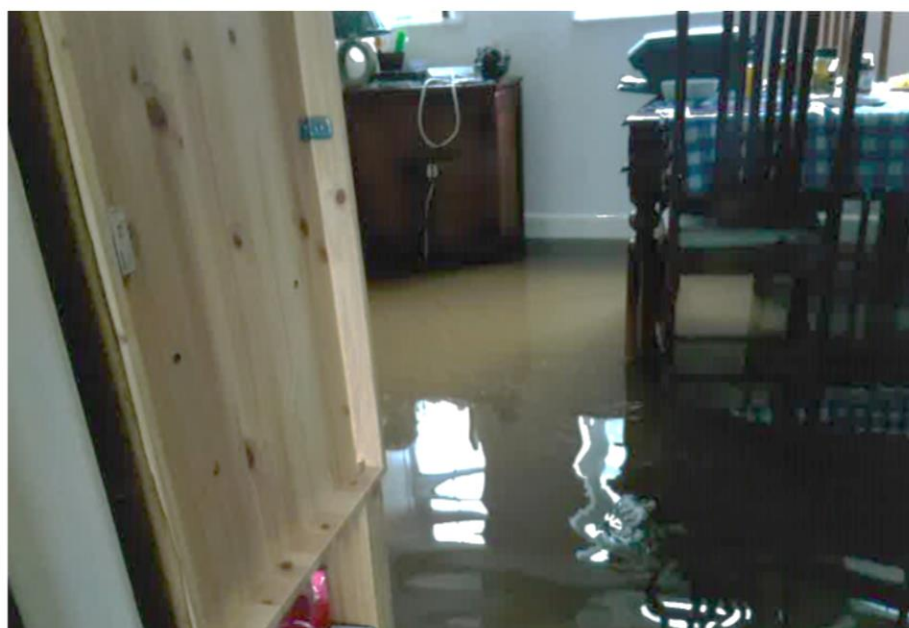




Investigation Report into the County Wide flooding in Norfolk on 6th October 2019 – Added Properties

Report Reference: FIR052

Draft Report prepared Oct 2020



Executive Summary

This report is an addition to the original [Flood Investigation Report](#) on the Flooding (Norfolk - 6 October 2019 - FIO48) that occurred across Norfolk on the 6th October 2019. The addition of this report is due to a number of properties having been reported to Norfolk County Council after the publication of the original report. A total of 102 properties have confirmed internal flooding on this day and 1 critical road was closed in two places due to flooding. 9 of these reports are included in this investigation.

Prior to the flooding on the 6th October there was a high amount of rainfall in the last week and a half of September. Across the East, in September the area received 131% of its monthly long-term average for rainfall, with some areas, such as North West Norfolk, experiencing 151% of its long-term rainfall. This meant that many watercourses were already experiencing high flows and the water table was elevated. On the 6th October some areas experienced up to 69mm of rainfall, meaning many areas experienced a months' worth of rainfall in one day.

We would like to acknowledge and thank staff from the Environment Agency who supported the LLFA in providing information and guidance to residents in response to the flooding that occurred on the 6th October 2019.

(a) Flooding incidents and causes

The flooding that occurred in Broadland was caused by:

- Surface run off from significant rainfall falling on impermeable areas
- An overloaded drainage network
- Significant rainfall

The flooding that occurred in South Norfolk was caused by:

- Significant rainfall
- Obstructed land drainage systems
- An overloaded foul drainage network

The flooding that occurred in Great Yarmouth was caused by:

- Increased run off from significant rainfall
- An overloaded drainage network

The flooding that occurred in North Norfolk was caused by:

- Rainfall pooling at a low point within the catchment
- Reduced capacity of a ditch due to vegetation

(b) Key recommendations

The recommendations set out in the report have been summarised below. Specific recommendations for each individual catchment are set out within the report. Please note a number of these recommendations have already been followed up by the respective organisations identified. Progress against these recommendations will be assessed as part of an addendum to this report to be undertaken a year from the date of publication of this report.

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.

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.
- Work with property owners to consider opportunities to route flood water on the highway away from 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.

It was deemed necessary to complete a formal investigation report into the flooding in Broadland and South Norfolk in 6th October 2019 as:

- multiple residential properties were internally flooded.

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.

Flood incidents within Broadland.

