

Herefordshire 2019/20

Section 19 Report



Balfour Beatty Living Places
Unit 3, Thorn Business Park
Rotherwas
Hereford
HR2 6JT

Herefordshire Council

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Notice

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Glossary

Term	Definition
BBLP	Balfour Beatty Living Places
DCWW	Dŵr Cymru Welsh Water
FWMA	Flood and Water Management Act
HC	Herefordshire Council
LLFA	Lead Local Flood Authority
PFRA	Preliminary Flood Risk Assessment
RMA	Risk Management Authority
SFRA	Strategic Flood Risk Assessment

Executive Summary

When made aware of flooding, Herefordshire Council, in its role as Lead Local Flood Authority, has a duty under Section 19 of the Flood and Water Management Act 2010 to investigate the flood to determine the causes of the flooding and appropriate actions that may be undertaken by the relevant Risk Management Authority (RMA).

An investigation was prompted following the flooding that affected much of Herefordshire in October 2019 and February 2020, causing damage to homes, businesses and infrastructure.

Herefordshire Council invited anyone affected by the flooding to complete a survey. These returns, along with information collated from flood recovery grant schemes operated by the council, were used as a basis for completing this study.

Flood Location summaries have been prepared that include the outcome of the respective investigations and any objectives that have been identified to mitigate flood risk.

1. Introduction

1.1 Requirement for Section 19 Investigation

Legislative Context

Under the Flood and Water Management Act 2010, a Lead Local Flood Authority (LLFA), such as Herefordshire Council (HC), have responsibilities in relation to the investigation of flood events. This requirement falls under Section 19 of the Flood and Water Management Act which states:

Section 19 Local Authorities: Investigations

(1) On becoming aware of a flood in its area, a lead local flood authority must, to the extent that it considers it necessary or appropriate, investigate—

- (a) Which risk management authorities have relevant flood risk management functions, and
 - (b) Whether each of those risk management authorities has exercised, or is proposing to exercise, those functions in response to the flood.
2. (2) Where an authority carries out an investigation under subsection (1) it must—
- (a) Publish the results of its investigation, and
 - (b) Notify any relevant risk management authorities.

RMA's have flood risk management functions according to the type of flooding as follows:

- Main Rivers – Environment Agency;
- Ordinary Watercourses – LLFA and River Lugg Internal Drainage Board;
- Surface Water Flooding – LLFA;
- Public Sewers – Water Company: Dŵr Cymru Welsh Water (DCWW) and Severn Trent Water;
- Highway Flooding – Highway Authority: Herefordshire Council and National Highways (trunk roads and motorways).

It is common for flooding to be attributable to multiple sources and not just one source (sewers flooding because of water backing up from a river, for example) and so a partnership approach is often implemented. This has been considered in the site assessments to identify where a joint approach is required.

Local Threshold

The council's Local Flood Risk Management Strategy (LFRMS) states that: "Only events that have 'significant harmful consequences' require a Section 19 investigation to be completed by the council. There is no national definition of 'significant harmful consequences' as local receptors respond in different ways". (LFRMS, Section 6.3 Investigating Flood Events).

The LFRMS states that if three or more residential properties are flooded internally then the appropriate investigations will be carried out. Internal flooding is defined for this purpose as flooding at ground level which affects the living areas and excludes porches, conservatories, integral garages, etc. The following sets out other flood incidents which may be investigated due to other considerations:

Risk Category	Significant Harmful Consequence
Risk to loss of life	Any flood related fatality or risk to life.
Residential property	Three or more properties flooded internally at ground floor level within same locality
Critical services: <ul style="list-style-type: none"> • Hospitals, health centres, clinics, surgeries, pharmacies, care homes; 	One or more properties flooded internally above ground floor level. One or more facilities rendered inoperable due to impassable access.

