. No actions were identified for this warning area.	Environment Agency	
30		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.	Environment Agency	
31		Medium term (6-12 months)	Investigate the trigger level at the Kings Ditch and the communication procedure to ensure that the IDB duty officer is alerted from the Environment Agency when the ditch is nearing capacity.	IDB / Environment Agency	

32		Medium term (6-12 months)	Investigate the suitability of flood protection measures for the affected properties (e.g. tanking of basements, etc.)	Homeowner / Landowner	
33		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	
34	**Carlton The Causeway**	Complete	Set up 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	
35		Complete	Investigate highway drainage in the area and clear any blockages. Gullies and drains were cleared along The Causeway in January 2021, and at the junction to Beeby Way in April 2021.	Bedford Highways	
36		Ongoing	Continued engagement with and support of the community flood group to enable preparedness in advance of a future flood.	Lead Local Flood Authority	
37		Medium term (6-12 months)	Liaise with landowners to ensure the ditches to the east of The Causeway are maintained to reduce the amount of water that is directed onto the road in a flood event. Set a suitable inspection and maintenance regime as necessary.	Lead Local Flood Authority / Bedford Highways	
38	**Carlton Pavenham Road**	Complete	Set up 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	
39		Complete	Investigate the highway drainage on Pavenham Road including the culvert beneath the road and clear any debris. This was completed in March 2021.	Bedford Highways	
40		Ongoing	Continued engagement with and support of the community flood group to enable preparedness in advance of a future flood.	Lead Local Flood Authority	
41		Short term (1-6 months)	Liaise with landowners to ensure the Pavenham Road watercourse and land drains are maintained, and set a suitable inspection and maintenance regime as necessary.	Lead Local Flood Authority / Bedford Highways	
42		Medium term (6-12 months)	Investigate the condition and capacity of the existing drainage on Pavenham Road, including the culvert beneath Pavenham Road and the culvert that conveys the watercourse beneath Carlton, to understand the potential for improvement works.	Bedford Highways / Lead Local Flood Authority	
43		Medium term (6-12 months)	Investigate the potential benefit of digging out a ditch running parallel to one of the affected properties and constructing a bund along its southern edge to provide a level of protection against the overland flow route from the adjacent field.	Lead Local Flood Authority	
44	**Clapham**	Complete	Investigate the highway drainage along High Street and clear any blockages. Blockages were cleared in March 2021.	Bedford Highways	

45		Complete	Set up 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	
46		Ongoing	Continued engagement with and support of the community flood group to enable preparedness in the event of a future flood.	Lead Local Flood Authority	
47		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.	Environment Agency	
48		Medium term (6-12 months)	Investigate the suitability of flood protection measures for affected properties (e.g. flood barriers, waterproof wall sealant, non-return valves, etc.) and develop a flood action plan.	Homeowner	
49		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	
50	**Felmersham**	Complete	Investigate the condition of the highway drainage on Pavenham Road as well as the piped watercourse crossing to clear any blockages. This was completed in March 2021.	Bedford Highways	
51		Medium term (6-12 months)	Investigate who is responsible for the informal drainage run between the western fields and Pavenham Road. Discuss the findings with the landowner and investigate the benefits of re-instating it to full functionality.	Bedford Highways / Lead Local Flood Authority	
52		Medium term (6-12 months)	Undertake a capacity assessment of the watercourse crossings beneath Pavenham Road and Grange Road to identify opportunities for improvement.	Bedford Highways	
53		Medium term (6-12 months)	Liaison with the landowner to ensure the watercourse throughout Felmersham is maintained, setting a suitable inspection and maintenance regime as necessary.	Lead Local Flood Authority / Riparian Owner	
54		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	
55		Long term (2-4 years)	Investigate the potential benefits of a flood warning system in the watercourse upstream of Felmersham.	Lead Local Flood Authority	

