



On behalf of: **Lincolnshire**
COUNTY COUNCIL
Working for a better future

Investigation into the flooding in Wainfleet in June 2019

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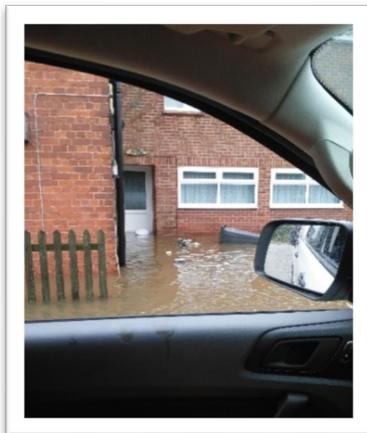


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1 Executive Summary

1.1 Summary

The Steeping River is located in East Lincolnshire and drains almost 200km² of the Wolds. The elevation of the area is only slightly above sea level with extensive areas of reclaimed peat and marshland. As a result, this region has a long history of flood risk. In the 1970s a flood relief channel was built to provide flood storage in the lower reaches of the Steeping River system, particularly during periods of tide lock.

On the 9th June 2019, the Met Office issued a yellow weather warning for North East Lincolnshire. On the 11th June at 08:20 a flood alert was issued for the Steeping River. Wainfleet All Saints Flood Warning was issued at 23:36 on 11th June 2019 and Great Steeping Flood Warning was issued at 23:12 on 12th June 2019. Over the next few days 1000 people were evacuated from their homes, extensive overtopping culminated in a breach in the bank of the relief channel on 12th June. The Strategic Command Group declared an emergency incident.

The various pumping stations in the region were struggling to cope with the amount of water and on the 12th June Thorpe Culvert pumping station had to be turned off for one hour. On the 13th June, evacuation of the area commenced, a MACA (Military Aid to the Civil Authorities) request was sent to plug the breach in the relief channel and the first helicopter arrived on scene filling the breach by a third which consisted of 40 tonnes of material. By midnight on the 14th June, the breach had been sealed placing a total of 270 tonnes of material. On the 15th June more overtopping in the breach location led to a second military assistance request. A further 290 properties were evacuated as a precaution.

The affected properties were flooded from three sources: main river, ordinary watercourses and surface water. The area saw unusual levels of rainfall but, it is considered that the impact would have been significantly lessened had the breach not occurred. Although the relief channel has historically overtopped, the banks have not been known to breach before.

1.2 Flooding Incidents and Causes

This report has investigated the flood event that ensued and includes the internal flooding of 88 properties located across the East Lindsey District within the following parishes:

- Wainfleet All Saints (45);
- Thorpe St Peter, Thorpe Culvert & Firsby (18);
- Partney, Hundelby & Greetham (3);
- Great Steeping (13);
- Croft (6);
- Burgh Le Marsh (3) Please note these properties fall outside of the Steeping catchment but have been included.

Across the area, 580 homes were evacuated over 6 days affecting around 1000 people.

The majority of properties affected were flooded by main river sources. The flooding that occurred led to the internal flooding of 61 properties.

A number of properties affected were flooded by surface water. The flooding that occurred led to the internal flooding of 14 properties.

Of the remaining properties, 2 were flooded by ordinary watercourses, 9 by multiple sources and 2 properties are unknown.

Principal Causes:

The embankments alongside the relief channel, built after the flood event of 1968, are constructed from the arisings excavated in constructing the relief channel. They do not afford the protection of a newly constructed flood defence.

In March and May 2019, maintenance works were undertaken at the breach location. The work involved removing vegetation from the banks and filling in (with bare soil) rutting caused by cattle grazing and vehicle damage. However, the bank crest levels were not reduced during the operation and the grassed areas either side of the ruts were left untouched. It is standard practice for works of this nature to be undertaken at this time of year. However, it is worth noting that the majority of high rainfall events that we have information on also occurred during the summer months.

Significant rainfall fell across the catchment, particularly during the 10th and 11th of June which caused overtopping over an extended length of the bank. The breach formed as water flowed down the rear side of the bank and eroded away until insufficient support remained. The breach event exacerbated the impact and scale of the flooding.

Other Factors:

The relief channel splits the flow of the Steeping River, rather than acting as an overflow when river levels are high. The river system also contains a number of constrictions such as syphons and sluice gates and has periods of tide locking. This may slow the flow of the river and lead to increased siltation. The level of silt in the relief channel was a potential contributory factor in water levels reaching higher levels sooner.

Water levels in the Steeping River system, including the relief channel, are kept at a higher level during the summer months to allow for water abstraction.

Areas of river bank had been grazed by cattle which had caused some damage that was still evident on a site visit after the flood event (sheer banks in vicinity of breach). This may have weakened the bank, caused erosion and made it more susceptible to breaching.

The impact of the breach was compounded by the water flowing towards the railway line which acted as a conduit directing water across the wider catchment

Significant rainfall was directed into the surface water and foul drainage systems. This caused the network to surcharge. Flows that exceeded the system's capacity contributed to the flooding.

Other Issues Raised:

Although evidence of badger activity was present in places along the relief channel, we have found no direct evidence of badger activity at the breach location.

1.3 Recommendations

The recommendations made below have been assigned to the relevant Risk Management Authority (RMA). However, it is envisaged that the responsibility for reviewing, disseminating and implementing these recommendations will be shared collectively by the RMA's; with Lincolnshire County Council, as Lead Local Flood Authority (LLFA), monitoring the implementation.

