



Norfolk County Council

Investigation Report into the flooding in Broadland District during Winter 2020-2021

Report Reference: FIR066

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Executive Summary

Introduction

Flooding occurred across Broadland on the 23 and 24 December 2020. Norfolk County Council has confirmed 15 incidences of internal flooding on this date which are covered in this report. We note that significantly more properties were flooded internally, based on reports from neighbouring properties or risk management authority reports. However, due to the absence of direct and verifiable reports from property owners, the LLFA does not have the permission to include, hold or publish information for those properties where direct reports have not been submitted.

Please note that the LLFA made extensive site visits and provided 'fliers' or letter drops to the majority of those affected by flooding. Any subsequent reports received will be investigated and published in an additional report

Norfolk received an above normal amount of rainfall throughout December with a total of 1117.7mm rainfall, 204% of the Long-Term Average. For the purpose of this report and ease of presentation we have divided the report by parish, then sub catchment. In some cases a catchment map has been generated to show the proximity of the properties to overland flow paths, however, in areas of isolated flooding where the flooding does not relate to a flow path a catchment map has not been generated.

Flooding incidents and causes

The flooding that occurred in the locations listed below led to the internal flooding of 17 properties.

Location	Sub Catchment	Number of affected properties
Acle	N/A	3
Blofield	N/A	5
Hellesdon	N/A	1
Hemblington	N/A	1
Horsford	N/A	4
Rackheath	N/A	3

Key recommendations

The recommendations set out in the report have been summarised below.

All Risk Management Authorities should;

- Communicate with affected residents where their assets have given rise to the flooding of properties.
- Review the appropriateness of their response to flooding.
- Determine the integrity and/or capacity of their assets and their maintenance where they have contributed to the flooding of properties to understand the systems role in accommodating rainfall events as well as mitigating flooding.

Property owners of affected properties should;

- Confirm the integrity, capacity and appropriateness of their property drainage
- Determine if works are needed to remove the risk posed by structures that form obstructions to flows.
- Determine if it is appropriate for them to protect their buildings through flood protection measures.
- Seek their own legal advice if they are concerned about the responsibilities and liabilities of themselves and/or others.
- All property owners should remove any inappropriate surface water connections to the foul sewer system and direct flows to alternative points of discharge where it doesn't increase flood risk.
- Should consider installing property protection measures. Residents can apply for a grant towards the cost of flood protection measures at this link

Norfolk County Council should;

- Work with partner organisations to identify funding for flood mitigation. This would include assessing the potential to install property level protection measures, reduce run-off and increase the attenuation of flood water to reduce the impacts of flooding. Property owners could also carry out their own measures where funding is not forthcoming or residents are unwilling to wait for measures to be approved through national funding schemes.
- Work with property owners to assess the road structure to identify if it could be amended to route flood water away from the affected properties to alternative points of discharge, or other solutions as practicable.
- Seek to remind riparian owners of their responsibility to undertake appropriate levels of maintenance to sustain the efficiency of the drainage systems.
- Communicate with local residents to advise them of the appropriate measures they could take to protect their property without prejudicing the rights and responsibilities of adjoining property holders

- Determine if works are needed to remove the risk posed by structures that form obstructions to watercourse flows and communicate with affected parties and riparian owners
- Review and monitor the delivery of recommendations within this and other relevant flood investigation reports.

Anglian Water should;

- Work with partner organisations to identify the potential for managing the amount of surface water entering their drainage system in flood events.

Justification for Flood Investigation

The purpose of this report relates to Section 19 of the Flood and Water Management Act 2010. This legislation sets out that the County Council, in its role as Lead Local Flood Authority for Norfolk, should investigate the role and response of organisations to significant flooding incidents. Significant flooding is deemed to be those incidents that impact upon people, property and infrastructure.

The Norfolk Local Flood Risk Management Strategy Policy UC2 (Flood Investigation) sets out the thresholds the Lead Local Flood Authority will apply to its formal flood investigation role. This states an investigation will be undertaken where it is determined that;

- (a) There is ambiguity surrounding the source or responsibility for a flood incident, and/or;
- (b) There is cause to investigate the flood incident, due to either its impact, or consequence

In judging the impact or consequence of a flood event Norfolk County Council uses the criteria set out below;

- Any risk to loss of life or serious injury.
- One or more residential or business property flooded internally.
- One or more critical services/installations and vulnerable person's properties flooded internally; and/or rendered inoperable or their functions severely compromised due to the access to the premises being impassable; and/or resulting in a loss of service impacting on the local community.
- Any section of a national category 3 road or above made impassable due to flooding; and/or flooding to priority 1 and 2 gritting routes.
- Flooding adversely impacting a rail link by making it impassable.

In this instance it was deemed necessary to complete a formal investigation as:
[list reasons to justify investigation]

This impact met Norfolk County Council's threshold for triggering the undertaking of a formal flood investigation.

The flood investigation report aims to:

