

SAFE WELL PROSPEROUS CONNECTED

# **NORTH LINCOLNSHIRE COUNCIL**

**LEAD LOCAL FLOOD AUTHORITY**

**FLOOD INVESTIGATION REPORT**

**FLOOD AND WATER MANAGEMENT ACT – SECTION 19**

**EVENTS OF NOVEMBER 2019**

## Contents

<b>1. Introduction</b>	<b>4</b>
<b>1.1 Purpose of the Report</b>	<b>4</b>
<b>1.2 Approach to the Report</b>	<b>4</b>
<b>2. 2019 Flooding Incident</b>	<b>6</b>
<b>2.1 Flooding Investigation</b>	<b>6</b>
<b>2.2 Areas Affected by Flooding</b>	<b>6</b>
2.2.1 Alkborough	8
2.2.2 Barrow upon Humber	8
2.2.3 Barton Upon Humber	8
2.2.4 Belton	9
2.2.5 Burringham	9
2.2.6 Crowle and Crowle Moors	10
2.2.7 Eastoft	11
2.2.8 Epworth	11
2.2.9 Flixborough	12
2.2.10 Goxhill	12
2.2.11 Hibaldstow	13
2.2.12 Horkstow	13
2.2.13 Keadby	13
2.2.14 Kirton in Lindsey	14
2.2.15 Luddington	14
2.2.16 New Holland	15
2.2.17 Normanby	15
2.2.18 North Killingholme	15
2.2.19 Redbourne	16
2.2.20 Scunthorpe	16
2.2.21 South Ferriby	17
2.2.22 South Killingholme	17
2.2.23 Ulceby	18

2.2.24	Walcott.....	18
2.2.25	West Halton .....	18
2.2.26	West Butterwick.....	19
2.2.27	Westwoodside .....	19
2.2.28	Winteringham.....	20
<b>3.</b>	<b>Response to 2007 Floods .....</b>	<b>21</b>
3.1	<b>Barrow, Midby Drain and Cherry Lane Outfall .....</b>	<b>21</b>
3.2	<b>Barnetby, Woodland View / Chestnut Grove.....</b>	<b>21</b>
3.4	<b>Belton, King Edward Street to Millers Brook .....</b>	<b>22</b>
3.5	<b>Ulceby, Spruce Lane / Coronation Road .....</b>	<b>22</b>
<b>4.</b>	<b>The Local Flood Risk Management Strategy (LFRMS) .....</b>	<b>24</b>
<b>5.</b>	<b>Response to the 2019 Floods .....</b>	<b>26</b>
5.1	<b>Immediate Actions .....</b>	<b>26</b>
5.2	<b>Forward Steps .....</b>	<b>26</b>
<b>6.</b>	<b>North Lincolnshire’s Local Plan .....</b>	<b>28</b>
<b>7.</b>	<b>Conclusions.....</b>	<b>29</b>

This document has been prepared by North Lincolnshire Council as the Lead Local Flood Authority under Section 19 of the Flood and Water Management Act 2010, with the assistance of:

Severn Trent Water

Anglian Water

Scunthorpe and Gainsborough WLMB

Ancholme IDB

Isle of Axholme and North Notts WLMB

North East Lindsey IDB

Doncaster East IDB

The findings in this report are based on the information available to North Lincolnshire Council at the time of preparing the report. North Lincolnshire Council expressly disclaim responsibility for any error in or omission from this report. North Lincolnshire Council does not accept any liability for the use of this report or its contents by any third party.

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## 1. Introduction

North Lincolnshire, along with other counties across the East Midlands and the Humber area faced extreme rainfall events during the month of November in 2019.

These rainfall events triggered fluvial, surface water, groundwater and sewer flooding which had a significant impact on a range of areas within North Lincolnshire. Many residential and commercial properties along were affected by internal and external flooding and local highway and transport networks faced disturbances due to elevated water levels.