Lincolnshire County Council – Lead Local Flood Authority:

- Facilitate the review; dissemination and implementation of the findings and recommendations contained within this Section 19 investigation;
- Continue to improve partnership working between RMA's through reviewing the current roles and responsibilities of Lincolnshire RMA's; considering the 2019 flooding in Wainfleet and the updated Joint Lincolnshire Flood Risk and Drainage Management Strategy 2019-2050;
- Continue to work in partnership with landowners and the community to manage flood risk and promote best practice in relation to land management and property flood resilience;
- Develop an Emergency Plan for Wainfleet and the surrounding villages in conjunction with RMA's, landowners, partner organisations and residents.

The Environment Agency:

- Assess the condition of existing raised embankments along the Steeping River and relief channel and consider the technical and financial feasibility of replacing these with new flood embankments. In doing so also consider the longer-term standard of protection and whether further mitigation measures are required;
- Continue to work in partnership with RMA's to identify funding for flood mitigation measures and engage with residents, landowners and partner organisations to implement the measures identified;
- Monitor silt levels and vegetation growth in the Steeping River and relief channel and establish the benefits operational changes could provide, including: regular or one-off dredging of channels; reconfiguring the relief channel so that it is only in use during high flow events; and re-establishment and/ or reconfiguration of in channel sluices;
- Review maintenance regime for existing embankments along the Steeping River and the relief channel including the nature and timing of routine and future maintenance works and the risk should these coincide with periods of high-water levels;
- Continue to work in partnership with local landowners to improve land management practices in the Steeping River catchment, including: limiting the amount of sediment from adjacent farmland entering land drains and watercourses; controlling cattle access to river banks and provision of alternative drinking stations; and managing the effects of burrowing animals on the existing embankments.

Internal Drainage Board (IDB):

- Continue to work in partnership with other RMA's, residents, landowners and partner organisations to identify and implement flood mitigation measures and develop plans to manage flood risk;
- In conjunction with other RMA's review the operational performance (e.g resilience) of existing pumping stations and IDB assets that interact with the Steeping River and relief channel and establish the benefits that operational changes could provide.

Anglian Water (AW):

- Continue to work in partnership with other RMA's, residents, landowners and partner organisations to identify and implement flood mitigation measures and develop plans to manage flood risk;
- In conjunction with other RMA's review the operational performance (e.g resilience) of existing AW assets in the Steeping River catchment and establish the benefits that operational changes could provide; to reduce surface water flood risk for example.

Partner Organisations:

- Continue to work in partnership with RMA's, landowners and residents in the development and implementation of flood mitigation measures and plans to manage flood risk.

Landowners:

- Continue to work in partnership with RMA's, partner organisations and residents in the development and implementation of flood mitigation measures and plans to manage flood risk;
- Continue to work in partnership with RMA's to adopt best practice land management in the Steeping River catchment, including: limiting the amount of sediment from adjacent farmland entering land drains and watercourses; controlling cattle access to river banks and provision of alternative drinking stations; and managing the effects of burrowing animals on the river embankments.

Residents:

- Continue to work in partnership with RMA's, partner organisations and landowners in the development and implementation of flood mitigation measures, including adopting best practice in property flood resilience, to manage flood risk;
- Continue to work in partnership with RMA's, partner organisations and landowners in the development of an Emergency Plan for Wainfleet and the surrounding villages.

2 Justification for Flooding Investigation

Lincolnshire County Council (LCC) is a Lead Local Flood Authority (LLFA) as designated by the Flood and Water Management Act (FWMA) 2010 which places two duties upon them when flooding occurs:

FWMA 2010 section 19 – Local authorities: Investigations

- 1) On becoming aware of a flood in its area a lead local flood authority must, to the extent that it considers it necessary or appropriate, investigate:
 - a) Which risk management authorities have relevant flood risk management functions, and
 - b) Whether each of those risk management authorities has exercised, or is proposing to exercise, those functions in response to the flood.
- 2) Where an authority carries out an investigation under subsection (1) it must:
 - a) Publish the results of its investigation, and
 - b) Notify the relevant risk management authorities.

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

- Any risk to loss of life;
- Residential property:
 - One or more property flooded internally above ground floor level and/or below ground level where used as basement living accommodation;
- Critical services/installations and vulnerable person's properties:
 - One or more property flooded internally above ground floor level and/or below ground level where used as basement living accommodation or of the provision of critical services;
 - One or more property 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;
- Commercial property:
 - One or more property flooded internally above ground floor level and/or below ground level where used as basement operating space;
- At least 2 hectares of agricultural land flooded for more than 2 days;
- Any section of a national category 3 road or above made impassable due to flooding; and/or flooding to a minor road cutting off effective access to a village, hamlet or blocking a designated bus route;
- Flooding adversely impacting normal timetables or cutting off of a rail link.

It was deemed necessary to complete a formal Investigation Report into the flooding in the catchment of the Steeping River as:

- multiple residential properties were internally flooded;
- critical services were rendered inoperable;
- at least 2 hectares of agricultural land flooded for more than 2 days;
- roads made impassable due to flooding;
- flooding adversely impacting normal timetables.

3 Scope of the Report

The LLFA, or another LLFA working on its behalf, will undertake whatever tasks and allocate appropriate resources as it deems reasonable and necessary to deliver the specific outputs within the agreed timescale.