Risk Category	Significant Harmful Consequence
<ul style="list-style-type: none"> • Village and parish halls that were being used as rest centres during an emergency situation; • Schools, colleges, day nurseries; • Police, fire, ambulance stations; • Electricity stations and substations, gas stations, sewerage treatment and pumping stations, water treatment and pumping stations. 	<p>One or more flooded critical installations resulting in loss or potential loss of service or causing or potentially causing flooding to other property.</p>
<p>Non-residential property:</p> <ul style="list-style-type: none"> • Shops/supermarkets/retail premises; • Agricultural or Manufacturing premises; • Offices. 	<p>Three or more non-residential properties flooded internally above ground floor level within same locality.</p>
<p>Road and rail infrastructure:</p> <ul style="list-style-type: none"> • The county’s Strategic Network and any motorway or national rail network • Key access routes for emergency services 	<p>Any section that becomes impassable due to flooding</p> <p>Any section of road which provides the sole vehicle access to three or more residential properties or any one or more of the critical services defined above which becomes impassable to the police, fire or ambulance services.</p>
<p>Cultural heritage</p>	<p>Subject to local assessment of impact to national or international cultural heritage sites</p>
<p>Environment</p>	<p>Subject to local assessment of impact to local, national or international designated sites</p>

1.2 Report Scope

The scope of this report is to review the flooding that occurred across Herefordshire and to determine the causes of this flooding. It also identifies the relevant RMAs and appropriate actions that may be undertaken. The information used to inform this Section 19 report was:

- Community engagement and post flooding drop-in sessions;
- Site visits;
- Documents including the Herefordshire Strategic Flood Risk Assessment (SFRA) 2009 and Preliminary Flood Risk Assessment (PFRA) 2017;
- Review of the Environment Agency’s Flood Map for Planning (Fluvial flood risk from rivers and sea) and Flood Risk from Surface Water map (see figures 3 and 4 respectively); and
- Review of historic maps.

Most of the data that has been used to inform our analysis of the October 2019 and February 2020 flooding was based upon survey returns, along with information collated from flood recovery grant schemes operated by the council. The River Lugg IDB also provided flood records. Further information was acquired regarding critical infrastructure that have experienced flooding. The likely flood mechanism was then determined as far as possible from the available information, such as previous reports of flooding, Surface Water Flood Mapping, the Flood Map for Planning and local knowledge.

Where respondents have not provided information regarding the source of flooding, the likely flood mechanism has been inferred using nearby survey data and the available flood mapping. Groupings were made of properties in close proximity, where it is likely the flood mechanism would be the same or similar and this factor has helped identify the flood mechanism at specific points.

Consideration has also been given to historic flood records in these areas, although these older records are unlikely to be complete and do not always indicate the extent or impact of flooding.

During the review some sites were found to include businesses which had lost revenue, as a result of the flooding but had not internally flooded.

It is likely that flooding incidents have been under-reported. Furthermore, since data has been provided from personal account, there is considerable variation in its completeness, as well as apparent inconsistencies and contradictions. Consequentially the data has been analysed with a degree of caution.

2. Initial Assessment of Flood Data

2.1 Review of clustered flood sites

The available flooding records were collated to identify flooded properties that were in close proximity. This allowed affected communities to be identified, many of these sites were located on river networks. Two maps showing Significant Flooding have been prepared that show the impact that the October 2019 and February 2020 floods have had on the community. These maps are included in the report appendix.

2.2 Main River sources of flooding

Many of the affected communities were flooded from Main Rivers, which are under the jurisdiction of the Environment Agency. Flood Location summaries have not been prepared for all of these sites, because the flooding mechanism is known.

The table below identifies the locations that are indicated to meet the 'significant event' criteria where flooding is in the same locality. Any reports received of Critical Services or Critical Infrastructure flooding have been included.

Summary of February 2020 data attributable to main rivers

Location	Internal Property Flooding February 2020	Highways closed due to flooding	Bridges closed due to flooding	RMA	Risk Management Authority actions in response to floods
River Wye					
Cusop -via tributary Dulas Brook	15			NRW	Natural Resources Wales Multi Agency Meeting - June 2020
Letton & surrounding area -via tributaries	22	A438 to north and south of Letton	Bredwardine bridge, Bridge Sollars bridge	EA HC	Whitney on Wye Flood Meeting held Nov 2019 Assistance provided to Letton & Staunton-on-Wye Flood Group in establishing an Emergency Plan Herefordshire Highways are currently reviewing the Letton signage, along with the use of gauge boards to assess whether a system of signage can be installed that can be more quickly deployed. The flood modelling and mapping on the River Wye is currently in the process of being reviewed and updated. The new modelling will provide updated flood mapping (including climate change allowances) for the River Wye in England from Hay-on-Wye to Symonds Yat and include confluences of major tributaries such as the River Lugg. The outputs will provide a consistent baseline of evidence which can be used to underpin future business cases along the River Wye.