Within this district, 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
06/10/2019	On the 6 th October 2019, 2 properties were internally flooded on Norwich Road, Strumpshaw. These incidents were reported by: The Fire and Rescue Service via an electronic report on the 7 th October 2019, (1348, 1341)	<ul style="list-style-type: none">Residents carried out measures to minimise the impact of flooding during the incident.Norfolk County Council visited affected residents to offer advice and to gather information after the incident.Anglian Water Services Ltd carried out measures to relieve the overloaded drainage system after the incident.Norfolk County Council carried out maintenance work to the highway drainage system after the incident.NCC Highways attended to alleviate the severity of the flooding through the use of suction tankers to remove surface water.
06/10/2019	On the 6 th October 2019, 1 property was internally flooded on Hallgate, Great & Little Plumstead. This incident was reported by: The Fire and Rescue Service via an electronic report on the 27 th November 2019, (1539)	<ul style="list-style-type: none">The Fire and Rescue Service responded and pumped out during the incident.Norfolk County Council visited affected residents to offer advice and to gather information after the incident.
06/10/2019	On the 6 th October 2019, 1 property was internally flooded on Pikeman Place. This incident was reported by: A resident on the 10 th March 2020, (2256)	<ul style="list-style-type: none">Norfolk County Council assessed the validity and impact of the report.
06/10/2019	On the 6 th October 2019, 1 property was internally flooded on Heggatt Street, Horstead with Stanninghall. This incident was reported by: The Fire and Rescue Service via an electronic report on the 27 th November 2019, (1546)	<ul style="list-style-type: none">The Fire and Rescue Service responded and pumped out during the incident.Norfolk County Council 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.

1 of the incidents of internal flooding in this district is within 2.5km of a rain gauge. 67mm rainfall was recorded as falling in 9 hours 15 minutes at the Belaugh rainfall monitoring station. This intensity of rainfall for the total duration equates to a 40 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
Various	In the 13 years that the resident has lived in Hallgate, Great & Little Plumstead, it has flooded 5 times. The water pools in the driveway in any rainfall event.	Unknown
Various	There have been several historical flood events along Norwich Road . The residents have invested in numerous property protection measures as a reaction to this.	Moderate to heavy rainfall

Background and update on actions taken in relation to flooding on Norwich Road, Strumpshaw

The first reported incident of flooding received by the Lead Local Flood Authority (LLFA) at this location was in 2015, although it is known that this location has a long history of flooding that pre dates 2015. In response to the first flood report received by the LLFA a Flood Investigation Report which can be found [here](#) (*'Strumpshaw - Norwich Road – 2015, Ref: Y/5/14/000467'*) was published that identified the causes of and recommendations to reduce the flood risk at this location. Since then Norfolk County Council have worked alongside Anglian Water, the District Council, Parish Council and property owners to reduce the risk at this location.

The reasons for the flooding at this location are due to a number of factors, that in combination cause flooding, but no one single factor can be attributable to the cause of the flooding. Furthermore, the responsibility for reducing the impact and severity of flooding at this location requires action by a number of organisations and individuals including the County Council, Anglian Water, the District & Parish Councils, local residents and those directly affected by the flooding. As such this flood investigation report will be used to communicate and assist in reducing the flood risk by all those involved.

It should be acknowledged that there is an underlying risk as evidenced by the existing mapped surface water flowpath as outlined on the [Environment Agency Risk of Surface Water Flooding Maps](#). This causes surface water to flow from the upper catchment and pool at this location during rainfall events. Therefore, this location, regardless of the mitigation carried out will always have a level of residual risk.

Due to existence of naturally occurring surface water flowpath, any changes that increase the amount of surface water at this location will further exacerbate this risk. As such factors that have increased the risk at this location include:

- the loss of drainage features (e.g. pond)
- an increase in impermeable area within the location of the property and more widely
- mis-connections to the foul water network.

As stated previously, the responsibility for reducing the impact and severity of flooding at this location is the responsibility of a range of organisations and individuals. As such a number of actions have been taken forward in response to the recommendations contained within the Flood Investigation Report published in 2015 ('Strumpshaw - Norwich Road – 2015, Ref: Y/5/14/000467') and are as follows;

Norfolk County Council have:

- have informed affected residents of the availability of grants for property level protection measures.
- been informed that there are no additional connections across the property from the highway ditch to a wider system.
- been informed that the adjacent landowner has amended their land management techniques to reduce the risk of surface water increasing the risk at the current location.
- as statutory consultee to the planning process, informed the local planning authority of the existing flood risk in relation consultations.