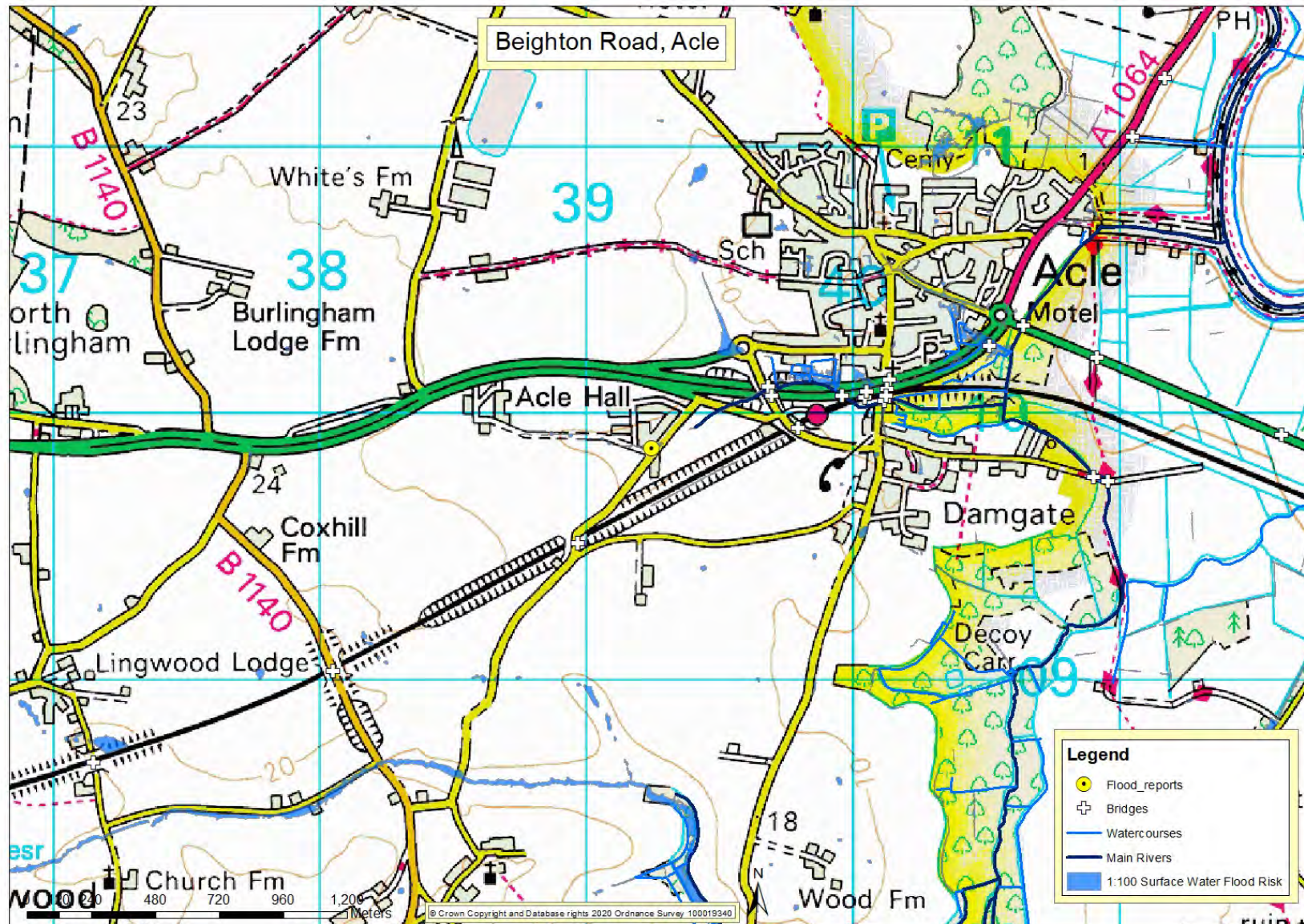
- provide a transparent and consistent review of recent flooding.
- identify those organisations and individuals who have responsibility to manage the causes of the flooding.
- identify what their response has been or will be to the flooding.
- make recommendations as to how the flood risk could be mitigated or reduced.
- provide new evidence of the level of risk faced by communities in Norfolk that can be used in current funding bids in support of flood mitigation schemes.

Mitigation measures include property level protection: reinstating lost drainage features: reviewing or increasing maintenance regimes and increasing the capacity of the drainage network.

The flood investigation report cannot:

- Resolve the flooding issues or provide designed solutions.
- Force authorities to undertake any of the recommended actions.

Flooding and flood risk in Acle



Flood incidents in Acle

Within Acle 1 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	What was the response to the flood incident
23/12/2020	On the 23/12/2020 – 1 property was internally flooded on Beighton Road, Acle. This incident was reported by <ul style="list-style-type: none">a resident via an online flood report form on the 30/12/2020, (FWF/20/3254)	<ul style="list-style-type: none">Norfolk County Council (Lead Local Flood Authority) visited affected residents to offer advice and to gather information after the incident.
23/12/2020	On the 23/12/2020 – 2 properties were internally flooded on Beighton Road, Acle. This incident was reported by <ul style="list-style-type: none">Clarion Housing via an email on 16/11/2021	<ul style="list-style-type: none">Norfolk County Council (Lead Local Flood Authority) visited the location to gather information 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 has sought to use data from rain gauges where incidents of flooding are located within a 2.5 km 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.

1 of the incidents (100%) of internal flooding in this catchment is within 2.5km of a rain gauge.

Data from rain gauges located in Acle has been analysed to ascertain the intensity of the rainfall events experienced in the catchment.

The rainfall events recorded by gauges for this catchment are:

23 December 2020 – 44.4mm of rainfall was recorded as falling in 10 hours 0 minutes at the Acle TBR rainfall monitoring station. This intensity of rainfall for the total duration equates to an 8 year rainfall event.

Historic flooding incidents within the catchment

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

Date of incident	Impact	Rainfall intensity
13/06/2016	8 Internally flooded properties	Not significant