To meet those requirements the LLFA will carry out an investigation to:

- i. Determine the cause(s) of the flooding, including limitations or failures, if any, in the current infrastructure, associated assets;
- ii. Determine which risk management authorities have relevant flood risk management functions;
- iii. Determine if any or each of those risk management authorities has exercised, or is proposing to exercise, those functions in response to the flood;
- iv. Provide one or more possible strategic level options, if appropriate, to remove or reduce the risk of future flooding, or, if not appropriate, indicate the next steps that might be taken to identify and appraise the options;
- v. Draft and submit a report in an agreed format.

The outputs will be:

- 1) A flood investigation report which meets the above (i to v) requirements, making recommendations with respect to iv.

3.1 Approach to completing the Flood Investigation Report

Norfolk County Council, working on behalf of Lincolnshire County Council, have spoken to all relevant Risk Management Authorities, Parish Councils and many local residents during site visits and following correspondence. A considerable amount of data was received during the investigation, that included historical data, probable causes and proposals for solutions and accounts of the event. A number of these accounts conflicted with each other.

However, we have not detailed all of the background information supplied as we have sought to keep this report concise and focussed on the key points of the event in June 2019 and the recommendations for future actions.

It is worth noting that the flood investigation report cannot:

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

4 The Steeping River Catchment

What are 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.

Description of catchment:

The Steeping catchment is predominately rural with small settlements and historic market towns such as Spilsby and Wainfleet All Saints. The catchment encompasses the southern area of the Lincolnshire Wolds Area of Outstanding Natural Beauty (AONB). Important chalk streams rise from the chalk outcrop in this catchment. To the south the catchment becomes coastal floodplain and the watercourses flow to the North Sea. There are protected areas in the catchment including important bathing waters, Natura 2000 sites and urban waste water directive sensitive sites.

Flood Risk within the catchment:

The flood risk from strategic sources (fluvial above 3 square km and the sea) of flooding within this catchment has been assessed. The number of properties at risk are set out in Table 1 below for two different risk bandings, the 1 in 30 event (3.33% Annual Exceedance Event (AEP)) and the 1 in 100 event (1% AEP). This assessment does not take into account flood risk from groundwater or reservoir failure.

Table 1: Number of Properties and Assets at Risk

Flood Risk Data Source	Critical Services	Residential	Non-residential
[c] No. of properties subject to flood risk from rivers and the sea at 1 in 30 event (3.33% AEP):	1	203	21
[d] No. of properties subject to flood risk from rivers and the sea at 1 in 100 event (1% AEP):	4	345	25

5 Risk Management Authorities' Responsibilities

Within the Steeping River Catchment, the following Risk Management Authorities (RMAs) have been identified: the Environment Agency (EA); the Lead Local Flood Authority (Lincolnshire County Council); Anglian Water Services (AWS); Highway Authority (LCC and Highways England); and the Witham Fourth District, Black Sluice and Lindsey Marsh Internal Drainage Boards (IDBs).

The Roles and Responsibilities of each of these RMAs are provided in Appendix A. Each of the above mentioned RMAs has exercised, or is proposing to exercise, those functions in response to the flood incident in Wainfleet in June 2019. The collective RMA response during the flood incident is summarised in Table 2.