In addition, Anglian Water have:

- Provided flood protection measures to the flooded property e.g. Non-Return Valve and flood boards
- Assessed the opportunities to remove or reduce the amount of surface water entering the foul system, however these were not considered viable as they would have either:
 - Redirected the risk of foul sewer surcharging elsewhere
 - Reduced the amount of surface water entering the system and increase the amount that would pool at the flooded location.

In summary, actions by all parties carrying out recommendations (as detailed on the map on page 10) will support the reduction in the impact and severity of flooding. However, the underlying flood risk from the overland surface water flowpath will continue to pose a risk. It is therefore important that additional property level resilience measures e.g. flood doors will still need to be considered.

Causes of flooding within the catchment and recommendations

The findings of the investigation are detailed on the following pages. The maps detail the causes that led to flooding for each incident 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 maps set out recommendations to mitigate the causes and impacts of the flooding experienced at each property.

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

Flooding on Norwich Road

Location: **Norwich Road, Strumpshaw**

Norwich Road– Report of internal flooding on 6th October to two properties and external flooding to neighbouring properties.

Causes –

- Run-off from significant rainfall pooled at a low point within the catchment affecting properties.
- Significant rainfall was concentrated on the highway. Vehicles using the highway passed through the flood water causing it to wash towards the affected properties.
- Run-off from significant rainfall was directed towards the surface water drainage network. These flows could not be accommodated as the system was already overloaded due to obstruction in the system by debris. This directed flood water towards the affected properties.
- Due to the overloaded surface water system, significant rainfall was directed into the foul system causing it to surcharge elsewhere. This surcharging contributed to the flooding at the affected properties.
- The loss of pre-existing drainage features (a pond on an adjacent field) within the catchment exacerbated the flooding.
- Increase in impermeable areas, both with the property, and wider development elsewhere within the catchment.

