



Norfolk County Council

Second Addendum to Flood Investigation into County Wide Flooding in Winter 2020/2021

Report Reference: FIR066B

Draft Report Prepared by Martin Matthews



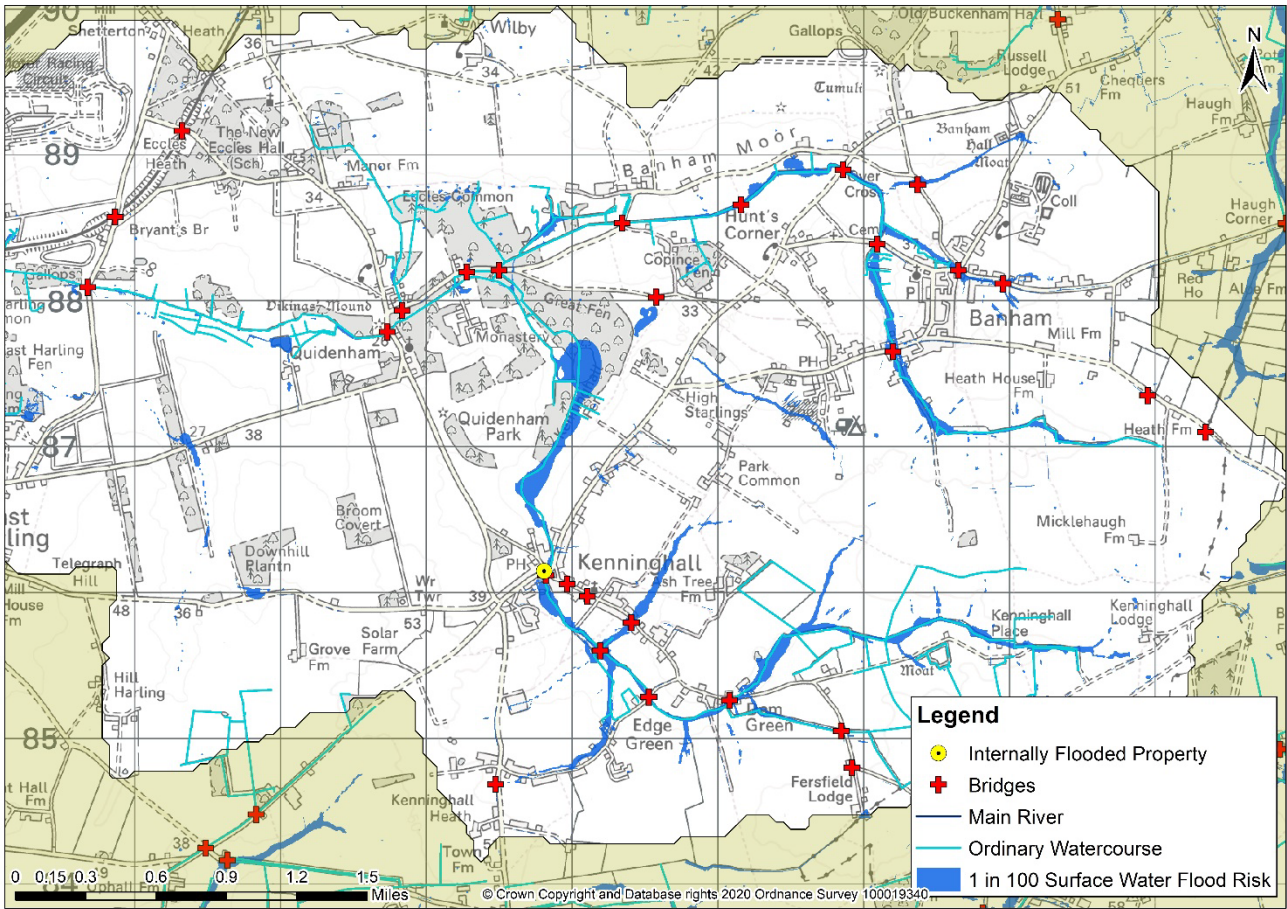
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This report is an addition to the original Flood Investigation Reports FIR066 and 66A on the flooding that occurred across Norfolk on the 23rd and 24th of December 2020. The addition of this report is due to properties having been reported to Norfolk County Council after the original report had been drafted and several instances of repeat flooding. Justification and key information about this event can be found in [FIR066 Breckland Winter Flood Event 2020 21 report \(norfolk.gov.uk\)](#) and [Investigation report into the flooding in South Norfolk District in winter 2020-2021 FIR066](#).

Breckland District Council

Flooding and Flood Risk Within Kenninghall Area



Map Showing Location of Flooded Properties in Quidenham Road and Market Place, Kenninghall.

Description of Area

The flooded property is in the village of Kenninghall within the River Whittle catchment that covers Kenninghall and other neighbouring villages. The area consists of mostly green open land and small villages and clusters of properties. The Beck flows in a southerly direction through the centre of the village passing under Market Place, then moves westerly along watercourses before entering the river Thet.

Flood Incidents Within the Area

Within the area three incidents of internal flooding have been assessed as part of this investigation. These incidents are detailed in the table below.

Date of Incident	Incident as Reported	Response to the Flood Incident
23 December 2020	On the 23 December 2020 - one property was internally flooded on Quidenham Road, Kenninghall. This incident was reported by: <ul style="list-style-type: none"><li data-bbox="384 949 855 1055">• a resident via an online flood report form on the 22 January 2021 (FWF/21/3895).	Norfolk County Council (Lead Local Flood Authority) assessed validity and impact of the flood report after the incident. Elected representatives visited affected residents to offer advice and to gather information during the incident. The Fire and Rescue Service responded and pumped out during the incident.