North Lincolnshire Council (NLC), as Lead Local Flood Authority (LLFA), is now working with Risk Management Authorities (RMA's) to investigate the causes of flooding and potential for mitigation against future flooding. NLC shall liaise with:

- Environment Agency (EA)
- Severn Trent Water (STW)
- Anglian Water (AW)
- Highways England (HE)
- The appropriate Internal Drainage Boards (IDB)
  - Ancholme IDB
  - North East Lindsey IBD
  - Doncaster East
- The appropriate Water Level Management Boards (WLMB)
  - Isle of Axholme and North Nottinghamshire WLMB
  - Scunthorpe and Gainsborough WLMB

### 1.1 Purpose of the Report

This Flood Investigation Report has been prepared by NLC to address the requirements of Section 19 of the Flood and Water Management Act 2010 which states:

- (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 any relevant risk management authorities.*

This Section 19 document will investigate the causes of flooding within North Lincolnshire and any associated damage to properties because of the flooding events that took place during November 2019. This report will suggest appropriate actions that shall be implemented to mitigate against future flooding events within the area. Additionally, this report will address how North Lincolnshire responded to the floods of 2007 and what lessons were learnt.

### 1.2 Approach to the Report

Flooding is a natural phenomenon, the consequences of which can be exacerbated by poor management of the water environment including natural and manmade watercourses. The risk of flooding is predicted to rise in the future because of climate change. Whilst it is not possible to prevent all instances of flooding, it is possible to take actions to manage these

risks and to reduce the impacts on communities by understanding the causes of flooding and applying appropriate and viable mitigation measures.

It is North Lincolnshire Council's role, as LLFA, to co-ordinate flood risk management within the district through their Strategic Flood Risk Management Board (SFRMB). The SFRMB, along with the appropriate RMA's, must investigate the history/frequency of flooding, the scale of flooding and the consequences of flooding for events within North Lincolnshire. Every flood investigation takes a lot of time and resource, so it is often impossible to predict a timescale for a report to be finalised and published. It requires contribution and factual information from all RMA's who often have their own priorities and limited resource.

Not all flooding events are required to be mentioned within a Section 19 report, for example NLC have chosen not to carry out **formal** investigations for external property flooding events, where flood waters have not entered a property. Furthermore, if flooding has been obviously caused by a short-term blockage in for example a public sewer, and the appropriate authority has adequately and promptly rectified this, then a S19 report is probably not necessary. All flooding incidents are recorded by NLC and investigated as required.

NLC prioritise flood investigations based on the type of flooding (internal/external/highways) and the type of property that has been impacted. Prioritisation is designated in accordance with the list below, with 1 being of highest priority and 7 being of lowest priority:

- 1) Internal flooding to multiple properties (flood water entering habitable areas of property)
- 2) Internal flooding to one property that has previously internally flooded
- 3) Internal flooding to one property
- 4) Internal flooding to business serving vulnerable people e.g. community care home, hospital, doctors' surgery
- 5) Internal flooding to one or more other commercial premises
- 6) Flooding of the classified highway network
- 7) Prolonged flooding of the unclassified highway network

NLC formally publishes the results of investigations completed on properties that fall under priority number 1 to 4 within the Section 19 report. Investigations into properties that fall under priority number 5 to 7 are completed but the results are often not published.

Although all flooding events are not described within this report, NLC still operationally investigate flooding from all sources where possible.

NLC are mindful of the flood investigation information that is published due to General Data Protection Regulations (GDPR).

Details of properties affected are not included within this report to ensure that sensitive and address based information is not placed in the public domain. Other RMA's have also recorded issues reported directly to them. Details of flooding incidents are discussed with appropriate Flood Risk Management Partners as part of the detailed investigation process, and as part of ongoing discussions to resolve issues. Some of the previously published historic flooding information in the NLC Local Flood Risk Management Strategy has been included in the next section.