56		Long term (2-4 years)	Investigate the potential for Natural Flood Management (NFM) in the form of a flood storage area in the upstream reaches of the watercourse to hold back floodwater.	Lead Local Flood Authority	
57	**Harrold South**	Complete	Investigate highway drainage in the area and clear any blockages. This was completed around Odell Road/Carlton Road in February 2021 and around Dove Lane in June 2021.	Bedford Highways	
58		Complete	Set up a community flood group. A flood kit has now been issued and a flood plan has been written.	Lead Local Flood Authority	
59		Ongoing	Continued engagement with and support of the community flood group. The flood group should enable access to the flood kits, flood action plans, and information about flood warnings/alerts and Property Flood Resilience (PFR).	Lead Local Flood Authority	
60		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.	Environment Agency	
61		Medium term (6-12 months)	Undertake a capacity assessment of the culvert at The Green watercourse to identify the requirement for improvement works.	Lead Local Flood Authority	
62		Medium term (6-12 months)	Investigate the suitability of flood protection measures for the affected properties (e.g. flood barriers, etc.)	Homeowner	
63		Medium term (6-12 months)	Investigate improvements to the Flood Warning system as no flood warning was issued. This warning is already included as high priority in the Environment Agency's Flood Warning Improvement Plan.	Environment Agency	
64	**Kempston Church Walk/High Street**	Complete	Investigate highway drainage and culverts in the area around High Street, Eugster Avenue, and Water Lane to clear any blockages. This was completed in January 2021.	Bedford Highways	
65		Ongoing	Investigate the potential for drainage and flood risk improvements along Kempston High Street, Church Walk, and Water Lane. The scope of these works is currently being defined in order to take this forward with a consultant team.	Lead Local Flood Authority	
66		Ongoing	Investigate the potential for Natural Flood Management (NFM) in the form of a flood storage area upstream along Wood End Brook to hold back floodwater. The scope of these works is currently being defined in order to take this forward with a consultant team.	Lead Local Flood Authority	

67		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.	Environment Agency	
68		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	
69		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	
70	**Kempston Marina Court**	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[1].	Environment Agency	
71		Medium term (6-12 months)	Investigate existing flood defence measures in the area where present, to identify the potential for improvements works. Alternatively, investigate the potential for a new flood alleviation scheme or defence measures to reduce the risk of flooding and/or increase resilience of the affected properties.	Environment Agency	
72		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	
73	**Odell High Street**	Complete	Clear debris build-up and blockages in High Street culverts. Two culverts were cleared in March 2021.	Bedford Highways	
74		Complete	Increase capacity and/or maintain highway drainage along High Street. Following the flood event, grips were dug either side of High Street to facilitate water draining away from the road into the adjacent ditches.	Bedford Highways	
75		Complete	Increase capacity and/or maintain the ditches along High Street. This was completed by the resident following the flood event.	Landowner / Lead Local Flood Authority	
76		Complete	Set up a community flood group. The flood group should enable access to the flood kits, flood action plans, and information about flood warnings/alerts and Property Flood Resilience (PFR).	Lead Local Flood Authority	

77		Ongoing	Continued engagement with and support of the community flood group to enable preparedness in the event of a future flood.	Lead Local Flood Authority	
78		Short-term (1-6 months)	Set an appropriate inspection and maintenance regime for the highway grips along High Street, such that they are maintained appropriately ahead of severe rainfall events.	Bedford Highways	
79		Medium-term (6-12 months)	Liaise with landowners to identify suitable land management techniques for the fields to the north of High Street, to reduce the amount of water which flows into the drainage ditches and highway grips.	Lead Local Food Authority	
80	**Odell Great Ouse**	Complete	Set up a community flood group.	Lead Local Flood Authority	
81		Ongoing	Continued engagement with and support of the community flood group. The flood group should enable access to the flood kits, flood action plans, and information about flood warnings/alerts and Property Flood Resilience (PFR).	Lead Local Flood Authority	
82		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.	Environment Agency	
83		Medium term (6-12 months)	Investigate the suitability of flood protection measures for the affected properties (e.g. flood barriers, etc.)	Homeowner	
84		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	
85	**Sharnbrook**	Complete	Inspect highway drainage and clear any blockages. A blocked gully was cleared on Kennel Hill in March 2021.	Bedford Highways	
86		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.	Environment Agency	