Date of Incident	Incident as Reported	Response to the Flood Incident
23 December 2020	<p>On the 23 December 2020 - one property was internally flooded on Market Place, Kenninghall. This incident was reported by:</p> <ul style="list-style-type: none"> • a resident via an online flood report form on the 10 February 2023 (FWF/23/6746). 	<p>Norfolk County Council (Lead Local Flood Authority) visited affected residents to offer advice and to gather information after the incident.</p> <p>Norfolk County Council (Highways) assessed the capacity of their drainage system after the incident.</p> <p>East Harling Internal Drainage Board visited affected residents to offer advice and to gather information after the incident.</p> <p>Elected representatives visited affected residents to offer advice and to gather information during the incident.</p> <p>The Fire and Rescue Service responded and pumped out during the incident.</p>

Date of Incident	Incident as Reported	Response to the Flood Incident
23/12/2020	On the 23 December 2020 - one property was internally flooded on West Church Street, Kenninghall. This incident was reported by: a resident via an online flood report form on the 10 February 2023, (FWF/23/6742).	<p>Norfolk County Council (Lead Local Flood Authority) visited affected residents to offer advice and to gather information after the incident.</p> <p>Norfolk County Council (Highways) assessed the capacity of their drainage system after the incident. East Harling Internal Drainage Board visited affected residents to offer advice and to gather information after the incident.</p> <p>Elected representatives visited affected residents to offer advice and to gather information during the incident.</p> <p>The Fire and Rescue Service responded and pumped out during the incident.</p>

Recent Rainfall Within the Area

This report seeks to draw on rainfall data to ascertain the intensity of the rainfall events experienced in the area that led to the flooding. This analysis is useful in assessing (in broad terms) if the design capacity of drainage systems within the affected areas was exceeded.

Norfolk County Council (LLFA) has sought to use data from rain gauges where incidents of flooding are located within a 2.5km radius of the instrumentation. This distance meets the requirements of British Standards and aims to capture localised rainfall patterns, where there is no available data within this radius this will be stated.

There were no verified rain gauges within 2.5km of the incidents of flooding within the area. However, a substantial amount of rainfall was recorded at an unverified tipping bucket gauge in Kenninghall. A total of 54mm was captured in 12 hours which equates to a 1 in 20yr storm (5% AEP) for this watershed. River levels at Quidenham, some 3km downstream recorded peak flows on the afternoon of the 24 December higher than the Great Flood of 1968 (see executive summary), this both indicated the severity of the event (approximately a 1 in 50yr fluvial return) and a short time to peak (flashy response) in the area of approximately six hours which is usually uncommon for winter storms indicating just how saturated the catchment was

prior to 23 December. (*Return periods based on data collected from Environment Agency rain gauges and FEH13 Depth Duration Frequency curves).

Historic Flooding Incidents Within the Area

The following table lists flooding incidents with the area that have been recorded.

Date of incident	Impact	Return Period
23 December 2020	26 properties were flooded in Kenninghall during this event. Please see Investigation report into the flooding in Breckland District in winter 2020-2021 (FIR066) .	>1 in 20

Causes of Flooding Within the Area and Recommendations

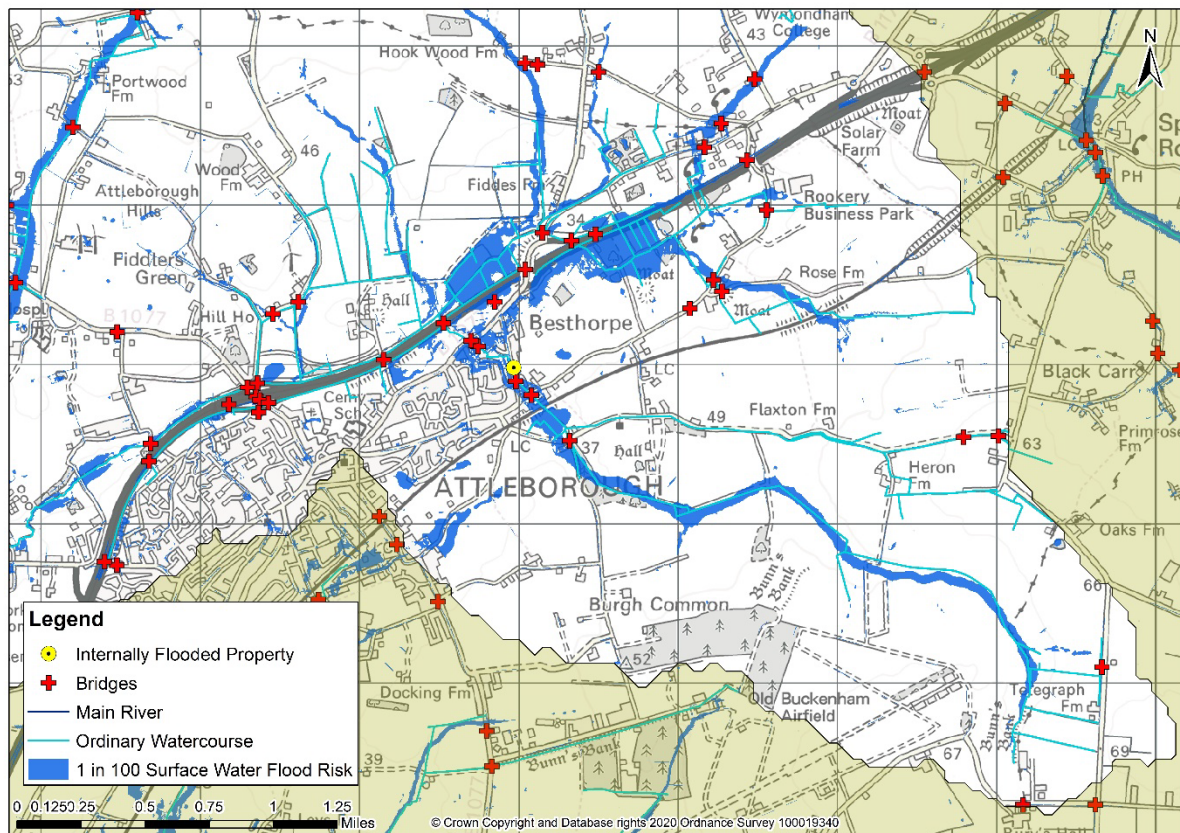
The findings of the investigation are detailed in the [Investigation report into the flooding in Breckland District in winter 2020-2021 \(FIR066\)](#). Causes and recommendations from this report are summarised below