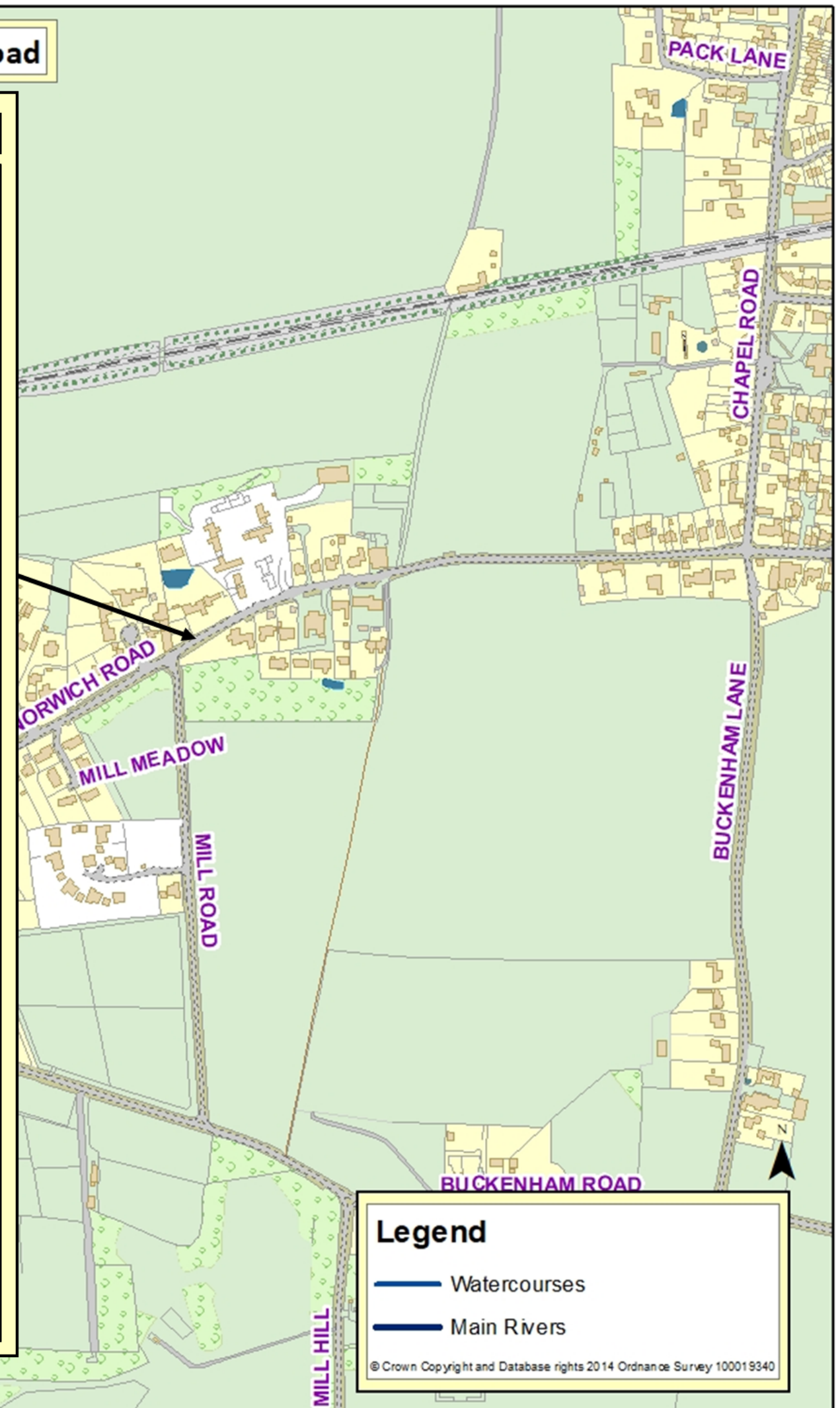
Recommendations –

- NCC Highway Design will carry out a feasibility study into managing the contributing area of surface water from the highway drainage system.
- NCC will review the 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 work with partner organisations to identify the potential for managing the amount or rate of surface water entering their drainage system in flood events
- Where it is determined that there is insufficient capacity in the public foul sewer system due to the inappropriate connection of surface water drainage and/or there is an interruption in the surface water system the relevant organisations (such as Anglian Water and the Lead Local Flood Authority) could work together with other RMAs, organisations and residents to mitigate these issues. This work could include feasibility studies that identify possible improvements into existing systems and identify the removal of surface water to alternative points of discharge. This could include a range of mechanisms both within the private property and externally.
- Property owners should further protect their buildings through flood protection measures where appropriate. NCC will communicate with local 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 for measures to be approved through national funding schemes.

Local Planning Authority should:

- note that there is an automatic right to connect to the public sewer and despite Anglian Water not being a statutory consultee to the planning process LPAs should include Anglian Water in discussions to ensure approvals incorporate appropriate mitigation
- seek potential drainage improvements through the approval of planning applications within the local catchment. The evidence and lessons learnt from past flooding and drainage surveys need to be incorporated into any possible drainage strategy identified for the proposed development. These will, where appropriate, be provided by the relevant RMA (e.g. LLFA) as part of the planning application consultation process and through more detailed discussions between RMAs and developers.

0 50 100 200 300 400 500 Meters



Legend

- Watercourses
- Main Rivers

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Flooding in Great Little Plumstead