Hereford	94 Hereford Leisure Centre plant room (Rest centre in emergencies), Manor House Care Home	A49 Asda Roundabout (SW), B4224 below railway, A438 Eign Brook, Holme Lacy Road (below railway and Red Brook)	Old Wye bridge, Victoria Footbridge, Canary bridge near, Outfall Road, bridge to Eign sewage treatment works	EA HC	<p>Greyfriars Community Flood Drop-In Session held December 2019</p> <p>Environment Agency Greyfriars Initial Assessment Report 2021 Community Engagement via Video Call - May 2021</p> <p>Lower Bullingham Community Flood Drop-In Session held December 2019 Further Community Meeting-held June 2021</p> <p>The flood modelling and mapping on the River Wye is currently in the process of being reviewed and updated. The new modelling will provide updated flood mapping (including climate change allowances) for the River Wye in England from Hay-on-Wye to Symonds Yat and include confluences of major tributaries such as the River Lugg. The outputs will provide a consistent baseline of evidence which can be used to underpin future business cases along the River Wye.</p> <p>Repair of flood defences at Bishop Meadows have been completed.</p>
Holme Lacy		B4399 Holme Lacy causeway		HC	Herefordshire Highways – Reactive Repairs
Hoarwithy	7			EA HC	Herefordshire Council Community Meeting held April 2021

Ross on Wye	50			EA HC	The flood modelling and mapping on the River Wye is currently in the process of being reviewed and updated. The new modelling will provide updated flood mapping (including climate change allowances) for the River Wye in England from Hay-on-Wye to Symonds Yat and include confluences of major tributaries such as the River Lugg. The outputs will provide a consistent baseline of evidence which can be used to underpin future business cases to help better protect communities along the River Wye.
Goodrich	5			EA	The flood modelling and mapping on the River Wye is currently in the process of being reviewed and updated. The new modelling will provide updated flood mapping (including climate change allowances) for the River Wye in England from Hay-on-Wye to Symonds Yat and include confluences of major tributaries such as the River Lugg. The outputs will provide a consistent baseline of evidence which can be used to underpin future business cases along the River Wye.
Whitchurch	65 Whitchurch CoE Primary School Whitchurch Care Home			EA	
Symonds Yat	28	B42329 to west of Kerne Bridge		EA	
River Lugg					
Leominster and surrounds (including The Broad, Elms Green, Ford Bridge)	50 Leominster Ambulance Station depot DCWW sewage treatment works			EA	Leominster (Lugg) Flood Alleviation Scheme - improvement to the standard of protection to flood defences protection 380 residential properties. Leominster (Kenwater) Flood Alleviation Scheme - repairs elongating the life of the flood defence walls are completed and repairs to severe erosion to the channel sides of the River Kenwater were completed in 2021.

Kingsland	9			EA	Review of flood risk data proposed to inform next steps.
Bodenham	4			EA	Review of flood risk data proposed to inform next steps.
Hampton Bishop	50 Hampton House Residential Care Home	B4224		EA HC	<p>Environment Agency Hampton Bishop Initial Report Assessment 2021 Community Engagement (Hampton Bishop Flood Mitigation Group) held (via Video Call) July 2021</p> <p>The flood modelling and mapping on the River Wye is currently in the process of being reviewed and updated. The new modelling will provide updated flood mapping (including climate change allowances) for the River Wye in England from Hay-on-Wye to Symonds Yat and include confluences of major tributaries such as the River Lugg. The outputs will provide a consistent baseline of evidence which can be used to underpin future business cases along the River Wye.</p> <p>Hampton Bishop (Wye) Stank - repairs have been completed to channel erosion around Mordiford bridge. repairs to the flood banks are ongoing. Lug Meadows (Lugg) Flood Embankments - repairs to flood banks from repeated overtopping damage are ongoing.</p>