Location and Date of Flooding	Causes of Flooding	Recommendation	Risk Management Authority/Individual with Relevant Flood Risk Roles
Quidenham Road, Kenninghall, 23 December 2020	Surface run-off from rainfall made its way onto roads and flowed along the road network and onto the accesses of affected properties that were situated lower than these features.	Norfolk County Council (Highways) should consider opportunities to route flood water on the highway away from affected properties to alternative points of discharge, or other solutions as practicable.	Norfolk County Council (Highways)

Location and Date of Flooding	Causes of Flooding	Recommendation	Risk Management Authority/Individual with Relevant Flood Risk Roles
<p>Quidenham Road, Kenninghall, 23 December 2020</p>	<p>The surface water drainage system network was obstructed by debris. This reduced the efficiency of the upstream drainage system contributing to flooding at the affected properties. The watercourse was obstructed by debris and high water levels downstream. This caused the failure of the upstream drainage system contributing to flooding at the affected properties.</p>	<p>The relevant property owner should instigate a regular regime of maintenance to ensure the system is free from obstruction (i.e. tree leaves or roots) at all times.</p>	<p>Riparian Owners</p>

Breckland District Council

Flooding and Flood Risk Within Besthorpe Area



Map Showing Location of Flooded Properties in Mill Lane, Besthorpe.

Description of Area

The flooded property is in the village of Besthorpe to the west of Attleborough within the River Great Ouse catchment that covers Besthorpe and a large surrounding area. The upper area consists of mostly green open land used for agriculture, with clusters of properties. The watercourse travels in a northerly direction through the village before connecting to the wider watercourse network.

Flood Incidents Within the Area

Within the area one incident of internal flooding has been assessed as part of this investigation. This incident is detailed in the table below.

Date of Incident	Incident as Reported	Response to the Flood Incident
24 December 2020	<p>On the 24 December 2020 - one property was internally flooded on Mill Lane, Besthorpe. This incident was reported by:</p> <ul style="list-style-type: none">• a resident via a flood questionnaire on the 13 October 2021 (FWF/22/6586).	Norfolk County Council (Lead Local Flood Authority) assessed validity and impact of the flood report after the incident.

Recent Rainfall Within the Area

This report seeks to draw on rainfall data to ascertain the intensity of the rainfall events experienced in the area that led to the flooding. This analysis is useful in assessing (in broad terms) if the design capacity of drainage systems within the affected areas was exceeded.

Norfolk County Council (LLFA) has sought to use data from rain gauges where incidents of flooding are located within a 2.5km radius of the instrumentation. This distance meets the requirements of British Standards and aims to capture localised rainfall patterns, where there is no available data within this radius this will be stated.

There were no rain gauges within 2.5km of the incidents of flooding within this area.

Historic Flooding Incidents Within the Area

The following table lists flooding incidents within the area that have been recorded.

Date of incident	Impact	Return Period
23/12/2020	Three properties were flooded in Besthorpe during this event. Please see Investigation report into the flooding in Breckland District in winter 2020-2021 (FIR066) .	Unknown

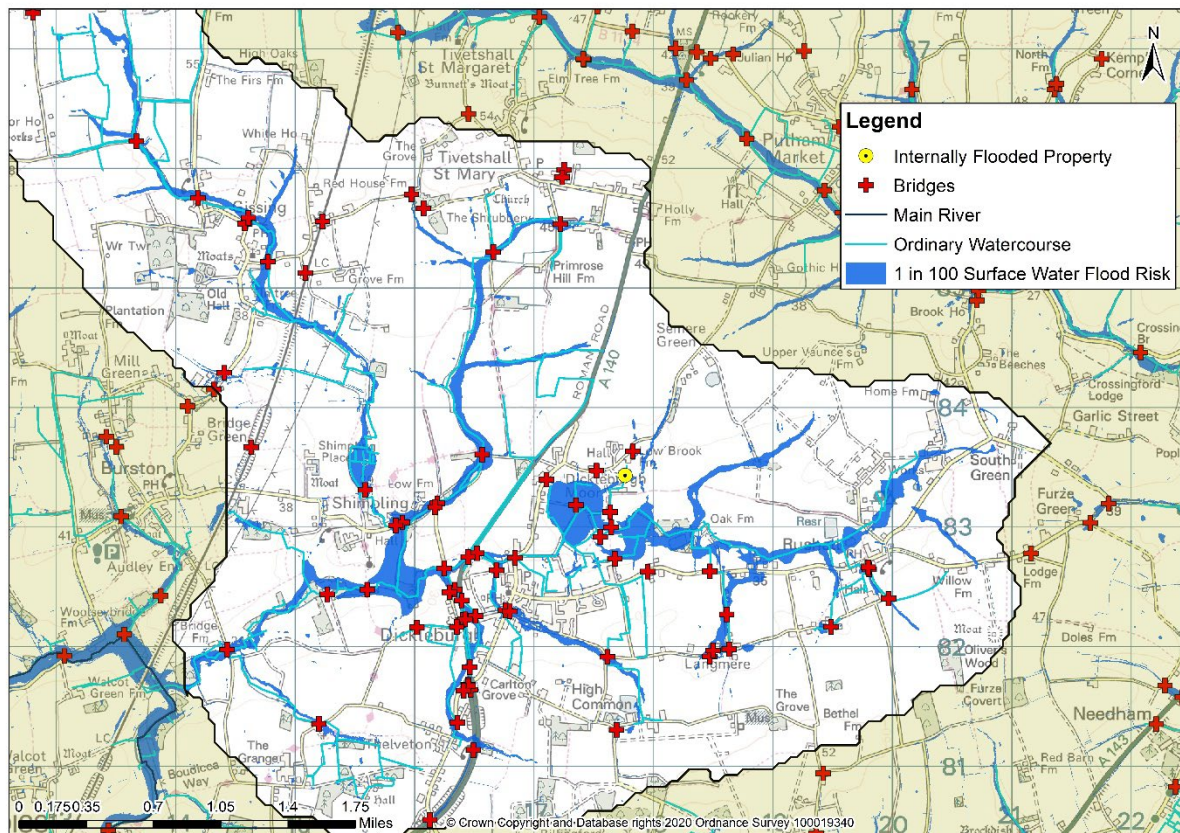
Causes of Flooding Within the Area and Recommendations