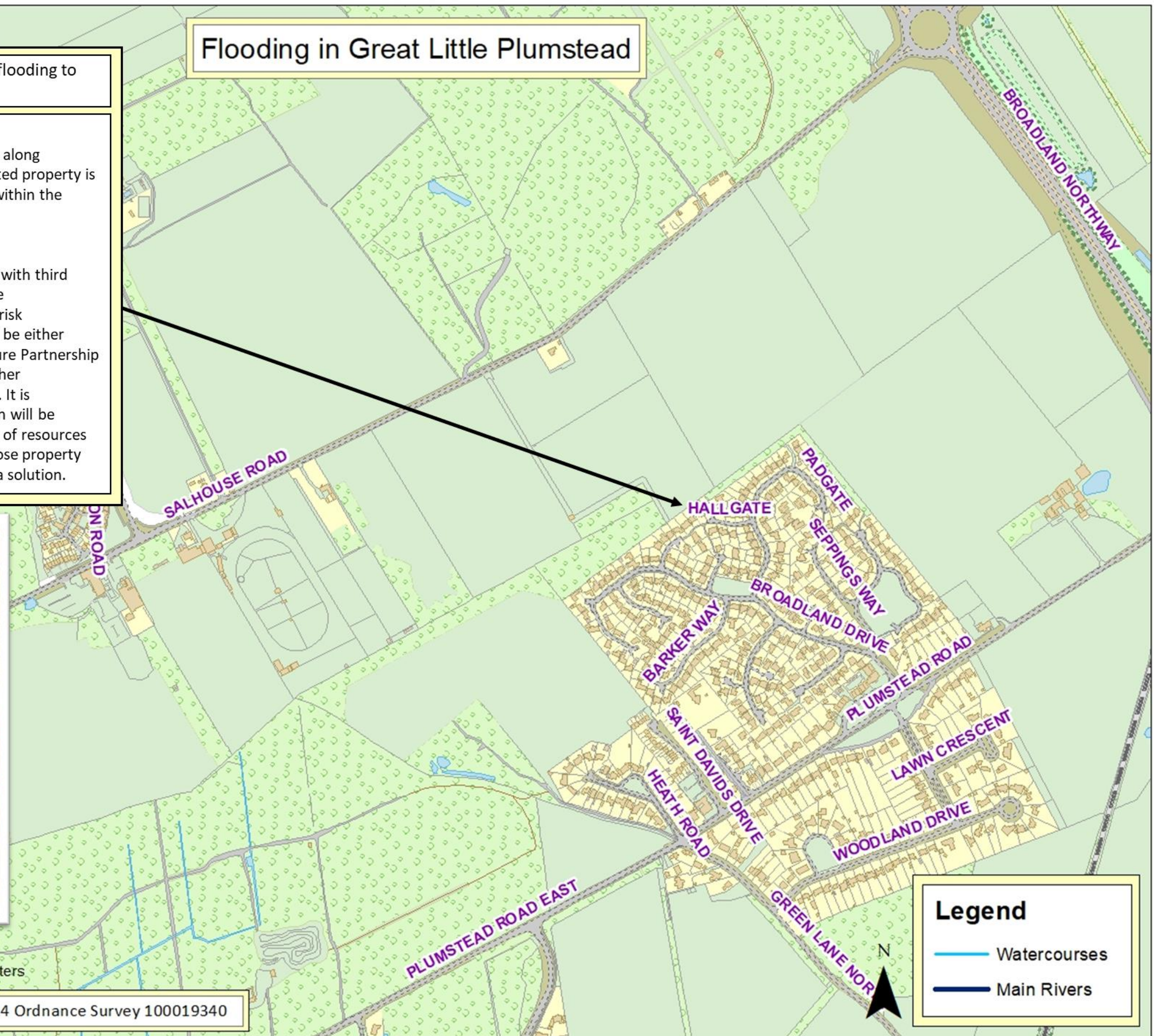
Location: **Hallgate** – Report of internal flooding to one property on 6th October 2019

Causes –

- Run-off from rainfall was concentrated along overland flowpaths on which the affected property is adjacent to and pooled at a low point within the catchment.

Recommendations –

- Norfolk County Council will investigate with third parties the potential to fund small scale improvement schemes to mitigate the risk experienced at this location. This could be either through the 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.



Legend

- Watercourses
- Main Rivers

Flooding in Horstead

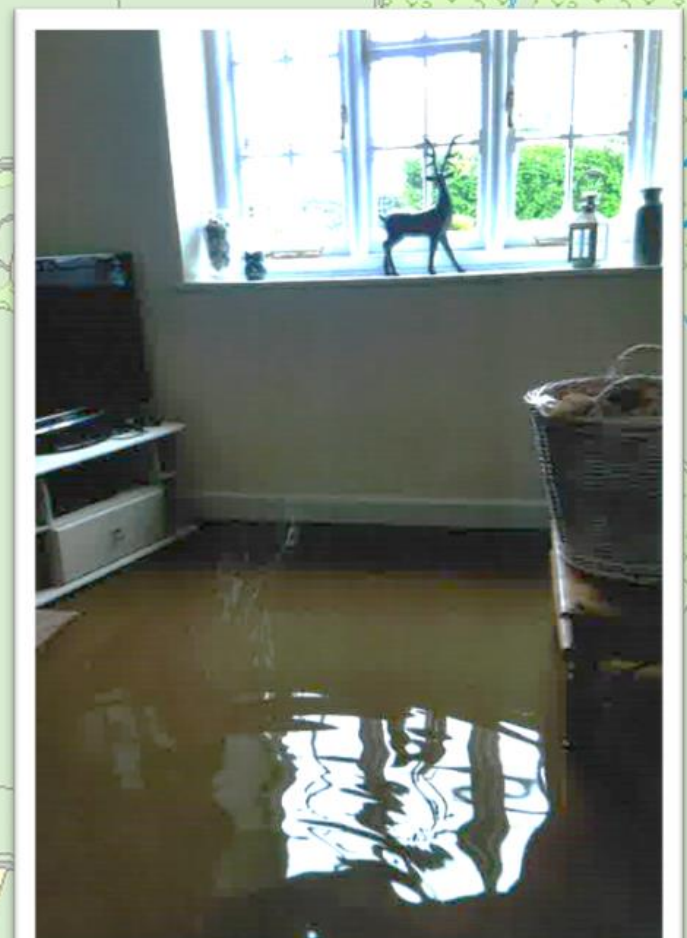
Location: **Heggatt Street- Report of internal flooding to one property on 6th October 2019**

Causes –

- Run-off from significant rainfall pooled at a low point within the catchment affecting property.
- Surface run-off from significant rainfall flowed off nearby fields and onto the accesses of affected properties that were situated lower than these features.