## 2. 2019 Flooding Incident

On Tuesday 5th November 2019, the Met Office issued a yellow weather warning for northeast England, in which North Lincolnshire falls into. Average total rainfall values in November for the district typically lie around 55mm however in November of 2019, levels reached 107.8mm in Laceby (located in north east Lincolnshire) and 104.6mm in Brigg. These values were influenced by the torrential downpour on Thursday 7<sup>th</sup> November when between 50-60mm of rain fell across North Lincolnshire within a 24-hour period. These statistics show that the average monthly rainfall total fell within a single day.

Rainfall continued into the following weekend (Saturday 9<sup>th</sup> and Sunday 10<sup>th</sup>) falling onto already highly saturated ground which further increased surface water runoff. The ground water table remained extremely high following the rainfall events, triggering further warnings, and setting off springs around North Lincolnshire. Reports of this were mainly received within the regions of Barton, Barrow, Kirton, Elsham and the low villages.

The heavy rainfall not only caused direct surface water run off issues, but overwhelmed sewerage and highway drainage systems both adopted and private, raised the groundwater table, filled open watercourses so urbanised drainage systems could not discharge, and raised the water in the main river network to levels which caused over topping in some areas.

### 2.1 Flooding Investigation

North Lincolnshire Council received more than 300 reports of flooding in response to the to the torrential downpour which occurred in November 2019. Each report has been followed up by NLC by contacting the residents of any affected property to ascertain the extent and severity of flooding. NLC also liaised with the local water companies and internal drainage boards (IDB) to establish the cause of the flooding and to identify any appropriate mitigation measures.