The findings of the investigation are detailed in the [Investigation report into the flooding in Breckland District in winter 2020-2021 \(FIR066\)](#). Causes and recommendations from this report are summarised below

Location and Date of Flooding	Causes of Flooding	Recommendation	Risk Management Authority/Individual with Relevant Flood Risk Roles
Mill Lane, Besthorpe, 24 December 2020	Run-off from significant rainfall was concentrated along overland flowpaths on which the affected properties are positioned on.	Norfolk County Council (LLFA) should investigate with third parties on developing a partnership funding solution to mitigate the risk experienced at this location. This could be either through submission of a bid to secure Partnership Funding or through negotiation with other organisations and the local community. It is important to note this recommendation will be subject to the priorities and availability of resources of funders. It may be dependent on those property owners affected contributing towards a solution.	Norfolk County Council (LLFA)

Location and Date of Flooding	Causes of Flooding	Recommendation	Risk Management Authority/Individual with Relevant Flood Risk Roles
Mill Lane, Besthorpe, 24 December 2020	Run-off from significant rainfall within the watercourse was obstructed by a blockage to the trash screen which is immediately adjacent to the affected properties and directed flood water towards the affected properties. The trash screen currently reduces the potential for blockage with a large underground culvert that	An assessment of the risk posed by the structure and its suitability should be undertaken. In addition, the ongoing responsibility for the maintenance of the structure should also be clarified as ownership of the asset is not known.	Norfolk County Council (Highways) Riparian Owners
Mill Lane, Besthorpe, 24 December 2020	Surface run-off from significant rainfall flowed off adjacent fields and onto the accesses of affected properties that were situated lower than these features.	Property owners should protect their buildings through flood protection measures where appropriate. Norfolk County Council (LLFA) will communicate with residents to advise them how they may apply for grants available. These grants are subject to a funding application. Property owners could also carry out their own measures where funding is not forthcoming, or residents are unwilling to wait.	Property owners Norfolk County Council (LLFA)

South Norfolk Council Flooding and Flood Risk Within Dickleburgh Area



Map Showing Location of Flooded Properties in Semere Green, Dickleburgh.

Description of Area

The flooded property is located outside the village of Dickleburgh with in the large catchment that covers Dickleburgh and other neighbouring villages. The area consists of mostly green open land used mostly for agriculture, the main A140 and small villages and clusters of properties. The flowpaths move westerly towards a tributary of the river Waveney, which then enters the main Waveney channel.

Flood Incidents Within the Area

Within the area one incident of internal flooding has been assessed as part of this investigation. This incident is detailed in the table below.

Date of Incident	Incident as Reported	Response to the Flood Incident
23 December 2020	<p>On 23 December 2020 - one property was internally flooded on Semere Green Lane, Dickleburgh and Rushall. This incident was reported by:</p> <ul style="list-style-type: none">• a resident via an online flood report form on the 25 October 2021 (FWF/21/5769).	Norfolk County Council (Highways) assessed the capacity of their drainage system after the incident.

Recent Rainfall Within the Area

This report seeks to draw on rainfall data to ascertain the intensity of the rainfall events experienced in the catchment that led to the flooding. This analysis is useful in assessing (in broad terms) if the design capacity of drainage systems within the affected areas was exceeded.

Norfolk County Council (LLFA) has sought to use data from rain gauges where incidents of flooding are located within a 2.5km radius of the instrumentation. This distance meets the requirements of British Standards and aims to capture localised rainfall patterns, where there is no available data within this radius this will be stated.

There were no rain gauges within 2.5km of the incidents of flooding within this catchment.

Historic Flooding Incidents Within the Area

The following table lists flooding incidents with the area that have been recorded.

Date of incident	Impact	Return Period
23 December 2020	Six properties were flooded in Dickleburgh during this event. Please see Investigation report into the flooding in South Norfolk District in winter 2020-2021 FIR066 .	>1 in 20

Causes of Flooding Within the Area and Recommendations

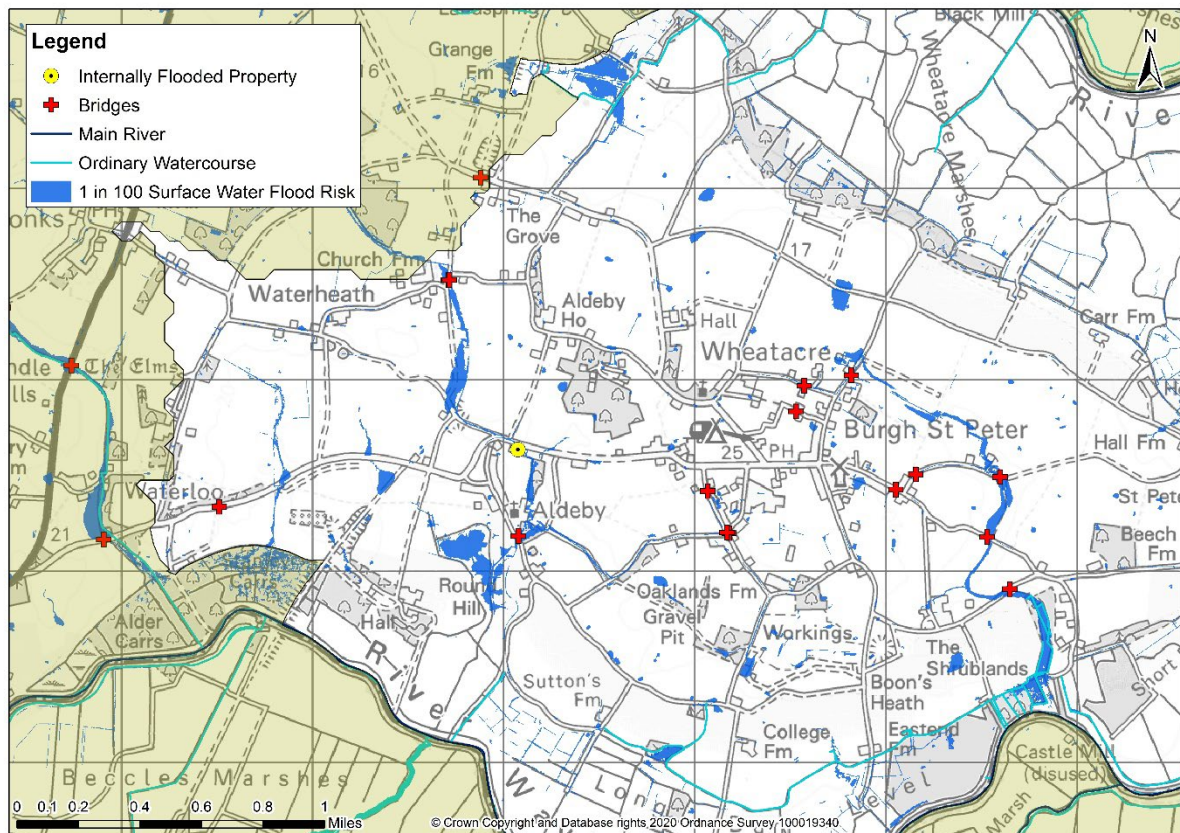
The findings of the investigation are detailed in the [Investigation report into the flooding in South Norfolk District in winter 2020-2021 FIR066](#). Causes and recommendations from this report are summarised below