87		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	
88		Medium term (6-12 months)	Liaise with landowners to set a suitable inspection and maintenance regime for the Sharn Brook.	Lead Local Flood Authority / Riparian Owners	
89		Medium term (6-12 months)	Investigate whether the Flood Warning system can be extended to include the Flood Zone 3 areas surrounding the Sharn Brook.	Environment Agency	
90	**Thurleigh**	Complete	Investigate the ditch on both sides of Robins Folly road and undertake maintenance to maximise the capacity. This has already been completed by a resident.	Riparian Owner	
91		Ongoing	Investigate the capacity of the existing culvert structures beneath Robins Folly road to identify the possibility for improvement works to the local drainage. A Capital Scheme is underway to look at the potential benefits of an additional pipe beneath the road next to the existing culvert and/or constructing a pipe from north to south following the alignment of the road to provide additional capacity.	Lead Local Flood Authority / Bedford Highways	
92		Medium term (6-12 months)	Undertake a capacity assessment of the Robins Folly ditches to understand the potential benefits of upsizing.	Lead Local Flood Authority	
93		Medium term (6-12 months)	Liaise with landowners to ensure the Robins Folly ditches are maintained along the entire length of the road including land drainage in the fields located in the upstream catchment areas to the north, setting a suitable inspection and maintenance regime as necessary.	Lead Local Flood Authority	
94	**Upper Dean**	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	
95		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	
96		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	

97		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	
98		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	
99	**Wymington**	Complete	Investigate highway drainage in vicinity of the affected property and clear any blockages. This was completed in May 2021.	Bedford Highways	
100		Short term (1-6 months)	Liaise with landowners to set a suitable inspection and maintenance regime for the watercourse.	Lead Local Flood Authority / Riparian Owners	
101		Medium term (6-12 months)	Investigate the condition of the culvert just upstream of the affected property to set a suitable inspection and maintenance regime. Undertake an assessment of the culvert's capacity.	Lead Local Flood Authority	
102		Long term (2-4 years)	Investigate the potential for Natural Flood Management (NFM) in the form of a flood storage area in the fields to the west of the railway line to decrease the amount of water entering the village in a flood event.	Lead Local Flood Authority / Riparian Owner	
103	**Wyboston**	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.	Environment Agency	
104		Medium term (6-12 months)	Investigate the suitability of flood protection measures for the affected property (e.g. flood barriers, tanking the ground floor, applying waterproof wall sealant, etc.). Develop a flood action plan.	Property / Business Owner	
105		Medium term (6-12 months)	Investigate improvements to the Flood Warning system as no flood warning was issued. This Flood Warning has not yet been included in the Flood Warning Improvement Plan.	Environment Agency	
106	**Yelden**	Complete	Gullies along High Street, Church Lane, and Spring Lane were cleared of siltation and blockages in March 2021.	Bedford Highways	
107		Complete	Undertake a flooding debrief/community visit with the flood group to identify improvements to the community flood plan and identify measures that need action following the flood event with other RMAs and/or riparian owners.	Lead Local Flood Authority	

108		Ongoing	Continued engagement with and support of the 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	
109		Short term (1-6 months)	Investigate the riverbank levels at the northern end of Yelden. The investigation should look at the potential benefits of reducing the amount of rising on the northern riverbank to natural levels and/or re-instating the riverbank to the south, to try to reduce the amount of water that overtops to the south.	Lead Local Flood Authority / Riparian Owner	
110		Medium term (6-12 months)	Undertake a capacity assessment of the watercourse crossings to identify the potential for improvement works.	Lead Local Flood Authority / Bedford Highways	
111		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	
112		Long term (2-4 years)	Investigate the potential benefits of Natural Flood Management (NFM) in the form of a flood storage area in the field to the west of High Street by lowering the western bank of the River Till in this location. Investigate the potential benefits of an additional NFM scheme upstream of Yelden, at one or both of the branches of the watercourse, which could be considered alongside a scheme in Upper Dean.	Lead Local Flood Authority	
113	**Bedford Priory Lake**	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.	Environment Agency	
114		Medium term (6 – 12 months)	Investigate the suitability of flood protection measures for the affected property (e.g. flood barriers, waterproof wall sealant, non-return valves, etc.), and develop a flood action plan.	Business owner	
115	**Riseley**	Complete	Undertake a flooding debrief/community visit with the flood group to identify improvements to the community flood plan, identify measures that need action following the flood event with other RMAs and/or riparian owners.	Lead Local Flood Authority	
116		Ongoing	Continued engagement with and support of the 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	