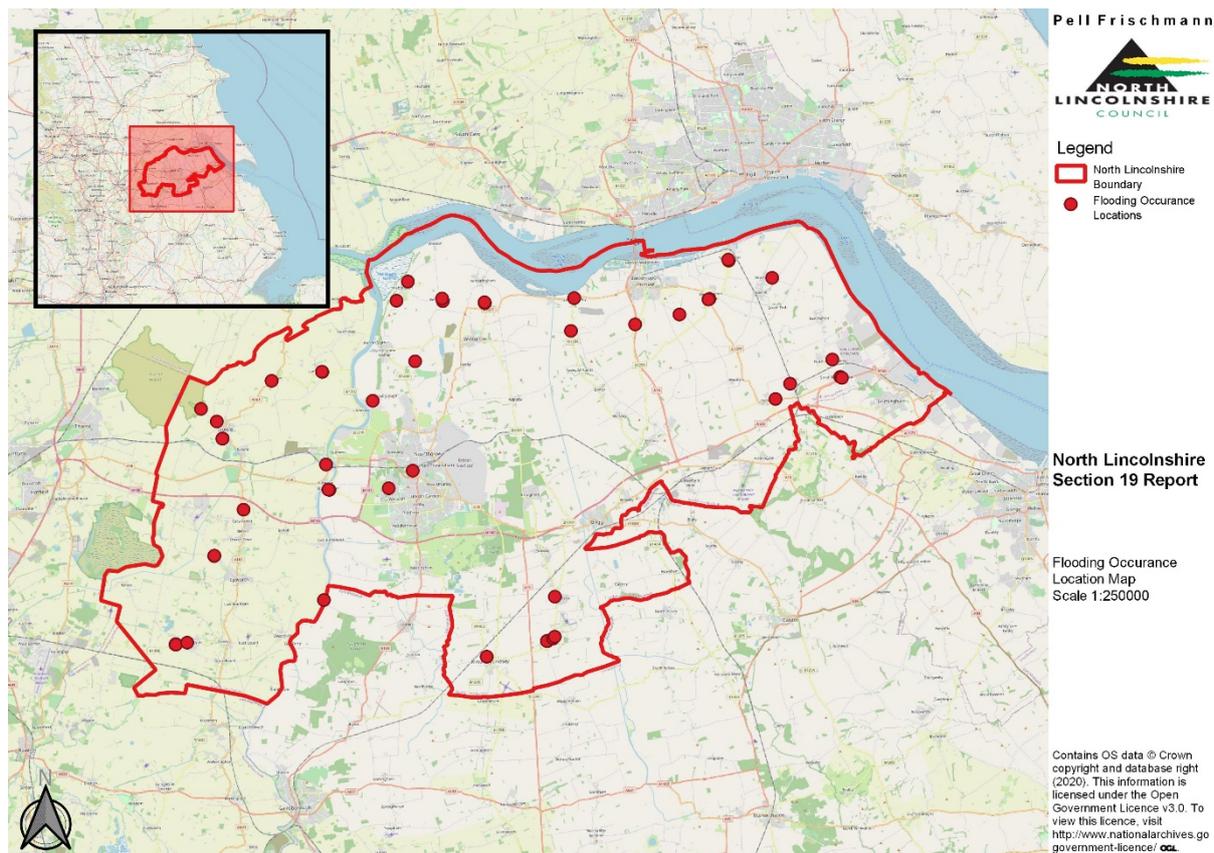
### 2.2 Areas Affected by Flooding

To date, the council have identified **54** properties that suffered from **internal flooding**, including **3** commercial/industrial business. These numbers are based solely on reports of flooding by local residents however the total number may be higher due to insurance reasons.

The areas that were predominantly affected, as illustrated below in Figure 1, were:

- Alkborough;
- Barrow upon Humber;
- Barton;
- Belton;
- Burringham;
- Crowle;
- Eastoft;
- Epworth;
- Flixborough;
- Goxhill;
- Hibaldstow;
- Horkstow;
- Keadby;
- Kirton in Lindsey;
- Luddington;
- New Holland;
- Normanby;
- North Killingholme;

- Redbourne;
- Scunthorpe;
- South Ferriby;
- South Killingholme;
- Ulceby;
- Walcott;
- West Halton;
- West Butterwick;
- Westwoodside; and
- Winteringham.



**Figure 1 - Flooding Occurrence Location Map**

Details of properties affected are not included within this report to ensure that sensitive and address based information is not placed in the public domain. Other RMA's have also recorded issues reported directly to them. Details of flooding incidents are discussed with appropriate Flood Risk Management Partners as part of the detailed investigation process, and as part of ongoing discussions to resolve issues. Some of the previously published historic flooding information in the NLC Local Flood Risk Management Strategy has been included in the next section.

### 2.2.1 Alkborough

Flooding was reported at one property on Whitton Road in Alkborough on the 18<sup>th</sup> November 2019.

The LLFA identified that this flooding event occurred because of groundwater moving through the basement and rising into the property.

In response to this flooding event, the LLFA had a meeting with the affected resident/s and appropriate advice has been given. Furthermore, the resident/s were emailed by the LLFA in April 2020 to confirm the source of flooding and any further action required.

Ongoing progress will be monitored through the Strategic Flood Board and Operational Risk Management Authority Group meetings as appropriate, as referenced in the conclusions section in this document.

There have been no previously reported issues of this type in Alkborough.

### 2.2.2 Barrow upon Humber

Flooding was reported at two properties on Town Street in Barrow Upon Humber on the 21<sup>st</sup> November 2019.

The LLFA liaised with AW who identified that flooding event occurred as a result of sewer flooding after Anglian Waters Assets (AWA) foul system became inundated by excess rainfall. AW visited both properties to assess the manholes and identified that they had become full due to the weather conditions and as a result overflowed leading to external flooding.

In response to this flooding event, AW checked the relevant manholes for possible blockages however no blockages or obstructions were identified. Additionally, AW completed a sewage debris clean up at both properties on Town Street.

Ongoing progress will be monitored through the Strategic Flood Board and operational Risk Management Authority Group meetings as appropriate, as referenced in the conclusions section in this document.

There was significant surface water flooding in Barrow in 2007. This was exacerbated by significant groundwater activity within the area. Significant works have been carried out to improve Midby Drain, and to improve the surface water outfall from the Cherry Lane area of Barrow. There was no repeat flooding in areas affected by direct surface and groundwater flooding in 2007, but once again, surface water and groundwater levels resulted in foul sewer flooding on Town Street.