6 Flooding Incidents within the Catchment

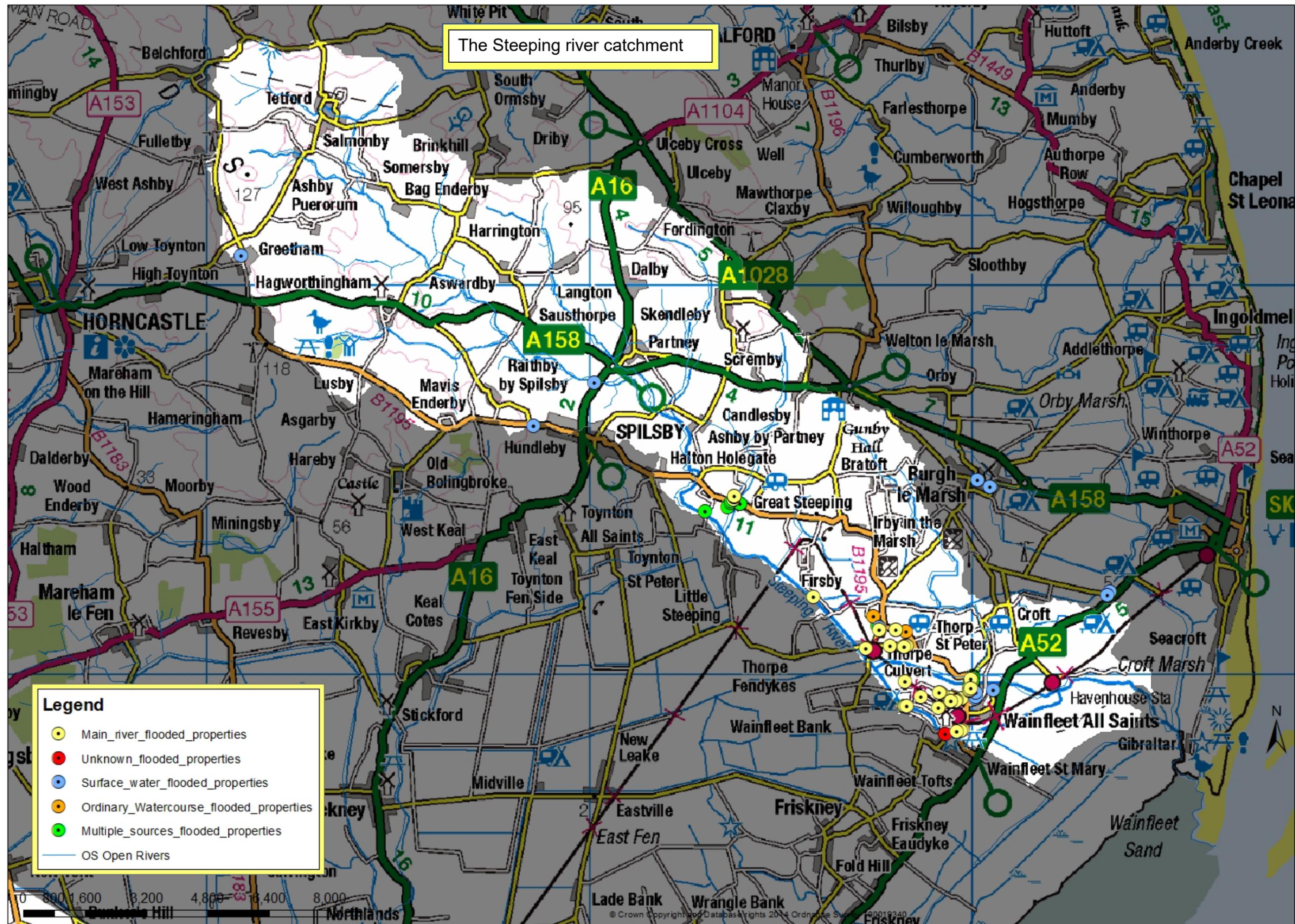
Within this catchment 88 incidents of internal flooding have been assessed as part of this investigation. These incidents are detailed in the Table 2 below and mapped on Figure 2. Details of the response to incident are also provided in the right hand column of Table 2.

Table 2: Details of Flooding Incidents and Response

Incident as reported	What was the response to the flood incident
<p style="text-align: center;"><u>Wainfleet</u></p> <p>Between the 11th & 16th June 2019:</p> <ul style="list-style-type: none"> • 12 properties were internally flooded on Matt Pitts Lane by fluvial sources. • 11 properties were internally flooded on Brewster Lane by fluvial sources. • 12 properties were internally flooded on Spilsby Road. 10 by fluvial sources, 1 by multiple sources and 1 unknown. • 3 properties were internally flooded on Havenside by fluvial sources. • 1 property was internally flooded on Crows Bridge by fluvial sources. • 1 property was internally flooded on Liam's Way by fluvial sources. • 1 property was internally flooded on Collison Gate by fluvial sources. • 1 property was internally flooded on Wainfleet Bank by fluvial sources. • 1 property was internally flooded on Mill Lane by fluvial sources. • 1 property was internally flooded on Hastings Drive by fluvial sources. • 1 property was internally flooded on Low Road by unknown sources. 	<ul style="list-style-type: none"> • Fire and Rescue Service: <ul style="list-style-type: none"> - Responded and pumped out properties; - Visited affected residents to offer advice and to gather information; - Carried out measures to minimise the impact of flooding. • Environment Agency, Lincolnshire County Council, East Lindsey District Council, Lincolnshire Police: <ul style="list-style-type: none"> - Worked together as part of a multi-agency group to co-ordinate their response to evacuate Wainfleet. • RAF: <ul style="list-style-type: none"> - Responded and dropped sand bags to seal breach. • Environment Agency: <ul style="list-style-type: none"> - Undertook works to repair and reinforce the bank at the site of the breach; - Assessed their flood warning system in the area to ensure Wainfleet was included.
<p style="text-align: center;"><u>Thorpe St Peter, Thorpe Culvert & Firsby</u></p> <p>Between the 11th & 16th June 2019:</p> <ul style="list-style-type: none"> • 10 properties were internally flooded on Station Road by fluvial sources • 4 properties were internally flooded on Spilsby Road. 1 by fluvial sources, 1 by an ordinary watercourse and 2 by surface water. • 1 property was internally flooded on Cork Lane by fluvial sources. • 1 property was internally flooded on Tip Lane by an ordinary watercourse 	<ul style="list-style-type: none"> • Witham Fourth District IDB and Lindsey Marsh IDB worked together to pump water away from the breached area.

Incident as reported	What was the response to the flood incident
<ul style="list-style-type: none"> 1 property was internally flooded on Culvert Road in Thorpe St Peter by fluvial sources 1 property was internally flooded in Firsby by surface water. 	
<u>Partney, Hundleby & Greetham</u>	
<p>Between the 11th & 16th June 2019:</p> <ul style="list-style-type: none"> 1 property was internally flooded on Brickyard Lane Hundelby by surface water. 1 property was internally flooded in Partney by surface water. 1 property was internally flooded in Greetham by surface water. 	
<u>Great Steeping</u>	
<p>Between the 11th & 16th June 2019:</p> <ul style="list-style-type: none"> 4 properties were internally flooded on Sandy Lane from fluvial sources. 1 property was internally flooded on Old Church Lane from multiple sources. 1 property was internally flooded on Mill Lane from multiple sources. 7 properties were internally flooded in Great Steeping. 1 was from fluvial sources and 6 were from multiple sources 	
<u>Croft</u>	
<p>Between the 11th & 16th June 2019:</p> <ul style="list-style-type: none"> 3 properties were internally flooded on Croft Lane by surface water. 3 properties were internally flooded on Croft Bank by surface water. 	
<u>Burgh Le Marsh</u>	
<p>Between the 11th & 16th June 2019:</p> <ul style="list-style-type: none"> 3 properties were internally flooded in Burgh Le Marsh by surface water. 	