117		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.	Environment Agency	
118		Medium term (6-12 months)	Investigate the suitability of flood protection measures for the affected properties (e.g. flood barriers, waterproof wall sealant, non-return valves, etc.), develop a flood action plan, and investigate the condition of drainage features.	Property owner	
119		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	
120		Medium term (6-12 months)	Investigate the potential benefits of installing non-return valves where the ditches discharge into the Riseley Brook to prevent water backing up during high-flow situations.	Bedford Highways	
121		Medium term (6-12 months)	Investigate the feasibility of grants for improvements to educational buildings in flood risk areas.	Lead Local Flood Authority	
122		Medium term (6-12 months)	Investigate the drainage ditch which may have been disconnected through the construction of new buildings to provide continuity of flow into the Riseley Brook.	Lead Local Flood Authority	
123	**Keysoe Row East**	Complete	Investigate highway drainage on Keysoe Row East including the culvert connecting the pond to the ditch and clear any debris. This was completed in February and March 2021.	Bedford Highways	
124		Complete	Liaise with the landowner to maintain the drainage ditches and ponds adjacent to Keysoe Row East to provide additional capacity and potentially reduce flooding at the affected properties.	Lead Local Flood Authority / Landowners	
125		Ongoing	Investigate the potential benefits of constructing a new headwall to ensure the pond drainage mechanism works effectively and water can discharge freely.	Bedford Highways	
126		Medium term (6-12 months)	Investigate the suitability of flood protection measures for the affected properties (e.g. flood barriers, waterproof wall sealant, non return valves, etc.), develop a flood action plan, and investigate the condition of drainage features.	Property owner	
127		Medium term	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	

		(6-12 months)			
128		Long term (2-4 years)	Investigate the potential benefits of improvement works to local drainage, which could include additional highway/land drainage and formalising the pond to the north of Keysoe Row East to hold more surface water runoff from the surrounding fields and ditches.	Lead Local Flood Authority / Riparian Owner	
129	**Swineshead**	Complete	Investigate highway drainage and culverts in the area and clear any blockages. This was complete for the length of High Street and Green Lane in May 2021.	Bedford Highways	
130		Short term (1-6 months)	Liaise with landowners to ensure ditches in the fields to the north of High Street are clear to maximise their capacity, setting a suitable inspection and maintenance regime as necessary.	Lead Local Flood Authority	
131		Short term (1-6 months)	Investigate the condition and capacity of the Swineshead watercourse, balancing pond, and culverts to set a suitable inspection and maintenance regime as necessary.	Lead Local Flood Authority.	
132		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	
133		Long term (2-4 years)	Investigate the potential for a Natural Flood Management (NFM) scheme upstream of Swineshead to reduce the amount of water that enters the village in a flood event.	Lead Local Flood Authority	
134	**Pertenhall Pertenhall Brook**	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[1].	Environment Agency	
135		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	
136		Long term (2-4 years)	Investigate a potential scheme to alter land levels in between Pertenhall Brook and the residential property to reduce the risk of flooding.	Environment Agency / Landowner	
137	**Pertenhall Wood End Lane**	Complete	Investigate the culvert beneath the Wood End Lane and Swineshead Road and clear debris where present.	Bedford Highways	
138		Short term (1-6 months)	Liaise with landowners to ensure ditches in the fields to the north of Wood End Lane are maintained to maximise their capacity, setting a suitable inspection and maintenance regime as necessary.	Lead Local Flood Authority	

139		Medium term (6-12 months)	Liaise with landowners to identify opportunities for land drainage improvements.	Lead Local Flood Authority	
140		Medium term (6-12 months)	Investigate the suitability of Property Flood Resilience (PFR) measures (e.g. flood barriers, waterproof wall sealant, non-return valves, etc.) for the utility room and develop a flood action plan.	Property owner	
141		Medium term (6-12 months)	Investigate the culverts beneath Wood End Lane and Swineshead Road to set a suitable inspection and maintenance regime as necessary.	Bedford Highways	