River Arrow					
Eardisland	19	A4110 Arrow Green		EA	Environment Agency Eardisland Initial Assessment Report completed 2021 Community engagement is currently being scheduled for September 2021.
River Dore					
Pontrilas	12	A465	A465 Llangua bridge	EA HC	Dulas Brook Hydraulic Modelling Study of the Confluence 2021 Repairs have been completed of eroded flood bank along the confluence and river Dore. Paradise Brook flood causeway improvements
Dulas Brook					
Ewyas Harold	6			EA DCWW	Dulas Brook Hydraulic Modelling Study 2021. Ewyas Harold Community Drop-In Session Scoping works for improvements to Flood Warning System DCWW – Parish Council Site Meeting June 2021
Teme					
Walford and Leintwardine	14	A4110		EA HC	Flood Resilience Parish Council Meeting Environment Agency Leintwardine and Walford Initial Report Assessment 2021 Community Engagement via Video Call - May 2021 Herefordshire Highways A4110 flood defences study
Little Hereford	6	A456		EA HC	Multi Agency visit June 2021 Property Flood Resilience Scheme proposed 2021

River Frome					
Bishops Frome (and surrounding hamlets)	7			EA	Repair to defective flap valve Review of flood risk data proposed to inform next steps
Old Longworth	3				
River Monnow					
Kentchurch	3			EA	Review of flood risk data to inform next steps.
Walterstone	Vineyard Farm			NR	Network Rail are progressing Drainage Works

3. Significant Flood Sites reviewed during the study

The table below summarises those sites which, under this review, have been confirmed as categorised as a ‘significant event’ and are attributed to local sources of flooding and consequently are confirmed as fulfilling the criteria for needing a Section 19 investigation. Flood Location summaries are included in the report appendix.

Summary of locations identified for Section 19 investigation

Sites Requiring a Section 19 Investigation	No. Properties Flooded (internally)
Wellington	36
Hereford (Lower Bullingham)	31
Hereford (Racecourse and Widemarsh Brook)	34
Hope Under Dinmore	15
North of Staunton on Wye	12
Credenhill	10
Wellington Marsh	9
Cross Keys	8
Luston	7
Hoarwithy The flooding occurred primarily due to the River Wye. However anecdotal reports suggest that the Wriggle Brook may have led to increased flood levels	7
Llangarron and Llanwarne	7
Eardisley	6
Canon Pyon	6
Moreton on Lugg	6
Orleton	6

Sites Requiring a Section 19 Investigation	No. Properties Flooded (internally)
Red Hill / Newton Farm, Hereford	6
Hereford (Towtree Lane/Roman Road)	5
Kingstone	5
Willersley	5
Whitney on Wye	5
Lyonshall	5
Mordiford	4
Cobhall Common (Allensmore)	4
Moccas	4
Madley	4
Ivington	4
Brimfield	4
Lyde	3

Fluvial flooding impacted some properties alongside the Rudhall Brook in Ross on Wye. However, the flooding was due to high flood levels on the River Wye and so these properties are not referred to in the table. The affected properties are located downstream of the Rudhall Brook Flood Alleviation Scheme which was commissioned in 2008. Herefordshire Council facilitates a walk-through inspection of the culvert every 2 years. The last inspection was on 17 August 2021 and before that, 10 May 2019.

3.1 Critical flooding sites reviewed during the study

Sites which were impacted during February 2020 from non-main river sources have been reviewed. The cause of flooding is detailed in the Flood Location summaries or clarified below.

3.1.1 Critical Services

- Holmer CoE Academy, Racecourse, Hereford.
- Luston Primary School.
- Ivington CoE Primary School.

The Primary School and the Fire Station in Peterchurch were affected by Surface Water flooding arising from higher land. A highway drainage scheme has been scoped to reduce runoff from the B4348.