Location and Date of Flooding	Causes of Flooding	Recommendation	Risk Management Authority/Individual with Relevant Flood Risk Roles
Semere Green Lane, Dickleburgh and Rushall, 23 December 2020	Significant rainfall fell on saturated soils, this resulted in high amounts of surface water runoff. Surface water then flowed off adjacent fields, along overland flow path, and onto the accesses of affected properties that were situated lower than these features.	Landowners should review land management practises to reduce surface water runoff.	Landowners
Semere Green Lane, Dickleburgh and Rushall, 23 December 2020	The watercourse and culverts under the road were obstructed by debris. This reduced the efficiency of the upstream drainage system causing flooding of the road which contributed to flooding at the affected property.	Norfolk County Council (Highways) and riparian owners should instigate a regular regime of maintenance to ensure the system is free from obstruction (i.e. tree leaves or roots) at all times.	Norfolk County Council (Highways) Riparian owners

Location and Date of Flooding	Causes of Flooding	Recommendation	Risk Management Authority/Individual with Relevant Flood Risk Roles
Semere Green Lane, Dickleburgh and Rushall, 23/12/2020	The flood water entered the property through low thresholds at entrances. Seepage of groundwater onto above-ground structures (i.e. roads or private forecourts) was reported.	Property owners should protect their buildings through flood protection measures where appropriate. Norfolk County Council (LLFA) will communicate with residents to advise them how they may apply for grants available. These grants are subject to a funding application. Property owners could also carry out their own measures where funding is not forthcoming, or residents are unwilling to wait.	Property owners Norfolk County Council (LLFA)

South Norfolk Council

Flooding and Flood Risk Within Aldeby Area



Map Showing Location of Flooded Properties in Rectory Road, Aldeby.

Description of Area

The flooded property is in the village of Aldeby with in the large catchment that covers Aldeby and other neighbouring villages. The area consists of mostly green open land used mostly for agriculture, small villages, and clusters of properties. The flowpaths move southernly towards the river Waveney.

Flood Incidents Within the Area

Within the area one incident of internal flooding have been assessed as part of this investigation. This incident is detailed in the table below.

Date of Incident	Incident as Reported	Response to the Flood Incident
24 December 2020	On the 24 December 2020 - one property was internally flooded on Rectory Road, Aldeby. This incident was reported by: <ul style="list-style-type: none">a resident via an online flood report form on the 14 May 2022 (FWF/22/6364).	Norfolk County Council (Lead Local Flood Authority) visited affected residents to offer advice and to gather information after the incident.

Recent Rainfall Within the Area

This report seeks to draw on rainfall data to ascertain the intensity of the rainfall events experienced in the catchment that led to the flooding. This analysis is useful in assessing (in broad terms) if the design capacity of drainage systems within the affected areas was exceeded.

Norfolk County Council (LLFA) has sought to use data from rain gauges where incidents of flooding are located within a 2.5km radius of the instrumentation. This distance meets the requirements of British Standards and aims to capture localised rainfall patterns, where there is no available data within this radius this will be stated.

There were no rain gauges within 2.5km of the incidents of flooding within this area.

Historic Flooding Incidents Within the Area

No historic records of internal flooding in the area.

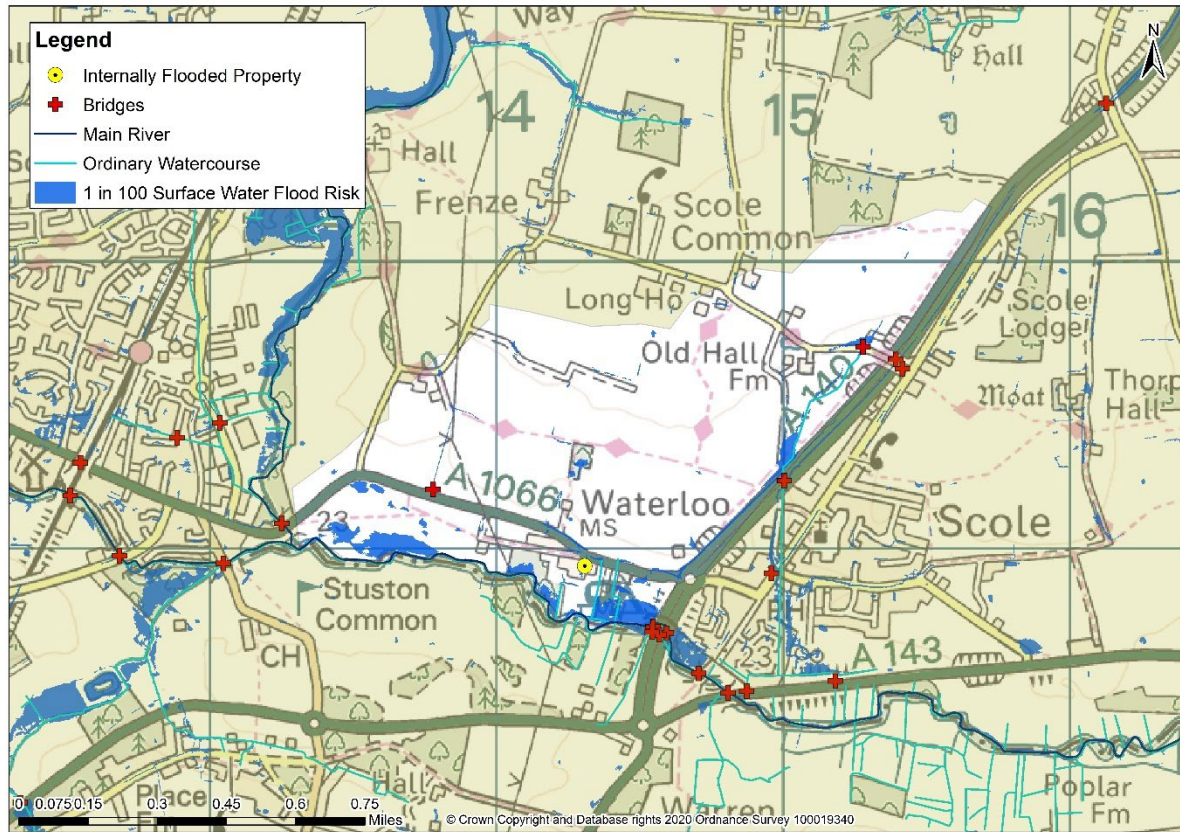
Causes of Flooding Within the Area and Recommendations