Recommendations –

- Property owners should protect their buildings through flood protection measures where appropriate. Norfolk County Council will communicate with local 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.
- Norfolk County Council could approach landowners to seek improvements in land management to reduce the levels of run-off from agricultural land.



0 250 500 Meters

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Legend

- Watercourses
- Main Rivers

Flooding on Pikeman Place

Location: Pikeman Place, Thorpe St Andrew

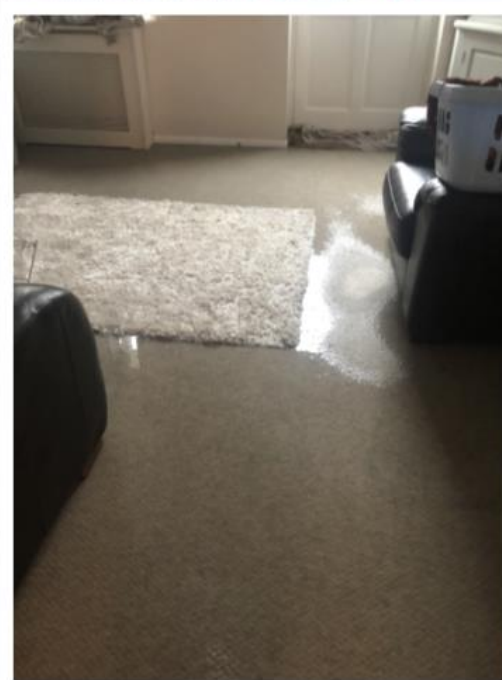
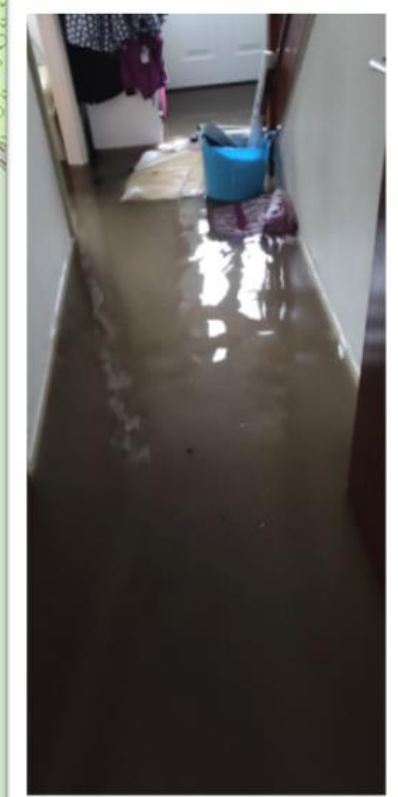
Pikeman Place— Report of internal flooding on 6th October to two properties and external flooding to neighbouring properties.

Causes –

- Surface run off from significant rainfall was concentrated along overland flow paths from a neighbouring field pooling at a low point in the catchment. This run off brought silt from the field into the Anglian Water and Norfolk County Council drainage networks causing an obstruction to flow.
- The flood water entered the property through low thresholds at entrances.

Recommendations –

- Norfolk County Council will work with adjacent landowners to remove the risk of debris being directed into the drainage systems.
- Norfolk County Council and Anglian Water should work together to identify the potential for managing the amount or rate of surface water entering their drainage systems in flood events.
- Property owners should protect their buildings through flood protection measures where appropriate. Norfolk County Council will communicate with local 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 for measures to be approved through national funding schemes.



Flooding incidents within South Norfolk.

Within this catchment 2 incidents of internal flooding to one property 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
06/10/2019	On the 6 th October 2019 – 1 property was internally flooded on Ferry Road, Surlingham. This incident was reported by: The Fire and Rescue Service via an electronic report on the 27 th November 2019, (1535)	<ul style="list-style-type: none">• The Fire and Rescue Service provided advice during the incident.
09/12/2019	On the 9 th December 2019 this property flooded again. This incident was reported by: A resident via a flood questionnaire on the 16 th December 2019, (1726)	<ul style="list-style-type: none">• Norfolk County Council 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.