Leominster Ambulance Station depot has flooded several times. Since the floods, the Ambulance Service have vacated the site. Discussions with affected business owners has confirmed the duration of the flooding demonstrates that fluvial flooding occurred and the site is in the flood plain of the River Lugg.

3.1.2 Critical Infrastructure

The review included identifying the impact on the strategic road network (or to key access routes for emergency services) as follows:

Summary of February 2020 data for impacts to highway infrastructure attributable to local sources

Highway Flooding Attributed to Local Sources			
Location	Details	History	Likely source
Mansel Lacy	1 highway – A480	No formal records	Surface Water flooding due to runoff from higher land.
Hereford Roman Road	1 highway - A4103		Surface Water arising due to diversion of the Yazor Brook.
Hereford (Aylestone Hill)	1 highway – A4103 Aylestone Hill		Surface Water.
Cross Keys	1 highway – A465	2007	Little Lugg.
Kingsland	1 highway – A4110		Surface Water affected low lying carriageway.
Little Hereford to Tenbury Wells	1 highway – A456	History of flooding from 2007	River Teme with influence of Ledwych Brook.
Whitney on Wye nr toll bridge	1 highway – A438	Adjacent Toll Bridge	Bank slippage due to inclement weather.
Stretford	1 highway – A4110/ B4457 Junction	One record pf flooding to north, pre-2009	Stretford Brook.
Hereford South	1 highway – B4399	Flooded in 2014	Norton Brook has been re-aligned. The road carriageway is low which leads to flooding.
Blacklands Farm, Ashperton	1 highway – A417	Some history of property flooding in 2007	Tributary of Back Brook spills onto the carriageway, because a ditch system ceases.

One section of rail infrastructure identified as ‘Cadbury’s Site’ (near Marlbrook, Leominster) is recorded as being affected by flooding in February 2020. Network Rail have advised that this was due to a blocked undertrack crossing. The affected drainage system has now been restored to functional use.

National Highways were contacted to identify any sections of the A49 or A40 that were closed to flooding. The Asda roundabout in Hereford was closed for a short time due to surface water flooding

which arose because the DCWW maintained pumps lift disperse water over the River Wye flood defences. DCWW operatives attended site to engage the additional pump, thus alleviating the highway flooding. Apart from this there were no known locations reported where floodwater blocked the road, although the Police may have carried out other short duration, localised closures.