The findings of the investigation are detailed in the [Investigation report into the flooding in South Norfolk District in winter 2020-2021 FIR066](#). Causes and recommendations from this report are summarised below:

Location and Date of Flooding	Causes of Flooding	Recommendation	Risk Management Authority/Individual with Relevant Flood Risk Roles
Rectory Road, Aldeby, 24 December 2020	Surface run-off from rainfall made its way onto roads and flowed along the road network and onto the accesses of the affected property that was situated lower than these features.	Norfolk County Council should consider opportunities to route flood water on the highway away from affected properties to alternative points of discharge, or other solutions as practicable.	Norfolk County Council (Highways)
Rectory Road, Aldeby, 24/12/2020	Surface run-off from significant rainfall flowed off adjacent fields and onto the accesses of affected properties that were situated lower than these features.	Property owners should protect their buildings through flood protection measures where appropriate. Norfolk County Council (LLFA) will communicate with residents to advise them how they may apply for grants available. These grants are subject to a funding application. Property owners could also carry out their own measures where funding is not forthcoming, or residents are unwilling to wait.	Property owners Norfolk County Council (LLFA)

South Norfolk Council

Flooding and Flood Risk Within Scole Area



Map Showing Location of Flooded Property on Waterloo Lane, Scole.

Flood Incidents Within this Area

Within this catchment one incident of internal flooding has been assessed as part of this investigation. These incidents are detailed in the table below.

Date of Incident	Incident as reported	What was the response to the flood incident
23/12/2020	On the 23/12/2020 one property reported internal flooding on Waterloo Lane, Scole. This incident was reported by a resident via a telephone call on the 16 December 2021, (FWF/22/6309)	Norfolk County Council (LLFA) assessed validity and impact of the flood report after the incident.

Recent Rainfall Within the Catchment

This report seeks to draw on rainfall data to ascertain the intensity of the rainfall events experienced in the catchment that led to the flooding. This analysis is useful in assessing (in broad terms) if the design capacity of drainage systems within the affected areas was exceeded.

Norfolk County Council (LLFA) has sought to use data from rain gauges where incidents of flooding are located within a 2.5km radius of the instrumentation. This distance meets the requirements of British Standards and aims to capture localised rainfall patterns. Where there is no available data within this radius this will be stated.

There were no rain gauges within 2.5km of the incidents of flooding within this catchment.

Historic Flooding Incidents Within Scole

The following table lists flooding incidents within the catchment that have been recorded.

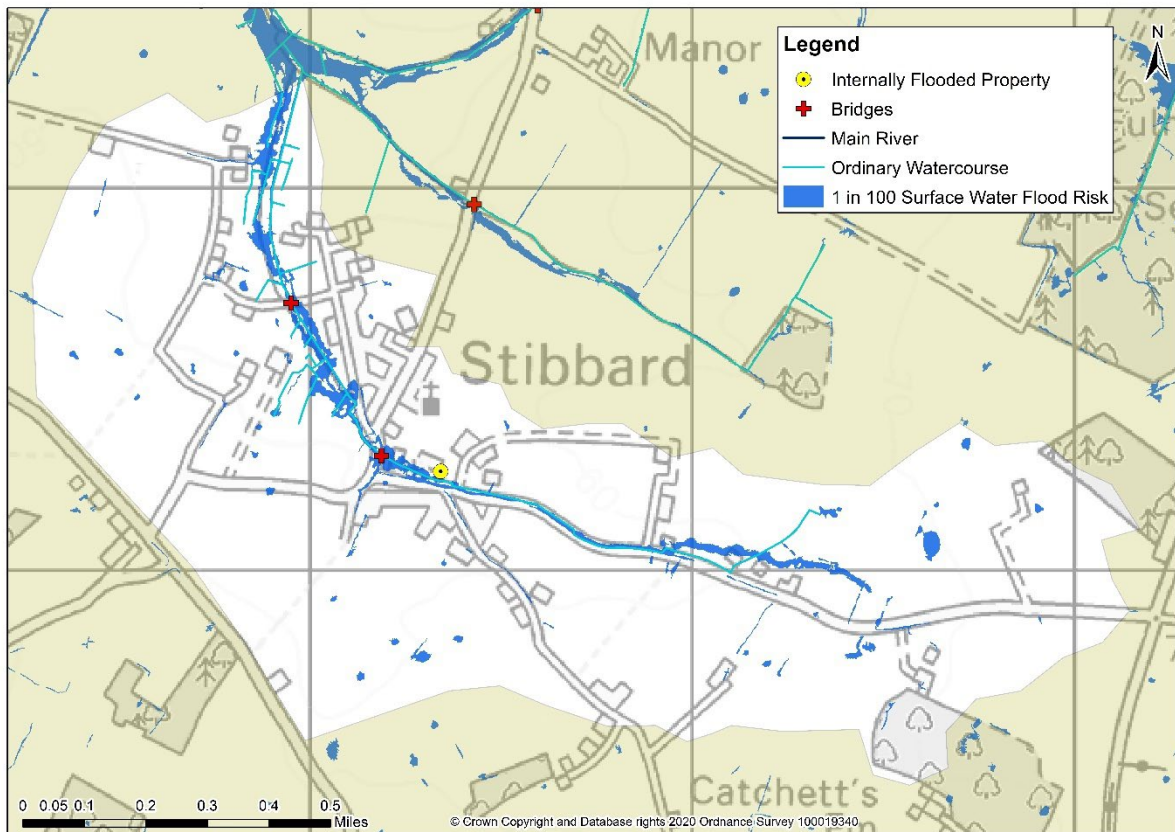
Date of incident	Impact	Return Period
December 2020	2 properties were flooded in Scole during this event. Please see South Norfolk - Winter flood report 2020/21 - FIR066	>1 in 20
July 2018	External Flooding to one property	Unknown
June 2016	6 properties were flooded in Scole during this event. Please see South Norfolk Flood Investigation 2013-2016 (FIR/036)	Unknown