Causes of flooding within the catchment and recommendations

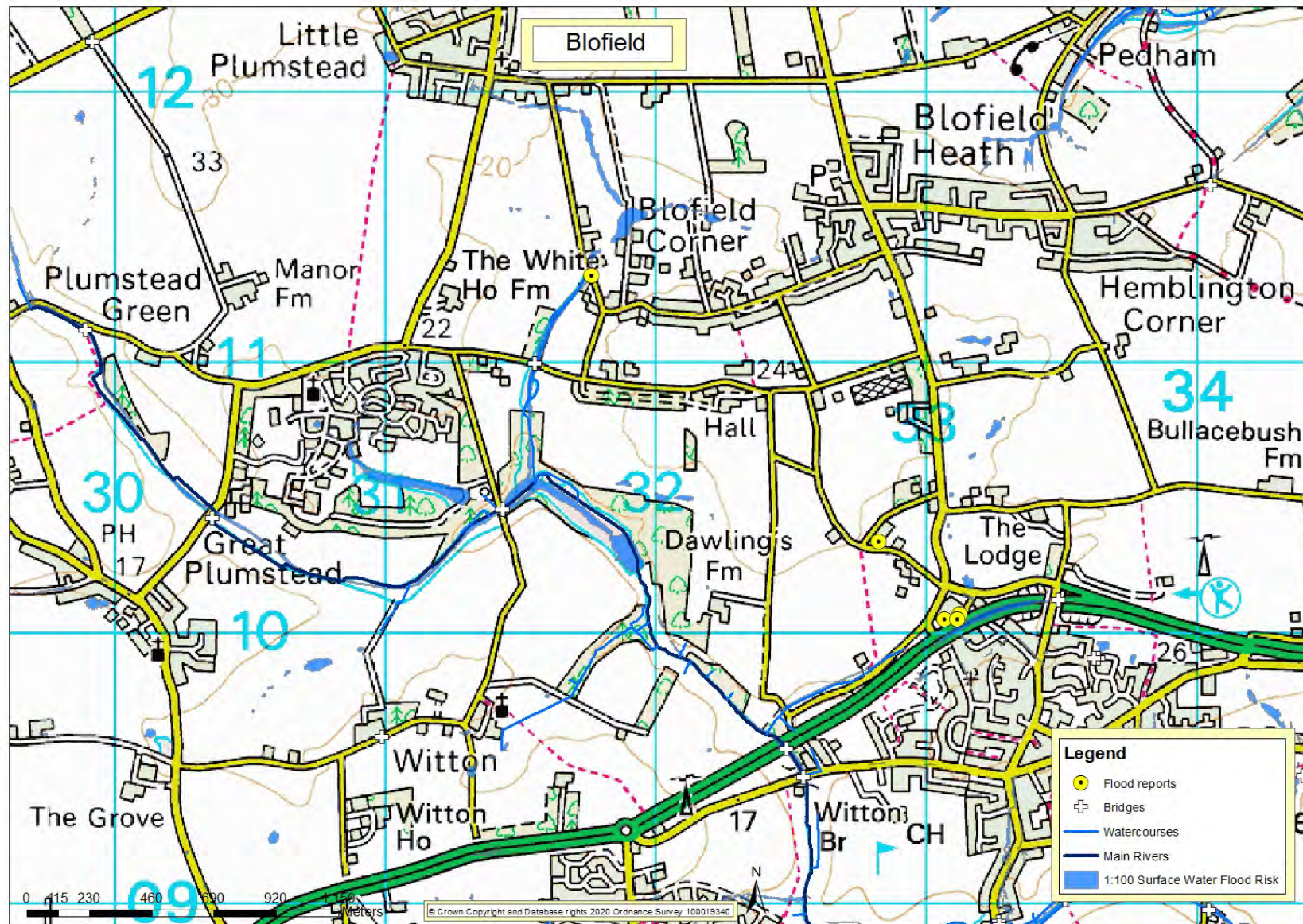
The findings of the investigation are detailed on the following pages. The first table details the causes that led to flooding within the catchment as well as when and where they were experienced. It also sets out which Risk Management Authorities have responsibility to help manage the causes of the flooding. The second table sets out recommendations to mitigate the causes and impacts of the flooding experienced within this catchment.

Following flooding to people, property and infrastructure

- Risk Management Authorities should
 - communicate with affected residents where their assets have given rise to the flooding of properties.
 - review the appropriateness of their response to flooding.
 - determine the integrity and/or capacity of their assets where they have contributed to the flooding of properties to understand the systems role in accommodating normal rainfall events as well as mitigating flooding.
- Property owners of affected properties should seek their own legal advice.
- NCC should
 - incorporate all relevant information of actual flooding into the review of the Norfolk Preliminary Flood Risk Assessment (“PFRA”).
 - review and monitor the delivery of recommendations within this and other relevant flood investigation reports.

Location and date of flooding	Causes of flooding	Recommendation	Who has responsibilities to manage the cause(s) of the flood?
<p>Beighton Road Acle 23/12/2020</p>	<ul style="list-style-type: none"> • The land drainage system was partially obstructed by debris and silt. This reduced the efficiency of the upstream drainage system contributing to flooding at the affected properties. • Surface run-off from rainfall flowed off adjacent fields and onto the accesses of affected properties that were situated lower than these features. 	<ul style="list-style-type: none"> • Amendments should be made to neighbouring land to ensure water is not directed towards properties. • Norfolk County Council should carry out a survey to assess and locate the network and culvert. 	<ul style="list-style-type: none"> • Landowner • Norfolk County Council (LLFA)

Flooding and flood risk within Blofield



Flood incidents in Blofield

Within Blofield 5 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	What was the response to the flood incident
24/12/2020	<p>On the 24/12/2020 - 2 properties were internally flooded on Lower Globe Lane, Blofield. These incidents were reported by</p> <ul style="list-style-type: none"> • a resident via an online flood report form on the 2 February 2021, (FWF/21/4029) • a resident via an online flood report form on the 22/01/2021, (FWF/20/3732) 	<ul style="list-style-type: none"> • The Fire and Rescue Service responded and pumped out during the incident. • Norfolk County Council (Lead Local Flood Authority) visited affected residents to offer advice and to gather information after the incident. • A resident carried out measures to minimise the impact of flooding during the incident.
	<p>On the 24/12/2020 - 1 property was internally flooded on Shack Lane, Blofield. This incident was reported by</p> <ul style="list-style-type: none"> • a resident via an online flood report form on the 22/01/2021, (FWF/21/3854) 	<ul style="list-style-type: none"> • Norfolk County Council (Lead Local Flood Authority) visited affected residents to offer advice and to gather information after the incident.
	<p>On the 23/12/2020 - 1 property was internally flooded on Holly Lane, Blofield. This incident was reported by</p> <ul style="list-style-type: none"> • a resident via an online flood report form on the 4/01/2021, (FWF/20/3273) 	<ul style="list-style-type: none"> • A resident carried out measures to minimise the impact of flooding during the incident. • Norfolk County Council (Lead Local Flood Authority) visited affected residents to offer advice and to gather information after the incident.
	<p>On the 23/12/2020 – 1 property was internally flooded on Blofield Corner Road. This incident was reported by</p> <ul style="list-style-type: none"> • a resident via email communication on the 08/01/2021, (FWF/21/4776) 	<ul style="list-style-type: none"> • Norfolk County Council (Lead Local Flood Authority) visited affected residents to offer advice and to gather information 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 has sought to use data from rain gauges where incidents of flooding are located within a 2.5 km 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 catchment