Figure 1: Internal Flooding Reports within the Steeping River Catchment



7 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.

Firstly, historical data of previous rainfall events was examined. The 10th June 2019 ranked as the wettest June day as well as the wettest day in Wainfleet ever recorded. The average rainfall for the month of June in Wainfleet is 53.13mm. On the 10th June 2019, 74.6mm of rain was recorded falling in one day. This exceptional level is emphasised when compared to the last flood event in June 2007 which saw 42.6mm of rain fall in one day.

The 11th June 2019 ranked as the highest 24- hour rainfall period for Wainfleet on record with a total of 75.6mm.

In comparison to the county, the 10th June 2019 saw Wainfleet ranked third wettest June day in Lincolnshire. Holbeach and Cranwell (both within 30-40 miles of Wainfleet) saw rainfall that ranked them 7th and 8th wettest June day in Lincolnshire since records began.

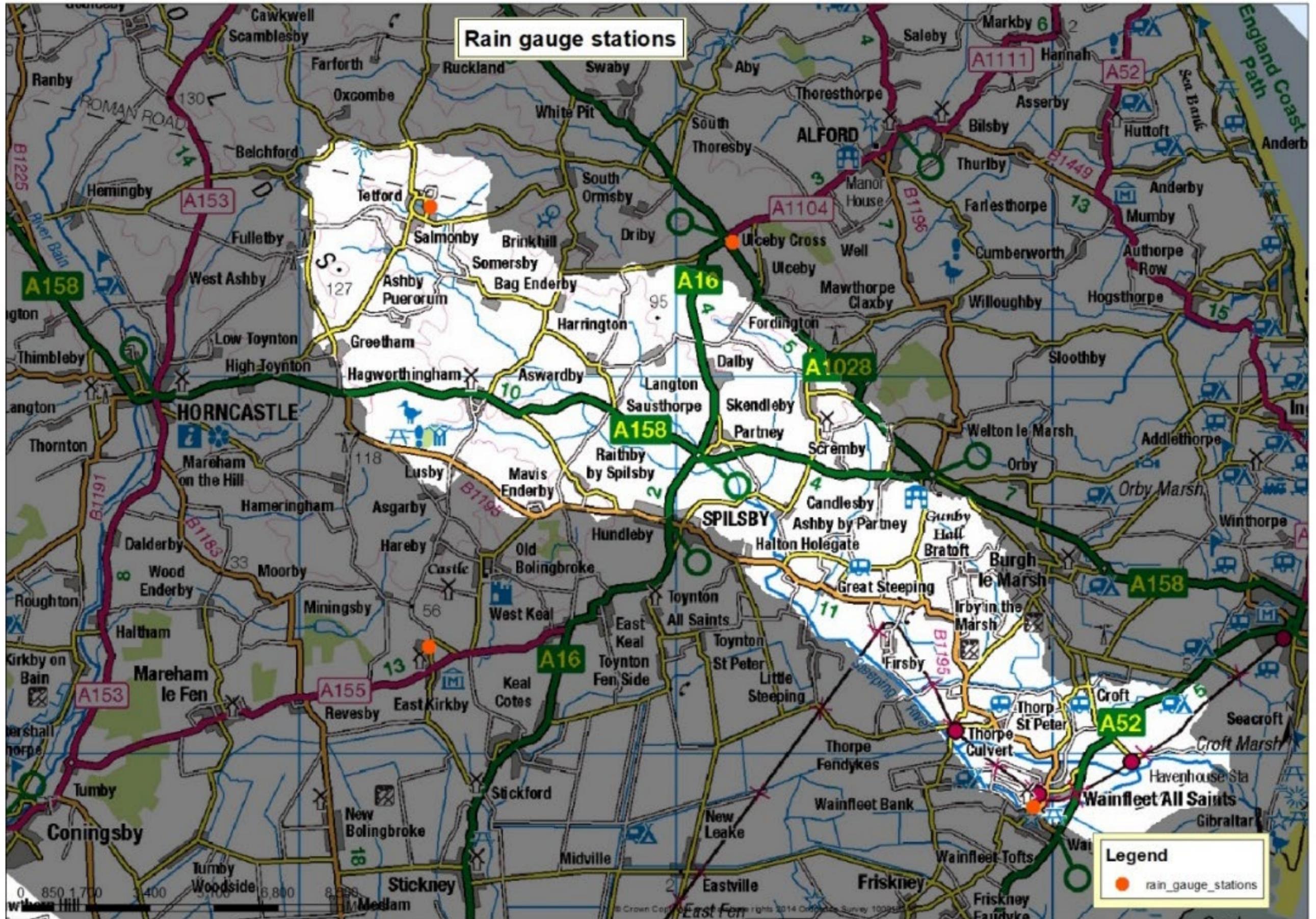
To examine the rainfall that influenced the flooding in June 2019, data was collected from four rain gauges within the region for the week 10th – 18th June. The location of these rain gauges are highlighted in Figure 2 and a summary of the total rainfall that fell and the event rarity are provided in Table 3. It is worth noting that two of the rain gauges fall outside of the Steeping catchment.