4. Catchment Information and Flood Return Periods

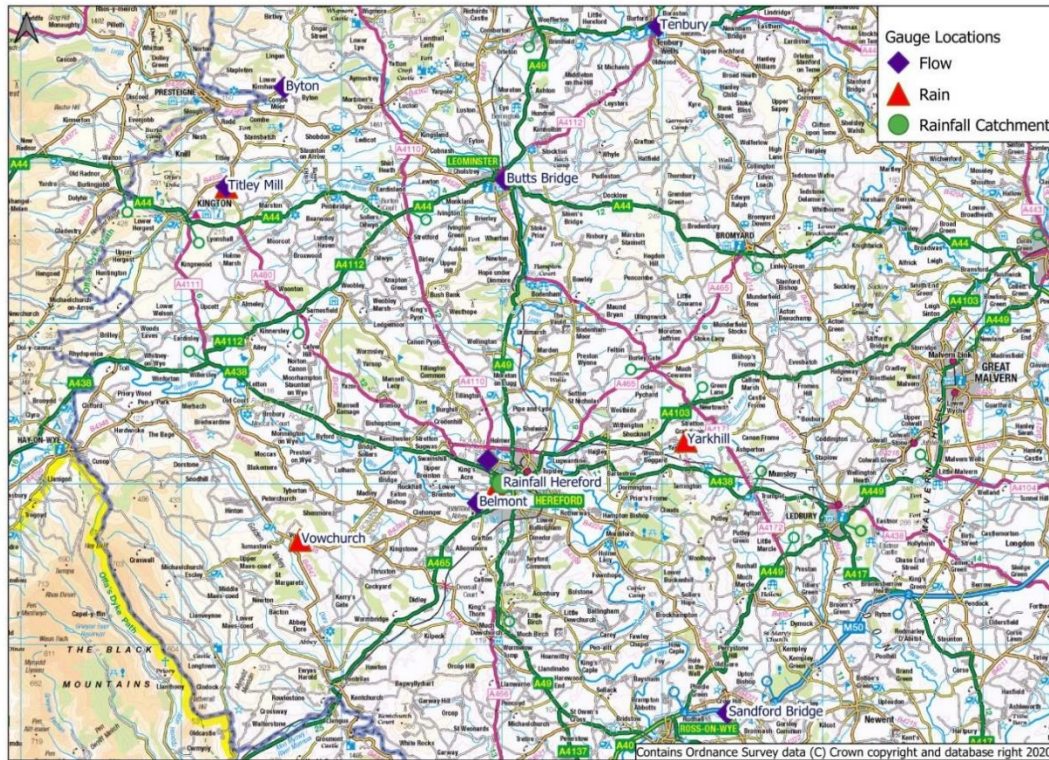
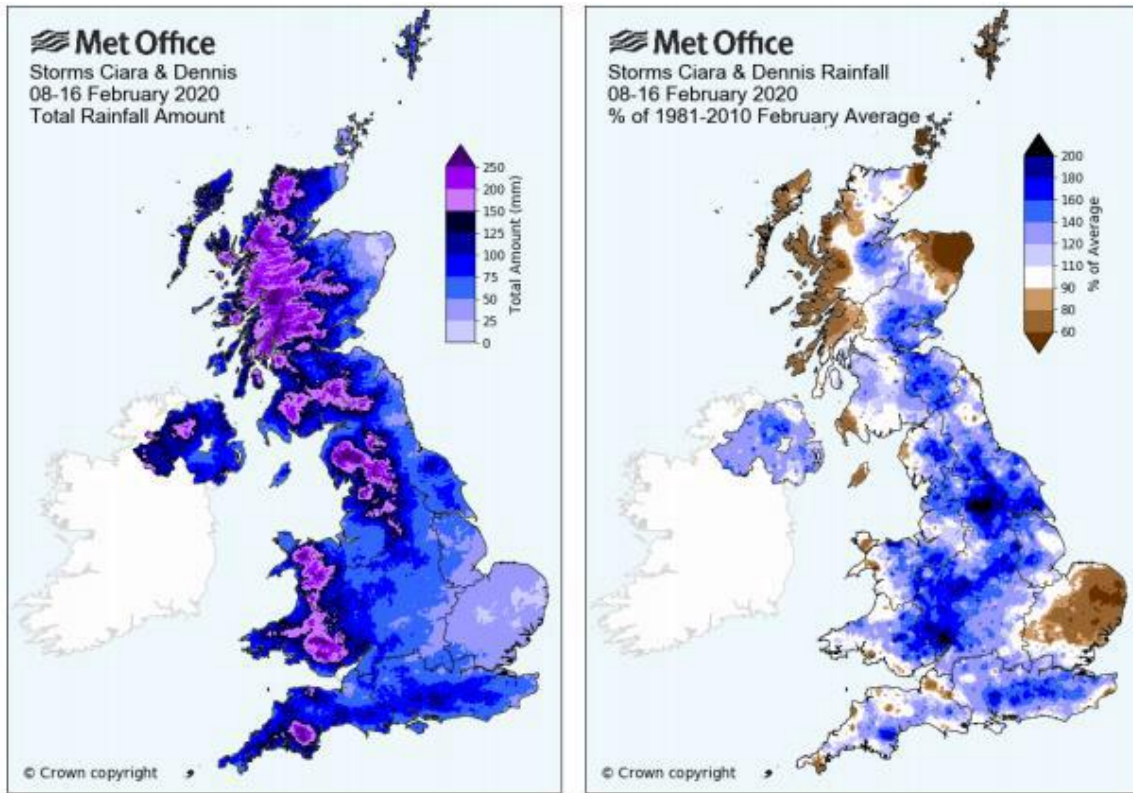
As part of the Section 19 investigation, a hydrological assessment of weather and river gauge data was commissioned to identify the magnitude of the flood events in October 2019 and February 2020.