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

Date of incident	Impact	Rainfall intensity
06/10/2019	3 properties on Lower Globe Lane were internally flooded.	Unknown

Causes of flooding within the catchment and recommendations

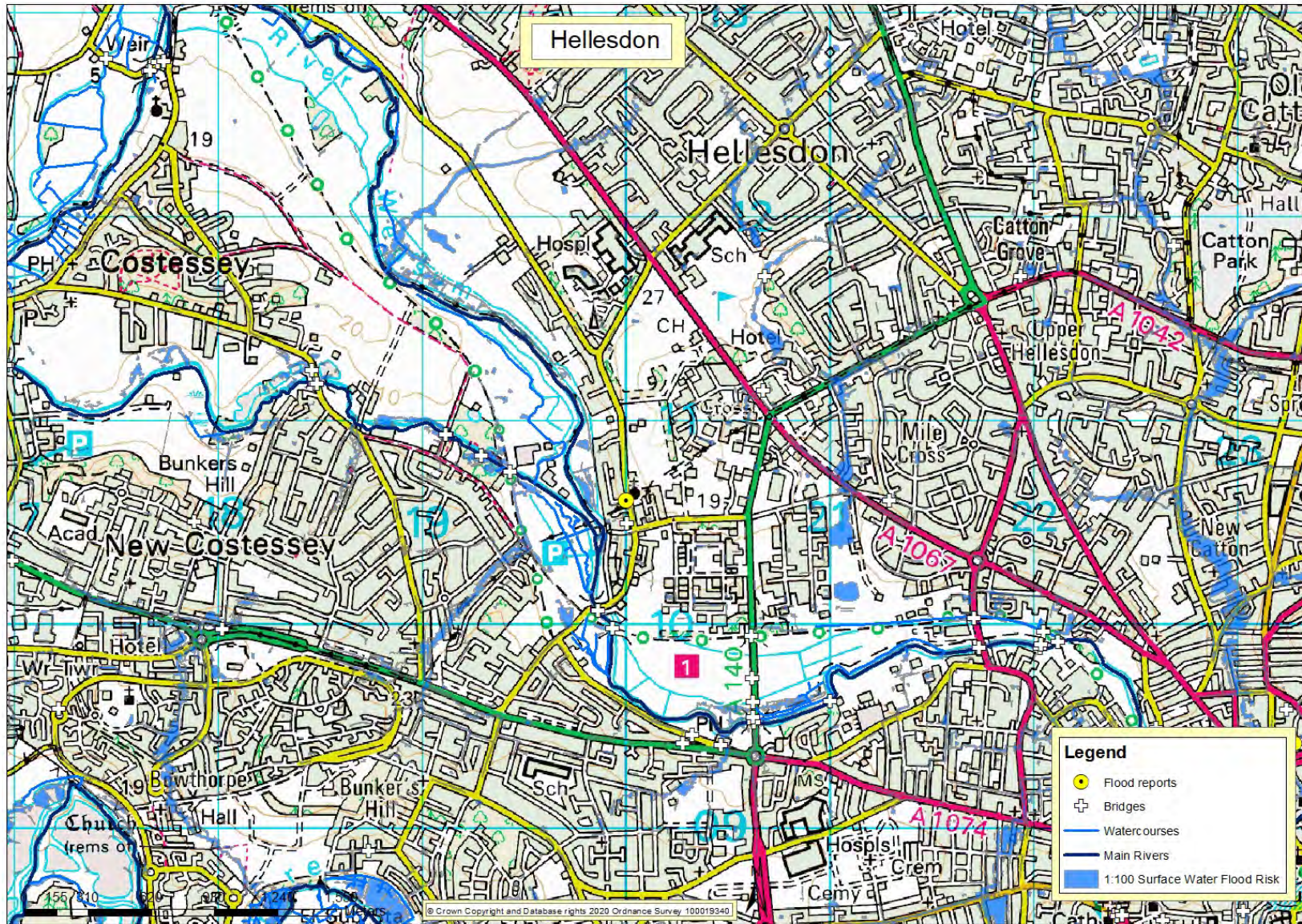
The findings of the investigation are detailed on the following pages. The first table details the causes that led to flooding within the catchment as well as when and where they were experienced. It also sets out which Risk Management Authorities have responsibility to help manage the causes of the flooding. The second table sets out recommendations to mitigate the causes and impacts of the flooding experienced within this catchment.

Following flooding to people, property and infrastructure

- Risk Management Authorities should
 - communicate with affected residents where their assets have given rise to the flooding of properties.
 - review the appropriateness of their response to flooding.
 - determine the integrity and/or capacity of their assets where they have contributed to the flooding of properties to understand the systems role in accommodating normal rainfall events as well as mitigating flooding.
- Property owners of affected properties should seek their own legal advice.
- NCC should
 - incorporate all relevant information of actual flooding into the review of the Norfolk Preliminary Flood Risk Assessment (“PFRA”).
 - review and monitor the delivery of recommendations within this and other relevant flood investigation reports

Location and date of flooding	Causes of flooding	Recommendation	Who has responsibilities to manage the cause(s) of the flood?
<p>Lower Globe Lane, Blofield, 24/12/2020</p> <p>Shack Lane, Blofield, 24/12/2020</p> <p>Blofield Corner Road 23/12/2020</p>	<ul style="list-style-type: none"> Run-off from rainfall was concentrated along overland flowpaths on which the affected properties are positioned adjacent to. Surface run-off from rainfall made its way onto highway and flowed along the road network and onto the accesses of affected properties that were situated lower than these features. Run-off from rainfall was directed towards the surface water drainage network. These flows could not be accommodated as the system was already overloaded. 	<ul style="list-style-type: none"> Norfolk County Council will review the capacity & level of maintenance required to sustain the design efficiency of their drainage systems that serve the flooding location in line with the risk identified. NCC should assess whether the capacity of the current system is able to provide protection that aligns with British standards. This may require a survey of the system being undertaken. Norfolk County Council will 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 should work with landowners to identify the potential for managing the amount or rate of surface water entering their drainage system in flood events. 	<ul style="list-style-type: none"> Norfolk County Council
<p>Blofield Corner Road 23/12/2020</p>	<ul style="list-style-type: none"> As above 	<ul style="list-style-type: none"> Advise residents of Property Level Resilience measures and funding opportunities. Property owners could also carry out their own measures where funding is not forthcoming, or residents are unwilling to wait / Property Owners should consider the potential to retrofit permeable areas and other methods of small-scale sustainable drainage systems. 	