The event rarity varied across the gauging stations. Wainfleet saw the most intense rainfall followed by Ulceby Cross.

Table 3: Rainfall Totals, Duration and Annual Exceedance Probability

Rain Gauge	Within Steeping Catchment	Depth of Rainfall	Duration	Estimated Annual Exceedance Probability
Wainfleet	Yes	98mm	1.5 days	1.1%
Tetford	Yes	94.8mm	1.5 days	2.3%
Ulceby Cross	No	111.2mm	1.8 days	1.2%
East Kirkby	No	103.8mm	1.9 days	1.6%

Figure 2: Rain Gauge Stations within the Steeping River Catchment



8 Historic Flooding Incidents within the Catchment

Table 4 lists the historic flooding incidents which have occurred within the Steeping River catchment.

Table 4: Historic Flooding Incidents

Date of Incident	Impact	Response
July 2008	Three properties flooded from Lady Waths Beck	
June 2007	Relief channel bank was overtopped, flooding land and 10 houses in Wainfleet St Mary (EA)	Various works carried out to reduce flood risk from the Steeping River, including raising localised low spots in the banks, improving the operation of sluice gates at the outfall and removal of silt in the channel upstream of Wainfleet (EA)
1993	One property was flooded as a result of minor flooding on the River Lymn at Partney following water levels backing up against the gauging station and bypassing the channel returning downstream.	
1968	Flooding from Steeping River.	
1947	Flooding from Steeping River.	

9 Flooding Locations and Key Recommendations

The following pages contain detailed maps for the areas affected by the flooding in June 2019. The maps detail where the flooding was experienced. They also set out the key recommendations to mitigate the causes and impacts of the flooding experienced within this catchment.

Location: **Wainfleet All Saints**

Low Road & Spilsby Road

- Report of 2 internally flooded properties, source: undetermined.

Matt Pitts Lane, Brewster Lane, Hastings Drive, Mill Lane, Wainfleet Bank, Havenside, Collison Gate, Liam's Way, Crows Bridge, Low Road & Spilsby Road

- Report of 42 internally flooded property, source: main river.

Spilsby Road

- Report of 1 internally flooded property, source: multiple sources.

Culvert Road

- Report of 1 internally flooded property, source: main river.

Croft Lane

- Report of 3 internally flooded properties, source: surface water.

Croft Bank

- Report of 1 internally flooded property, source: surface water.

Flooding in Wainfleet All Saints

Location: **Wainfleet All Saints**

Recommendations:

EA to assess the condition of existing raised embankments along the Steeping River and relief channel and consider replacing these with new flood embankments.

RMA's to continue to work in partnership to identify funding for flood mitigation measures and engage with residents, landowners and partner organisations to implement the measures identified.

RMA's to continue to work in partnership to identify assets which have a significant impact on flood risk and any operation and maintenance changes required (including watercourse and land management practices). This should include existing banks along the River Steeping and relief channel along with other LCC, AW, EA and IDB assets.

Legend

- Main river flooded properties
- Surface water flooded properties
- Ordinary Watercourse flooded properties
- Multiple sources flooded properties
- Unknown source flooded properties

0 115 230 460 690 920 1,150 Meters

Flooding in Thorpe St Peter, Thorpe Culvert & Firsby

Location: **Thorpe St Peter, Thorpe Culvert & Firsby**

Location: **Thorpe St Peter, Thorpe Culvert & Firsby**

- Spilsby Road**
- Report of 2 internally flooded properties, source: surface water.
 - Report of 1 internally flooded property, source: ordinary watercourse
 - Report of 1 internally flooded property, source: main river
- Station Road**
- Report of 10 internally flooded properties, source: main river.
- Cork Lane**
- Report of 1 internally flooded property, source: main river
- Tip Lane**
- Report of 1 internally flooded property, source: ordinary watercourse
- Clough Road, Firsby**
- Report of 1 internally flooded property, source: main river

Recommendations:

EA to assess the condition of existing raised embankments along the Steeping River and relief channel and consider replacing these with new flood embankments.