### 2.2.3 Barton Upon Humber

Flooding was reported at two properties to the south of Barton Upon Humber adjacent to Brigg Road and Caistor Road. These two properties reported flooding on the 7<sup>th</sup> and 21<sup>st</sup> November 2019.

The LLFA identified that this flooding event, which affected the two properties in Barton Upon Humber, occurred as a result of overland flow. At the Brigg Road location, it was also anticipated that a small volume of highway runoff from the adjacent Saxby Road may have influenced the flooding event.

In response to this flooding event, the LLFA identified riparian asset ownership issues in the affected areas and in response sent riparian ownership letters to the adjacent landowners to ensure that land drainage features are being properly maintained. Furthermore, the LLFA

conducted a wet weather inspection of Saxby Road in February 2020 to assess if this highway influenced the flooding event at the property adjacent to Brigg Road. The findings of this survey highlighted that no water from the highway entered the lane on which flooded property is located.

Flooding also occurred on Holydyke. This was identified as an issue with an AW combined sewer serving the Bowmandale area. This issue reoccurred in February 2020. In response to this, Anglian Water have attended site in Holydyke/Bowmandale to clear blockages.

Ongoing progress will be monitored through the Strategic Flood Board and operational Risk Management Authority Group meetings as appropriate, as referenced in the conclusions section in this document.

There have been no previously reported issues of this type in the Brigg Road and Caistor Road areas of Barton, however, combined sewer issues in the Holydyke/Bowmandale areas have been reported several times over several years. The settlement of Barton was identified in the LFRMS for further surface water drainage investigation and actions. This is now taking place and several areas within Barton have been identified for further investigation works, including the Bowmandale/Holydyke area.

#### 2.2.4 Belton

Flooding was reported on Woodhouse Lane, in Belton on the 15<sup>th</sup> November 2019.

The LLFA liaised with the Isle of Axholme and North Nottinghamshire Water Level Management Board (WLMB) who identified that this flooding event occurred because of excess overland flow from the nearby highway. The highway drainage is dependent upon an outfall into a riparian drainage system, and then on a downstream IDB maintained drainage dyke.

In response to this flooding event, investigations on relevant highway drains and culverts have been carried out. The local IDB has been contacted to carry out investigations on the dyke systems in the vicinity, to assess their condition. NLC is currently preparing a scheme to include a new highway drain along Woodhouse Lane to connect directly into the IDB maintained watercourse. It is hoped to complete this work early in 2021.

Ongoing progress will be monitored through the Strategic Flood Board and operational Risk Management Authority Group meetings as appropriate, as referenced in the conclusions section in this document.

There have been no previously reported significant flooding incidents in this area.

#### 2.2.5 Burringham

Flooding was reported at two properties on The Meadows in Burringham on the 7<sup>th</sup> and 19<sup>th</sup> of November.

The LLFA liaised with Scunthorpe and Gainsborough's Water Management Board (WMB) who identified that this flooding event occurred because of excess overland flow. Runoff from the Burringham area flows into the Burringham Pumping Station and during November 2019, inflow was almost 10x greater than the capacity of the station. In addition to the excess surface run off, the outfall riparian ditch was noted to be "full" and blocked meaning water was not flowing freely and therefore was unable to divert away from the properties thus exacerbating the problem. It was also suggested by Severn Trent Water (STW) that the flooding event was influenced by the foul water system as the area has known hydraulic problems.

In response to this flooding event, the LLFA have carried out a level survey, jet survey and CCTV survey to prove the integrity of the system. The surveys demonstrated that there were only minor faults in the surface water system which were not serious enough to warrant remedial action. Issues have been discussed with elected members and residents. It is known that there are numerous surface water connections from properties on The Meadows into the STW foul sewer system. STW attended the site to complete a connectivity survey which looked at the connection between the surface water and foul water system. Ditches and drains in catchment are drained through an IDB pumped system. Discussions are currently ongoing with STW and the IDB to consider solutions and improvements.