Flooding and flood risk in Hellesdon



Flood incidents in Hellesdon

Within Hellesdon 1 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	What was the response to the flood incident
22/12/2020	<p>On the 22/12/2020 - 1 property was internally flooded on Low Road, Hellesdon. This incident was reported by</p> <ul style="list-style-type: none">a resident via personal communication on the 23/02/2021, (FWF/21/4377) <p>This property was flooded again in July 2021.</p>	<ul style="list-style-type: none">Norfolk County Council (Lead Local Flood Authority) Norfolk County Council 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 has sought to use data from rain gauges where incidents of flooding are located within a 2.5 km 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.

RAINFALL DATA TO BE ADDED.

Historic flooding incidents within the catchment

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

Date of incident	Impact	Rainfall intensity
2017	<p>This property flooded previously in 2017 and was included in Norwich and Broadland 2016-2018 flood investigation report available at https://www.norfolk.gov.uk/rubbish-recycling-and-planning/flood-and-water-management/flood-investigations.</p>	

Causes of flooding within the catchment and recommendations

The findings of the investigation are detailed on the following pages. The first table details the causes that led to flooding within the catchment as well as when and where they were experienced. It also sets out which Risk Management Authorities

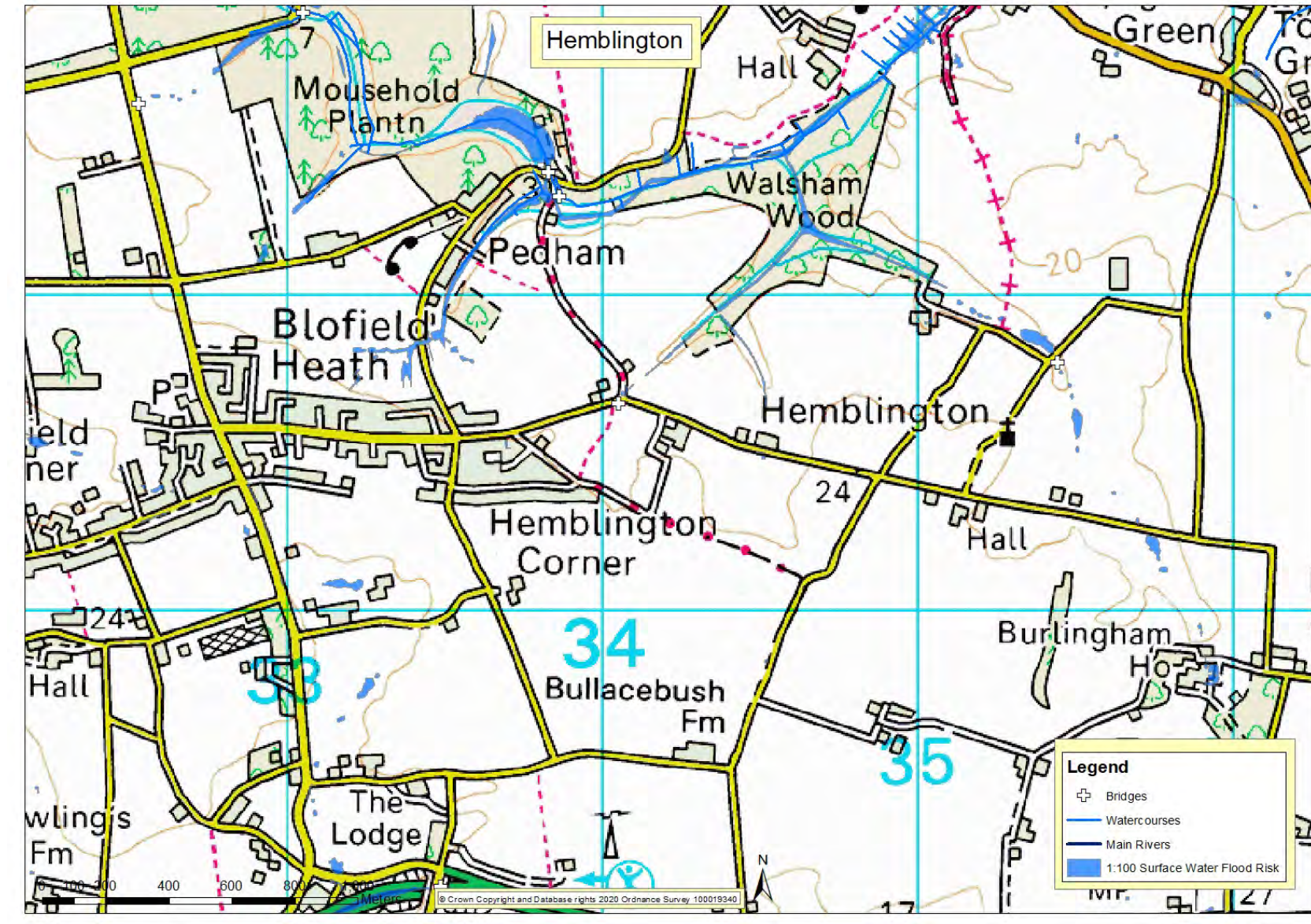
have responsibility to help manage the causes of the flooding. The second table sets out recommendations to mitigate the causes and impacts of the flooding experienced within this catchment.

Following flooding to people, property and infrastructure

- Risk Management Authorities should
 - communicate with affected residents where their assets have given rise to the flooding of properties.
 - review the appropriateness of their response to flooding.
 - determine the integrity and/or capacity of their assets where they have contributed to the flooding of properties to understand the systems role in accommodating normal rainfall events as well as mitigating flooding.
- Property owners of affected properties should seek their own legal advice.
- NCC should
 - incorporate all relevant information of actual flooding into the review of the Norfolk Preliminary Flood Risk Assessment (“PFRA”).
 - review and monitor the delivery of recommendations within this and other relevant flood investigation reports.