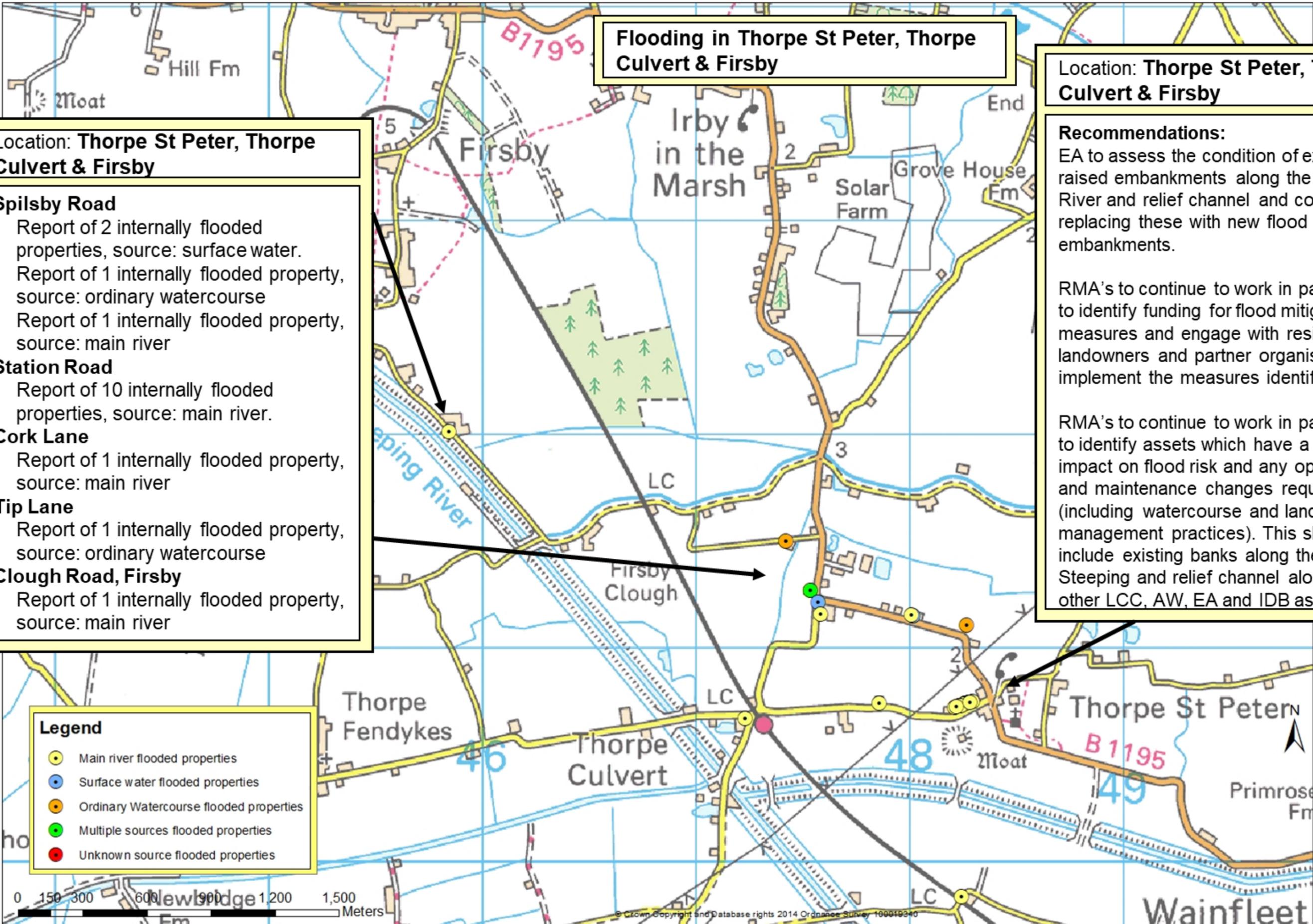
RMA's to continue to work in partnership to identify funding for flood mitigation measures and engage with residents, landowners and partner organisations to implement the measures identified.

RMA's to continue to work in partnership to identify assets which have a significant impact on flood risk and any operation and maintenance changes required (including watercourse and land management practices). This should include existing banks along the River Steeping and relief channel along with other LCC, AW, EA and IDB assets.

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Legend

- Main river flooded properties
- Surface water flooded properties
- Ordinary Watercourse flooded properties
- Multiple sources flooded properties
- Unknown source flooded properties



Flooding in Partney, Hundleby & Greetham

Location: Partney, Hundleby & Greetham

Recommendations:
 RMA's to continue to work in partnership to identify funding for flood mitigation measures and engage with residents, landowners and partner organisations to implement the measures identified.