The affected property was just outside the range of the nearest rain gauge. However, it should be noted that there were a number of properties internally flooded within the district of Broadland and the nearest rain gauge at Belaugh registered a 1:40 year rainfall return period.

Historic flooding incidents

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

Date of incident	Impact	Rainfall intensity
Various	The resident reported a persistent flooding problem since their property had been connected to the main Anglian Water foul drainage network.	Unknown

Causes of flooding within the catchment and recommendations

The findings of the investigation are detailed on the following pages. The map details the causes that led to flooding at the property. It also sets out which Risk Management Authorities have responsibility to help manage the causes of the flooding. The map sets out recommendations to mitigate the causes and impacts of the flooding experienced.

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.

Flooding in Surlingham

Location: Ferry Road- Report of internal flooding to one property on 6th October 2019

Causes –

- The land drainage system was partially obstructed by debris and overgrown vegetation. This reduced the capacity of the upstream drainage system contributing to flooding at the affected property.
- Run-off from rainfall was directed towards the Anglian Water foul drainage network which the property has recently been connected to. The affected property is at the end of this drainage network. The flows could not be accommodated as the system was already overloaded. This led to surcharging of the drainage system inside the property.

Recommendations –

- The Water Management Alliance should carry out maintenance works to allow more capacity in flood events.
- Anglian Water should work with partner organisations to identify the potential for managing the amount or rate of surface water entering their drainage system in flood events. Anglian Water should consider the potential to install a non-return valve at the property.

Legend

- Watercourses
- Main Rivers

0 45 90 180 270 360 450 Meters

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Flooding incidents in Bradwell.

Within this parish 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
06/10/2019	On the 6 th October 2019, 1 property was internally flooded on Lords Lane, Bradwell. This incident was reported by: The Fire and Rescue Service via an electronic report on the 27 th November 2019, (1532).	<ul style="list-style-type: none">Norfolk County Council assessed the validity and impact of the flood report.

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
28/08/2016	Water flowed off the road	Heavy rain
19/07/2017	Water flowed off the road	Heavy rain

Causes of flooding within the catchment and recommendations

The findings of the investigation are detailed on the following pages. The map details the causes that led to flooding within Bradwell 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 map sets out recommendations to mitigate the causes and impacts of the flooding experienced within Bradwell.

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.

Update on actions taken in relation to flooding in Bradwell

Norfolk County Council Highways have started design work on a project to improve surface water drainage along Lords Lane and Church Lane, Bradwell. New road gullies will be installed as part of these works which should alleviate pressure on the drainage system and reduce run off pooling at the low point within which the affected property is located.

Flooding in Bradwell

Location: **Lords Lane**

Lords Lane— report of internal flooding to one critical service on the 6th October 2019.

Causes –



- Run-off from significant rainfall was concentrated along overland flowpaths and pooled at a low point within the catchment affecting the property.
- The run-off from was directed towards the drainage network. These flows could not be accommodated as the system was already overloaded. This directed flood water towards the affected property. Due to the development of impermeable surfaces localised ground conditions caused run-off to be directed quickly from where it fell as to low points causing localised pooling.

Recommendations—

- 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.
- Property owners should protect their buildings through flood protection measures where appropriate. Norfolk County Council should work with partner organisations to communicate with and support residents in identifying and accessing funding for property level measures. 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. Property Owners should consider the potential to retrofit permeable areas and other methods of small scale sustainable drainage systems.



Legend

-  Watercourses
-  Main Rivers

Flooding incidents in Stalham, North Norfolk

Within this parish 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
06/10/2019	On the 6 th October 2019, 1 property was internally flooded on Upper Staithe Road, Stalham. This incident was reported by: The resident via an email on the 5 th March 2020, (2247).	<ul style="list-style-type: none">• Norfolk County Council assessed the validity and impact of the flood report.• Resident has cleared a nearby private ditch that has improved the drainage capacity in the area.• The resident undertook measures to reduce the impact of the flooding.