Location and date of flooding	Causes of flooding	Recommendation	Who has responsibilities to manage the cause(s) of the flood?
<p>Low Road Hellesdon 22/12/2020</p>	<ul style="list-style-type: none"> • Rainfall was concentrated on the highway. Vehicles using the highway passed through the flood water causing it to wash towards the affected property. • Surface run-off from rainfall made its way onto the highway and flowed along the road network and onto the accesses of affected properties that were situated lower than these features. 	<ul style="list-style-type: none"> • Norfolk County Council will consider options that would prevent water flowing from the highway towards the affected property. 	<ul style="list-style-type: none"> • Norfolk County Council Highways

Flooding and flood risk in Hemblington



Flood incidents in Hemblington

Within Hemblington 1 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	What was the response to the flood incident
23/12/2020	<p>On the 23/12/2020 - 1 property was internally flooded on Hemblington Hall Road, Hemblington. This incident was reported by</p> <ul style="list-style-type: none">• a resident via an online flood report form on the 28/12/2020, (FWF/20/3316)	<ul style="list-style-type: none">• A resident carried out measures to minimise the impact of flooding during the incident.• Norfolk County Council (Lead Local Flood Authority) visited affected residents to offer advice and to gather information 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 has sought to use data from rain gauges where incidents of flooding are located within a 2.5 km 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 catchment

The Lead Local Flood Authority has no previous reports of internal flooding on Hemblington Hall Road, Hemblington.

Causes of flooding within the catchment and recommendations

The findings of the investigation are detailed on the following pages. The first table details the causes that led to flooding within the catchment as well as when and where they were experienced. It also sets out which Risk Management Authorities have responsibility to help manage the causes of the flooding. The second table sets out recommendations to mitigate the causes and impacts of the flooding experienced within this catchment.

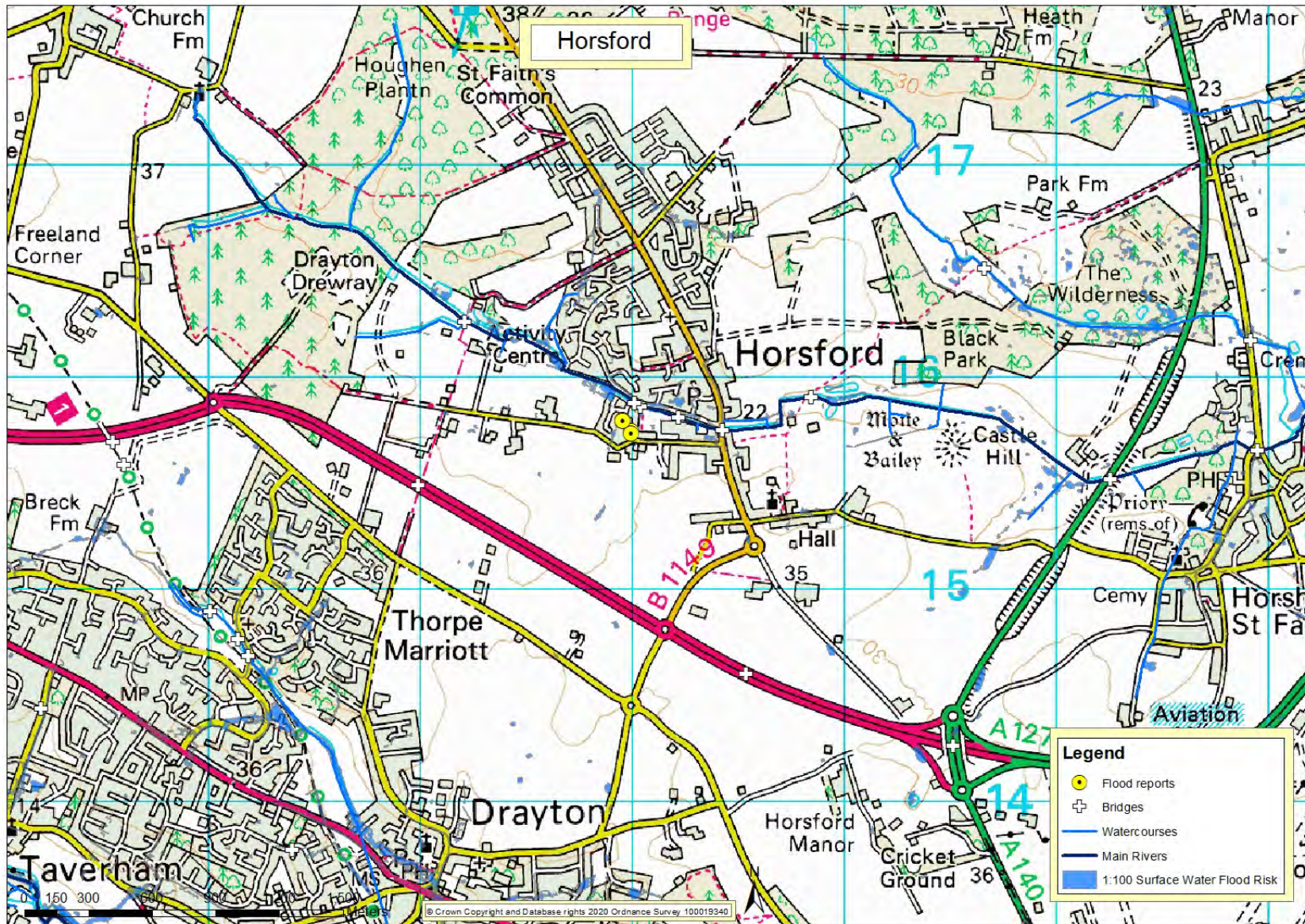
Following flooding to people, property and infrastructure

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 - communicate with affected residents where their assets have given rise to the flooding of properties.

- review the appropriateness of their response to flooding.
- determine the integrity and/or capacity of their assets where they have contributed to the flooding of properties to understand the systems role in accommodating normal rainfall events as well as mitigating flooding.
- Property owners of affected properties should seek their own legal advice.
- NCC should
 - incorporate all relevant information of actual flooding into the review of the Norfolk Preliminary Flood Risk Assessment (“PFRA”).
 - review and monitor the delivery of recommendations within this and other relevant flood investigation reports.