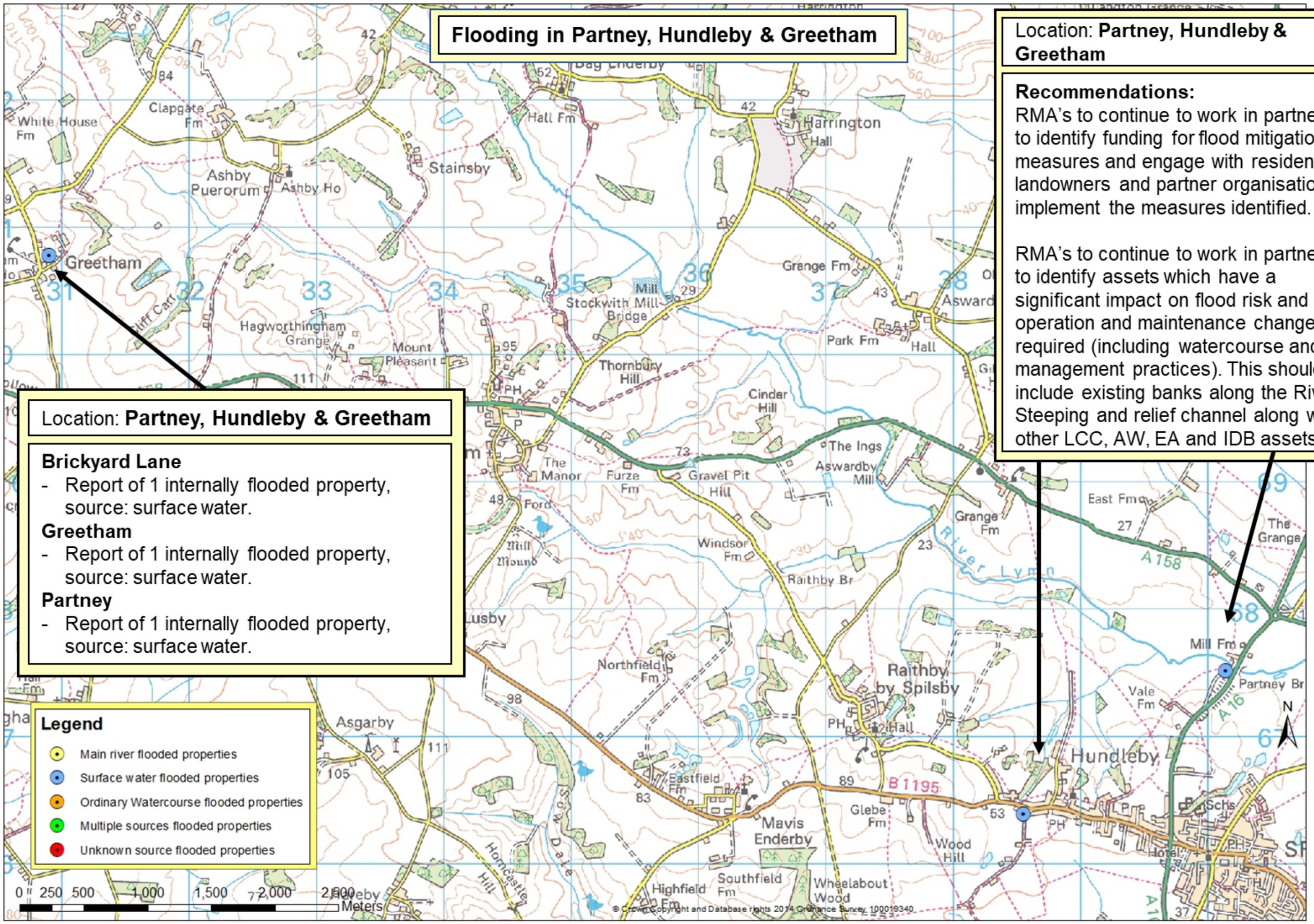
RMA's to continue to work in partnership to identify assets which have a significant impact on flood risk and any operation and maintenance changes required (including watercourse and land management practices). This should include existing banks along the River Steeping and relief channel along with other LCC, AW, EA and IDB assets.

Location: Partney, Hundleby & Greetham

- Brickyard Lane**
 - Report of 1 internally flooded property, source: surface water.
- Greetham**
 - Report of 1 internally flooded property, source: surface water.
- Partney**
 - Report of 1 internally flooded property, source: surface water.

Legend

- Main river flooded properties
- Surface water flooded properties
- Ordinary Watercourse flooded properties
- Multiple sources flooded properties
- Unknown source flooded properties



Location: **Great Steeping**

Old Church Lane

- Report of 1 internally flooded property, source: multiple sources

Sandy Lane

- Report of 4 internally flooded properties, source: main river.

Great Steeping

- Report of 6 internally flooded properties, source: multiple sources.
- Report of 1 internally flooded property, source: main river

Mill Lane

- Report of 1 internally flooded property, source: multiple sources

Flooding in Great Steeping

Location: **Great Steeping**

Recommendations:

EA to assess the condition of existing raised embankments along the Steeping River and relief channel and consider replacing these with new flood embankments.

RMA's to continue to work in partnership to identify funding for flood mitigation measures and engage with residents, landowners and partner organisations to implement the measures identified.

RMA's to continue to work in partnership to identify assets which have a significant impact on flood risk and any operation and maintenance changes required (including watercourse and land management practices). This should include existing banks along the River Steeping and relief channel along with other LCC, AW, EA and IDB assets.

Legend

- Main river flooded properties
- Surface water flooded properties
- Ordinary Watercourse flooded properties
- Multiple sources flooded properties
- Unknown source flooded properties



Flooding in Burgh le Marsh

Location: Burgh le Marsh

Recommendations:

RMA's to continue to work in partnership to identify funding for flood mitigation measures and engage with residents, landowners and partner organisations to implement the measures identified.

RMA's to continue to work in partnership to identify assets which have a significant impact on flood risk and any operation and maintenance changes required (including watercourse and land management practices). This should include existing banks along the River Steeping and relief channel along with other LCC, AW, EA and IDB assets.

Location: Burgh le Marsh

Burgh le Marsh

- Report of 3 internally flooded properties, source: surface water.

Croft Bank

- Report of 2 internally flooded properties, source: surface water.

Legend

- Main river flooded properties
- Surface water flooded properties
- Ordinary Watercourse flooded properties
- Multiple sources flooded properties
- Unknown source flooded properties



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 on behalf of Lincolnshire County Council as part of their responsibilities under the Flood and Water Management Act 2010 as set out in section 3 – Scope of the Report. It is also intended to provide context and information to support the delivery of flood risk management and should not be used for any other purposes.

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 Lincolnshire. 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. Environment Agency (EA):

- Lead authority for flood risk management in England for main rivers, reservoirs and the sea
- Monitoring and forecasting of river levels
- Powers to undertake works on main rivers
- Duties as a Category 1 Responder for local and national emergencies
- Providing and operating flood warning systems

2. Lincolnshire 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.

3. 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.

4. 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.

5. Highway Authorities (Lincolnshire 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.

6. 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.

7. 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.

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