Causes of Flooding and Recommendations

The findings of the investigation are detailed in the [Investigation report into the flooding in South Norfolk District in winter 2020-2021 FIR066](#). Causes and recommendations from this report are summarised below:

Location and date of flooding	Causes of flooding	Recommendation	Risk Management Authority/individual with Relevant Flood Risk Roles
Waterloo Lane, Scole, 23/12/2020	The river was obstructed by high water levels downstream and debris. This caused flooding at the affected properties.	The relevant property owners should instigate a regular regime of maintenance to ensure the watercourse is free from obstruction. Property owners should protect their buildings through flood protection measures where appropriate. Environment Agency will communicate with residents of properties known to have flooded internally to investigate options for managing flood risk. This may need to be dependent on those property owners affected contributing towards a solution.	Landowners Property Owners Environment Agency

North Norfolk Council
Flooding and Flood Risk Within Stibbard Area



Map Showing Location of Flooded Property on Wood Norton Road, Stibbard.

Description of Area

Stibbard is a village within a large wider drainage catchment. The main watercourse runs through the centre of the village from east to west. The village is surrounded by open green fields mostly used for agriculture. An ordinary watercourse flows through the village, culverted at various locations long side properties.

Flood Incidents Within the Area

Within the area one incident of internal flooding has been assessed as part of this investigation. This incident is detailed in the table below.

Date of Incident	Incident as Reported	Response to the Flood Incident
24 December 2020	On the 24 December 2020 - one property was internally flooded on Wood Norton Road, Stibbard. This incident was reported by: <ul style="list-style-type: none">• a resident via an online flood report form on the 13 June 2023 (FWF/23/6935).	Norfolk County Council (Lead Local Flood Authority) visited affected residents to offer advice and to gather information after the incident.

Recent Rainfall Within the Area

This report seeks to draw on rainfall data to ascertain the intensity of the rainfall events experienced in the catchment that led to the flooding. This analysis is useful in assessing (in broad terms) if the design capacity of drainage systems within the affected areas was exceeded.

Norfolk County Council (LLFA) has sought to use data from rain gauges where incidents of flooding are located within a 2.5km radius of the instrumentation. This distance meets the requirements of British Standards and aims to capture localised rainfall patterns, where there is no available data within this radius this will be stated.

There were no rain gauges within 2.5km of the incidents of flooding within this area.

Historic Flooding Incidents Within the Area

No historic records of internal flooding in the area.

Causes of Flooding Within the Area and Recommendations

Location and date of flooding	Causes of flooding	Recommendation	Risk Management Authority/individual with Relevant Flood Risk Roles
Wood Norton Road, Stibbard, 24 December 2020	Surface run-off from significant rainfall flowed off adjacent fields and onto the accesses of affected properties that were situated lower than these features.	Property owners should protect their buildings through flood protection measures where appropriate.	Property owners
Wood Norton Road, Stibbard, 24 December 2020	Significant rainfall fell on saturated soils, this resulted in high amounts of surface water runoff. Surface water then flowed off adjacent fields, along overland flow path, and onto the accesses of affected properties that were situated lower than these features.	Landowners should review land management practices to reduce surface water runoff.	Landowners
Wood Norton Road, Stibbard, 24 December 2020	The watercourse and culverts under the road were obstructed by debris. This reduced the efficiency of the upstream drainage system causing flooding of the road which contributed to flooding at the affected property.	Norfolk County Council (Highways) and riparian owners should instigate a regular regime of maintenance to ensure the system is always free from obstruction (i.e. tree leaves or roots).	Norfolk County Council (Highways) Riparian owners

Disclaimer

Although every effort has been taken to ensure the accuracy of the information contained within the pages of the report, we cannot guarantee that the contents will always be current, accurate or complete.

This report has been prepared as part of Norfolk County Council's responsibilities under the Flood and Water Management Act 2010. It is intended to provide context and information to support the delivery of the local flood risk management strategy and should not be used for any other purpose.

The findings of the report are based on a subjective assessment of the information available by those undertaking the investigation and therefore may not include all relevant information. As such it should not be considered as a definitive assessment of all factors that may have triggered or contributed to the flood event.

The opinions, conclusions and any recommendations in this Report are based on assumptions made by Norfolk County Council when preparing this report, including, but not limited to those key assumptions noted in the Report, including reliance on information provided by third parties.

Norfolk County Council expressly disclaims responsibility for any error in, or omission from, this report arising from or in connection with any of the assumptions being incorrect.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the time of preparation and Norfolk County Council expressly disclaims responsibility for any error in, or omission from this report arising from or in connection with those opinions, conclusions, and any recommendations.

The implications for producing Flood Investigation Reports and any consequences of blight have been considered. The process of gaining insurance for a property and/or purchasing/selling a property and any flooding issues identified are considered a separate and legally binding process placed upon property owners and this is independent of and does not relate to the County Council highlighting flooding to properties at a street level.

Norfolk County Council forbids the reproduction of this report or its contents by any third party without prior agreement.

Appendix A - Key Definitions and Responsibilities

What is Flooding?