The October 2019 event comprised a succession of heavy rainfall events that fell across England and Wales, and towards the end of the month led to flooding across Herefordshire. This was followed by a series of heavy successive rainfall events in February 2020 that led to record breaking flows and significant flooding across Herefordshire. The three named storms, Ciara, Dennis and Jorge, along with other rainfall in the month resulted in the new UK maximum for February monthly rainfall total since records started in 1862 (see Figure overleaf).

The rainfall for the nine months leading up to the end of February 2020 resulted in saturated catchments and enhanced flood risk. The Soil Moisture Deficits for the UK were near-zero for five consecutive months from October 2019 to February 2020. The consequence of the Soil Moisture Deficits being near zero is that river flows were very responsive to the rainfall, resulting in some peak flow records being established across the UK.

Data from four rain gauges across Herefordshire were recorded and analysed for the flood events. The data for four rain gauges were compared to design estimates for a kilometre grid square in Central Hereford. Some variation in design rainfall across the county is expected due to differences in topography etc, however at this scale this is unlikely to significantly impact on the findings. The map overleaf shows the location of the rain gauge and flow gauge locations across Herefordshire used in the analysis. These are largely across the central area of Herefordshire.

On 25-26 October 2019, the property flooding across Herefordshire was as a result of intense rainfall following a wet month which affected the antecedent conditions across the county. The calculated return period of the rainfall events is between a 13 and 87 year return period frequency. This resulted in a fluvial (river) flooding event with a return period frequency of a 5 to 50 year depending on the river. The rain gauges are located within Herefordshire and only record the data at a given time at that exact location and do not take into account any other factors, whereas the flow gauges within the rivers are as a result of the rainfall hitting the catchment and entering the river which is entirely dependent on antecedent conditions. A very high intensity rainfall event may not actually result in any fluvial flooding if the antecedent conditions in the catchment allow for the landscape to absorb the water. The October 2019 flooding event occurred when river levels were fairly high after a few weeks of wet weather and, combined with a storm with intensive rainfall, river flows increased rapidly.



In February 2020, a succession of storms (principally Storm Ciara and Storm Dennis) followed a very wet winter and resulted in high river flows across the county which resulted in a large number of properties flooding. The calculated return period of the rainfall events is between a 2 and 19 year return period frequency. When combined with very wet antecedent conditions and therefore very responsive catchments, this resulted in serious fluvial (river) flooding with a return period frequency of a 1 in 30 to 300 year event depending on the river. The rainfall totals recorded across the UK in February 2020 were particularly high in Wales and Gloucestershire and Herefordshire which therefore resulted in the high return period events. Both the Wye and the Lugg rise in a similar area by the Welsh Border so it is possible high rainfall totals in this specific area predominantly affected flows in those catchments. The February 2020 flooding event occurred after semi continuous rainfall from 8-17 February. This resulted in very wet antecedent conditions which when combined with heavy rainfall resulted in the highest ever recorded peak flows on the River Wye.

A technical note for the Herefordshire Event Analysis is included in the report appendix.

5. Ongoing work and future actions

Herefordshire Council is seeking funding to continue and expand upon its previously successful Defra funded Natural Flood Management (NFM) pilot project. NFM focusses on the use of natural processes and land management measures to both slow the flow of water and store water within upland areas. These measures result in lower flood levels downstream.

Following the February 2020 floods, Defra announced that flood-hit homes and businesses in Herefordshire could receive up to £5,000 to help protect them from future flooding. The purpose of the Property Flood Resilience (PFR) scheme is to assist property owners to improve the flood resilience of their individual properties when they repair them after a flood. The outcome from this funding should be that if flooding were to reoccur, damage levels would be considerably lower and householders and businesses could return to their properties much more quickly.

This Section 19 Report identifies the RMAs relevant to each flood location, but detailed consideration of further investigations and action is beyond the scope of this report.

Where the principal RMA identified is not Herefordshire Council, the relevant RMA will be the primary contact for further information. Where the council has been identified as the principal RMA, investigations are ongoing. The investigations will identify where flood alleviation measures may be feasible and where applicable schemes will be promoted, but this is subject to funding being available.