Location and date of flooding	Causes of flooding	Recommendation	Who has responsibilities to manage the cause(s) of the flood?
<p>Hemblington Hall Road Hemblington 23/12/2020</p>	<ul style="list-style-type: none"> Surface run-off from rainfall flowed off adjacent fields into unmaintained land drainage ditches. These flows could not be accommodated as the system was partially obstructed by debris and silt. Further downstream a culvert was blocked by debris and silt, further impeding flow. This caused the ditch to overtop and the water was directed towards the affected property. 	<ul style="list-style-type: none"> Norfolk County Council will determine an appropriate maintenance regime in line with the risk identified and communicate with affected parties and riparian owners. 	<ul style="list-style-type: none"> Landowner Norfolk County Council Highways/Bridges

Flooding and flood risk within the Horsford catchment



Flood incidents in Horsford

Within Horsford 4 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	What was the response to the flood incident
23/12/2020	<p>On the 23/12/2020 - 4 properties were internally flooded on Coltsfoot Road, Horsford. These incidents were reported by</p> <ul style="list-style-type: none"> • a resident via an online flood report form on the 11 January 2021, (FWF/21/3721) • a resident via an online flood report form on the 28/12/2020, (FWF/20/3331) • a resident via an online flood report form on the 9/01/2021, (FWF/21/3636) • a resident via an online flood report form on the 31/12/2020, (FWF/20/3344) • Landowner on the night of the event excavated a relief channel as the culvert was not coping to try and contain the surface water within the ordinary watercourse. NCC officer spoke to the landowner on the day of the site investigation. 	<ul style="list-style-type: none"> • The Fire and Rescue Service responded and pumped out during the incident. • A resident carried out measures to minimise the impact of flooding during the incident. • Norfolk County Council (Lead Local Flood Authority) visited affected residents to offer advice and to gather information after the incident. • Landowner to seek consent if there are proposing for this amendment to the watercourse to stay from Norfolk County Council LLFA.

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 has sought to use data from rain gauges where incidents of flooding are located within a 2.5 km 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 catchment

The Lead Local Flood Authority has no previous reports of internal flooding on Coltsfoot Road, Horsford.

Causes of flooding within the catchment and recommendations

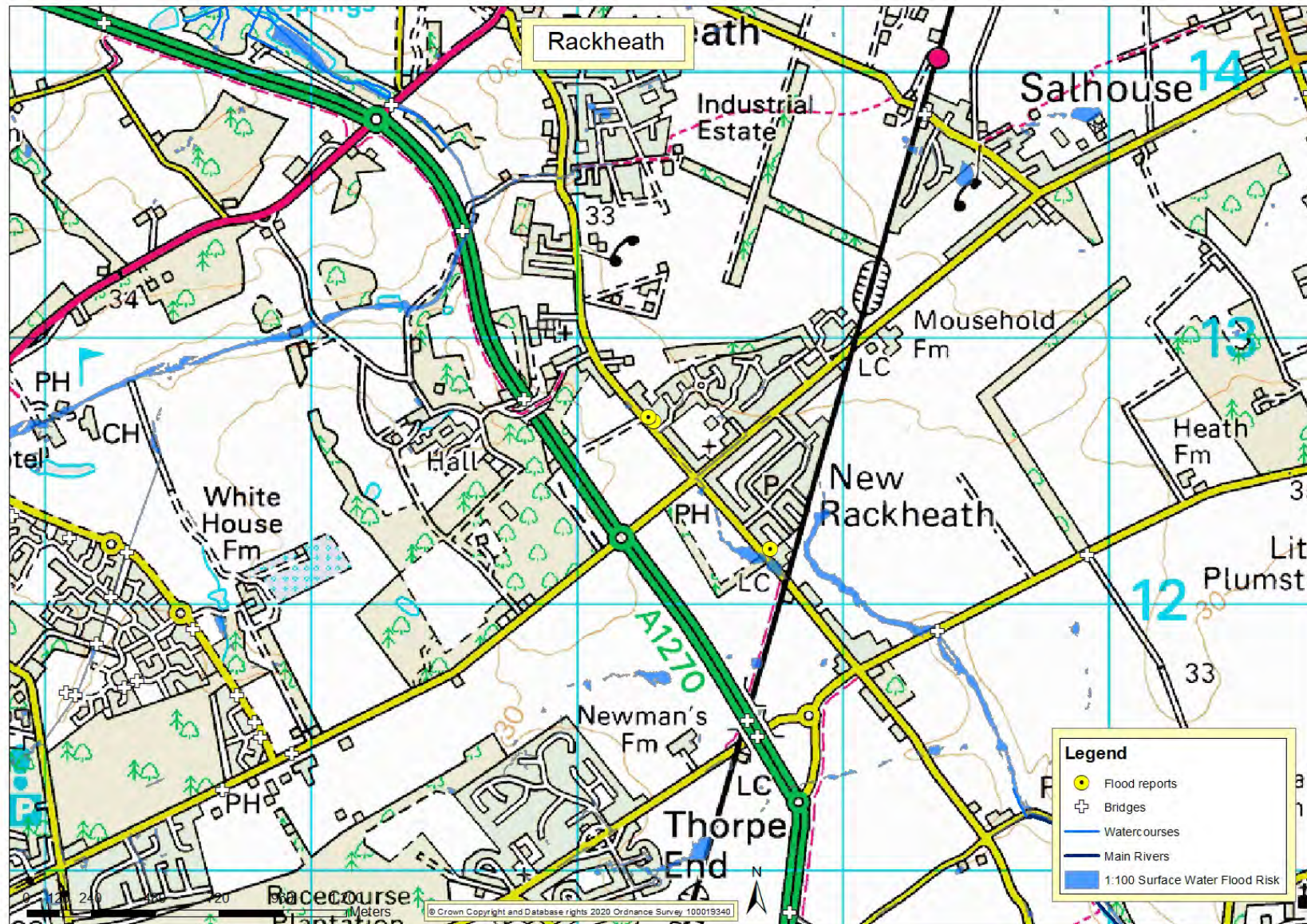
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Following flooding to people, property and infrastructure

- Risk Management Authorities should
 - communicate with affected residents where their assets have given rise to the flooding of properties.
 - review the appropriateness of their response to flooding.
 - determine the integrity and/or capacity of their assets where they have contributed to the flooding of properties to understand the systems role in accommodating normal rainfall events as well as mitigating flooding.
- Property owners of affected properties should seek their own legal advice.
- NCC should
 - incorporate all relevant information of actual flooding into the review of the Norfolk Preliminary Flood Risk Assessment (“PFRA”).
 - review and monitor the delivery of recommendations within this and other relevant flood investigation reports.