Section 1 of the Flood and Water Management Act 2010 states that: 'Flood' includes any case where land not normally covered by water becomes covered by water. In addition, this section adds the caveat:

"But 'flood' does not include –

- (a) a flood from any part of the sewerage system, unless wholly or partly caused by an increase in the volume of rainwater (including snow and other precipitation) entering or otherwise affecting the system, or
- (b) a flood caused by a burst water main (within the meaning given by Section 219 of the Water Industry Act 1991)."

What is Internal and External Flooding?

For the purposes of this report, properties that have internally flooded are those where it is considered that water has entered the fabric of the building, where:

- a) Basements and below ground level floors are included.
- b) Garages are included if in the fabric of the building. Garages adjacent or separate from the main building are not included.
- c) Occupied caravans are included but not tents.

External flooding included those properties where water has entered gardens or surrounding areas which restricts access, affects the highway or where flooding has disrupted essential services to the property such as sewerage. For businesses this includes those where the flood waters are directly preventing them trading as usual.

What is Local Flood Risk?

Local Flood Risk is defined by the Flood and Water Management Act 2010 as being flood risk from surface runoff, groundwater, and ordinary watercourses; where,

- a) 'Surface runoff' means rainwater (including snow and other precipitation) which is on the surface of the ground (whether or not it is moving) and, has not entered a watercourse, drainage system or public sewer.
- b) 'Groundwater' means all water which is below the surface of the ground and in direct contact with the ground or subsoil.
- c) 'Ordinary Watercourse' means a watercourse that does not form part of a main river and includes a reference to a lake, pond or other area of water which flows into an ordinary watercourse.

What is a Catchment?

To aid the investigation process and, for ease of presentation, the incidents of flooding have been grouped within this document based on hydrological catchments.

The purpose of viewing flooding incidents based on catchments reflects the reality that flooding does not respect the administrative boundaries of water management organisations. Hydrological catchments catch water and discharge it at locations

known as outlets. Individual hydrological catchment boundaries are usually formed by ridges of surrounding higher ground, which separate the lower lying areas at a line known as a watershed.

What is a Return Period?

A return period is the average length of time in years between events such as a particular amount of rainfall. Where rainfall data is available, we have calculated the return period to help us understand how frequently that event is likely to occur.

For example, a 1 in 100 year event would happen on average once every 100 years. This does not mean if an event occurs it will not happen for another 100 years. simply that this is the average interval between events.

Roles and Responsibilities of Risk Management Authorities

Below is a short summary of those groups and Risk Management Authorities (RMAs) that have a role in managing flooding within Norfolk. The listing of responsibilities includes those duties or powers that directly relate to managing the flood incidents or consequence. All RMAs have a duty to cooperate with other RMAs.

1. Norfolk County Council (as Lead Local Flood Authority)

- a) Duty to investigate significant flooding from any source.
- b) Duty to maintain a register of structures or features which affect flood risk from all sources.
- c) Power to undertake works to manage flood risk from surface run-off and groundwater.
- d) Powers to regulate activities on ordinary watercourses outside of Internal Drainage Board areas.
- e) Duties as a Category 1 Responder for Emergency Planning and the Fire and Rescue Service.

2. District, City and Bough Councils

- a) Powers to undertake works on ordinary watercourses outside of IDB areas.
- b) The Local Planning Authority for their District area and determine the appropriateness of developments and their exposure and effect on flood risk.
- c) Duties as a Category 1 Responder for Emergency Planning.

3. Internal Drainage Boards (IDBs)

- a) A duty to act in a manner consistent with the national and local strategies and guidance when exercising FCERM functions.
- b) Duty to act in a manner consistent with Local Flood Risk Management Strategies when exercising other functions that may affect flood risk.
- c) Powers to regulate activities on ordinary watercourses within IDB areas.
- d) Exercise a general power of supervision over all matters relating to the drainage of land within their district.

- e) Powers to undertake works on ordinary watercourses within IDB areas.

4. Highway Authorities (Norfolk County Council or Highways England)

- a) Powers to undertake works to manage water on the highway and to move water off the highway.
- b) Enforcement powers to unauthorised alterations, obstructions, and interferences with highway drainage.
- c) Have responsibilities for culverts vested in the highway. Currently Norfolk County Council discharges its responsibilities associated with bridges and culverts (whether as owner or highway authority) through the inspection of condition (undertaken by the Bridges team) and through maintenance activity (delivered on a as needs basis by the relevant Highways area team).

5. Water Companies

- a) Undertake cost beneficial capital schemes to alleviate or eliminate flooding where the flood event is associated with a failure of their assets.
- b) Duty to provide, improve, maintain, and operate systems of public sewers and works for the purpose of effectually draining an area.
- c) Are responsible for flooding from their foul, combined and surface water sewers, and from burst water mains.
- d) Maintain 'At Risk Registers' for Ofwat that record properties that have flooded from public foul, combined and surface water sewers and that are at risk of flooding again.
- e) Water companies respond to reports from the public of flooding associated with their assets and determine an appropriate response in line with their standards or customer service.
- f) Duties as a Category 2 Responder for Emergency Planning.

6. Riparian Owners

- a) Duty of care towards neighbours upstream and downstream, avoiding any action likely to cause flooding.
- b) Entitled to protect their properties from flooding.
- c) May be required to maintain the condition of their watercourse to ensure that the proper flow of water is unimpeded.

7. Environment Agency

- a) Powers to regulate Activities on Main Rivers.
- b) Permissive powers to undertake maintenance, however responsibility rests with riparian owners, any maintenance done under Environment Agency permissive powers is done on a risk based approach within the funding available.
- c) Power to undertake works to manage flood risk from main rivers.
- d) Required to have a strategic overview of all forms of flooding.
- e) Enforcement powers for reservoirs greater than 25,000m³ and a duty to maintain a register of these reservoirs.
- f) Duties as a Category 1 Responder for Emergency Planning (including issuing flood warnings).

Abbreviations

Abbreviation	Description
LLFA	Lead Local Flood Authority
FIR	Flood Investigation Report
IDB	Internal Drainage Board
FCERM	Flood and Coastal Erosion Risk Management