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:

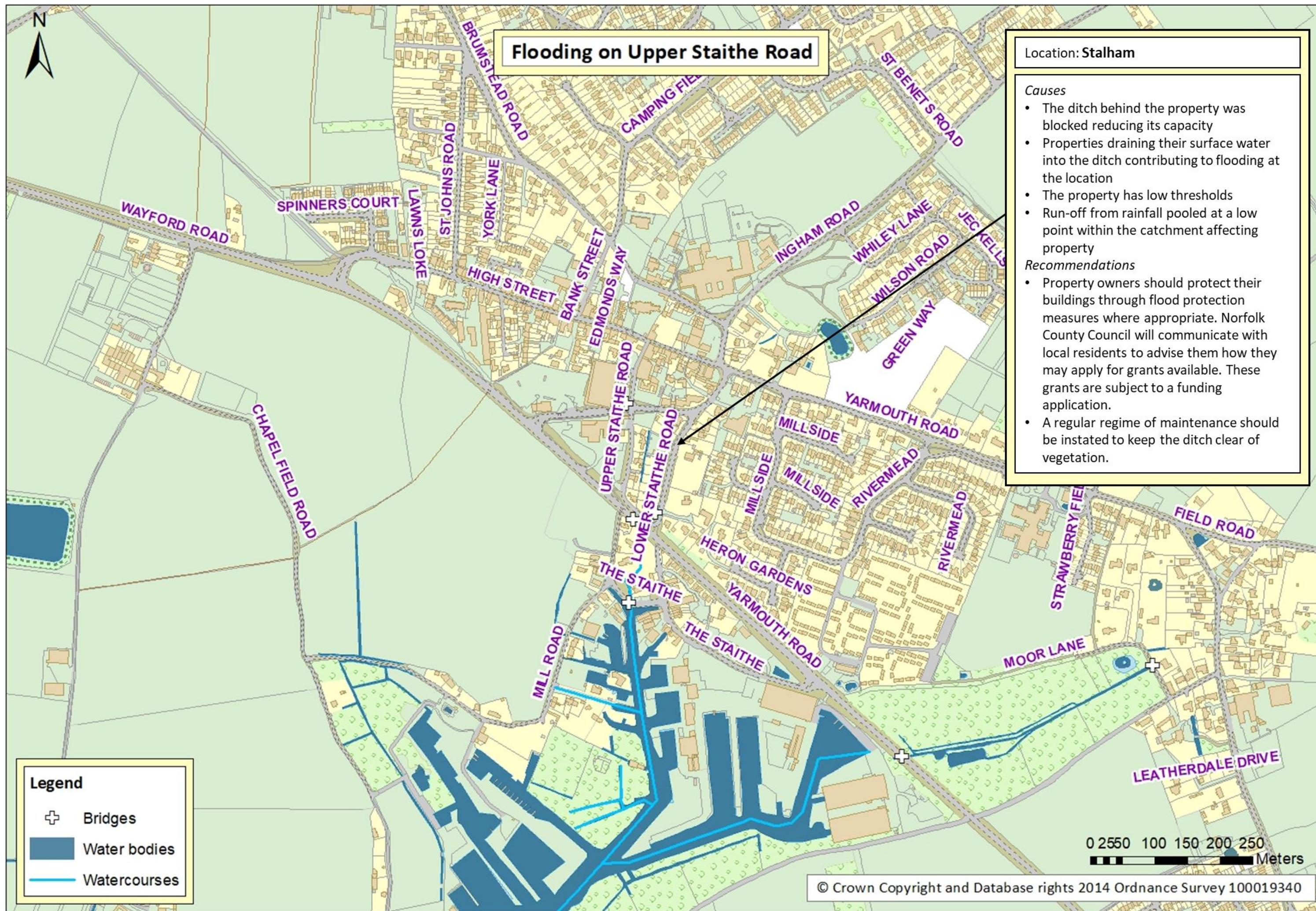
Date of incident	Impact	Rainfall intensity
2003 – 2004	Property was internally flooded	Unknown
2014 – 2015	Property was internally flooded	Unknown
29 th November 2016	Property was internally flooded	Unknown
09 th May 2018	Property was internally flooded	Unknown
02 nd June 2018	Property was internally flooded	Unknown
4 th June 2018	Property was internally flooded	Unknown
30 th April 2018	Property was internally flooded	Unknown
23 rd June 2016	Property was internally flooded	Unknown

Causes of flooding within the catchment and recommendations

The findings of the investigation are detailed on the following pages. The map details the causes that led to flooding within Stalham 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 map sets out recommendations to mitigate the causes and impacts of the flooding experienced within Bradwell.

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.



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.

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.