Location and date of flooding	Causes of flooding	Recommendation	Who has responsibilities to manage the cause(s) of the flood?
Coltsfoot Road, Horsford, 23/12/2020	<ul style="list-style-type: none"> • Run-off from significant rainfall was directed towards the surface water drainage network (Ordinary watercourse and Anglian Water surface water sewer). These flows could not be accommodated as the system was already overloaded. This directed flood water towards the affected properties. • The loss of pre-existing drainage features (ditches) within the catchment exacerbated the flooding. • The surface water drainage system has historically been modified and amended with various sized culverts one private and one NCC Highways owned. This has created a couple of pinch points within the system that struggle to allow free flow. 	<ul style="list-style-type: none"> • Anglian Water should work with landowners to identify the potential for managing the amount or rate of surface water entering their drainage system in flood events. • Anglian Water Highways should review the capacity & level of maintenance required to sustain the design efficiency of their drainage systems that serve the flooding location in line with the risk identified. Anglian Water should assess whether the capacity of the current system is able to provide protection that aligns with British standards. This may require a survey of the system being undertaken. 	<ul style="list-style-type: none"> • Landowners • Anglian Water • NCC (Highways)

Flooding and flood risk within the Rackheath catchment



Flood incidents in Rackheath

Within Rackheath 3 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	What was the response to the flood incident
24/12/2020	On the 24/12/2020 - 2 properties were internally flooded on Green Lane West, Rackheath. These incidents were reported by <ul style="list-style-type: none">• a resident via a flood questionnaire on the 31/01/ 2021, (FWF/20/3727)• a resident via a flood questionnaire on the 27/01/2021, (FWF/20/3729)	<ul style="list-style-type: none">• The Fire and Rescue Service responded and pumped out during the incident.• Norfolk County Council (Lead Local Flood Authority) visited affected residents to offer advice and to gather information after the incident.
24/12/2020	On the 24/12/2020 - 1 property was internally flooded on Green Lane East, Rackheath. This incident was reported by <ul style="list-style-type: none">• a resident via personal communication on the 15/03/2021, (FWF/21/4085)	<ul style="list-style-type: none">• Norfolk County Council (Highways) visited affected residents to offer advice and to gather information after the incident.• Norfolk County Council (Lead Local Flood Authority) visited affected residents to offer advice and to gather information 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 has sought to use data from rain gauges where incidents of flooding are located within a 2.5 km 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 catchment

The Lead Local Flood Authority has no previous reports of internal flooding on Green Lane East or Green Lane West, Rackheath.

Causes of flooding within the catchment and recommendations

The findings of the investigation are detailed on the following pages. The first table details the causes that led to flooding within the catchment as well as when and where they were experienced. It also sets out which Risk Management Authorities have responsibility to help manage the causes of the flooding. The second table sets out recommendations to mitigate the causes and impacts of the flooding experienced within this catchment.

Following flooding to people, property and infrastructure

- Risk Management Authorities should
 - communicate with affected residents where their assets have given rise to the flooding of properties.
 - review the appropriateness of their response to flooding.
 - determine the integrity and/or capacity of their assets where they have contributed to the flooding of properties to understand the systems role in accommodating normal rainfall events as well as mitigating flooding.
- Property owners of affected properties should seek their own legal advice.
- NCC should
 - incorporate all relevant information of actual flooding into the review of the Norfolk Preliminary Flood Risk Assessment (“PFRA”).
 - review and monitor the delivery of recommendations within this and other relevant flood investigation reports.

Location and date of flooding	Causes of flooding	Recommendation	Who has responsibilities to manage the cause(s) of the flood?
<p>Green Lane West 24/12/2020</p> <p>Green Lane East 24/12/2020</p> <p>Rackheath</p>	<ul style="list-style-type: none"> • Surface run-off from rainfall flowed off adjacent fields along overland flowpaths and the highway and onto the accesses of affected properties that were situated lower than these features. • Run-off from rainfall was directed towards the surface water drainage network. These flows could not be accommodated as the system is not designed to take field run off. This directed flood water towards the affected properties. • Vehicles using the highway passed through the flood water causing it to wash towards the affected properties. 	<ul style="list-style-type: none"> • Norfolk County Council will 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 should work with local landowners to identify the potential for managing the amount or rate of surface water entering their drainage system in flood events. 	<ul style="list-style-type: none"> • Norfolk County Council (LLFA) • Norfolk County Council (Highways)

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.

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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;

- Basements and below ground level floors are included.
- Garages are included if in the fabric of the building. Garages adjacent or separate from the main building are not included.
- 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.

- ‘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.
- ‘Groundwater’ means all water which is below the surface of the ground and in direct contact with the ground or subsoil.
- ‘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.

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)

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

2. District Councils

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

3. Internal Drainage Boards ("IDBs")

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

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

- Powers to undertake works to manage water on the highway and to move water off the highway.
- Enforcement powers to unauthorised alterations, obstructions and interferences with highway drainage.
- Have responsibilities for culverts vested in the highway. Currently NCC 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

- Undertake cost beneficial capital schemes to alleviate or eliminate flooding where the flood event is associated with a failure of their assets.
- Duty to provide, improve, maintain and operate systems of public sewers and works for the purpose of effectually draining an area.
- Are responsible for flooding from their foul, combined and surface water sewers, and from burst water mains.
- 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.
- 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.
- Duties as a Category 2 Responder for Emergency Planning.

6. Riparian Owners

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