Ongoing progress will be monitored through the Strategic Flood Board and operational Risk Management Authority Group meetings as appropriate, as referenced in the conclusions section in this document. Local liaison with residents and elected members is also ongoing.

Similar flooding occurred on The Meadows in 2007 and 2012. In 2014/15 the riparian landowner of the outfall ditch to the east of The Meadows carried out maintenance work under the supervision of the Internal Drainage Board. Severn Trent Water carried out surveys on surface to foul connections.

### 2.2.6 Crowle and Crowle Moors

Flooding was reported at three properties on Godnow Road, one property on Dole Road and one property within the vicinity of Middle Common Road. These five properties reported flooding between the 11<sup>th</sup> and 14<sup>th</sup> November 2019.

The LLFA liaised with STW who identified that the flooding event, which affected the three properties on Godnow Road, occurred as a result of excess foul water the three properties are on the Hydraulic Sewer Flooding Risk Register (HSFRR) and therefore are known to present a hydraulic risk. Additionally, it was also anticipated that a small volume of highway runoff from the adjacent carriageway may have exacerbated the flooding event.

The LLFA identified that the flooding event which affected the properties within the vicinity of Dole Road and Middle Common Road occurred because of poor riparian management which meant that water was unable to enter the downstream riparian ditched.

In response to the flooding event which impacted the properties on Godnow Road, the Isle of Axholme & North Nottinghamshire WLMB are to carry out investigations on Wrays Drain, along the rear of Lindum Grove, to assess the conditions of the drains. Additionally, STW will carry out their own investigations to identify possible reasons for occurrence of sewer flooding. Furthermore, STW are currently scoping the potential for upgrades at the local sewage treatment works and are also liaising with the Environment Agency regarding flows and consents.

Flooding which occurred in the vicinity of Dole Road and Middle Common Road was most likely due to riparian maintenance issues. In response to this, the LLFA sent riparian ownership letters to adjacent landowners to ensure that land drainage features are being properly maintained, in conjunction with the IDB.

A partnership highway and drainage improvement scheme between NLC and STW on Godnow Road is currently in the design phase.

Ongoing progress will be monitored through the Strategic Flood Board and operational Risk Management Authority Group meetings as appropriate, as referenced in the conclusions section in this document.

Similar flooding was experienced on Godnow Road in 2007, and also in Lindum Grove in 2007 and in 2012.

A Crowle flood forum group was established following the further flooding on Lindum Grove in 2012 to review sewer issues with all relevant Risk Management Authorities. STW carried out some works at this time and began the process of considering improvements to their sewer networks, and sewer misconnections. The group is chaired by NLC elected members and is ongoing. Wider areas of Crowle and Ealand were affected in 2007.

### 2.2.7 Eastoft

Flooding was reported at one property on Crowle Road in Eastoft on the 12<sup>th</sup> November 2019.

The LLFA liaised with STW who identified that the flooding event occurred because of excess surface water. It is suggested that the cause of the excess surface water was partially influenced by a historical blockage in the STW surface water outfall system and a lack of maintenance to the downstream water course. Furthermore, it is anticipated that flooding occurred because of surface water being unable to enter the relatively small diameter surface water sewer from the north.

In response to this flooding event, STW investigated the surface water system which highlighted the system was compromised by silt and debris which partially blocked the outfall and thus restricted flow. In follow up to this, STW cleansed the surface water system to remove the build-up of silt and debris and completed a CCTV inspection to ensure that the problem was resolved. It was also identified that the outfall is still partially blocked due to the ditch level which is being addressed by the Isle of Axholme & North Nottinghamshire WLMB. Additionally, the LLFA identified riparian asset ownership issues in the affected areas and therefore sent riparian ownership letters to adjacent landowners to ensure that land drainage features are being properly maintained.

Ongoing progress will be monitored through the Strategic Flood Board and operational Risk Management Authority Group meetings as appropriate, as referenced in the conclusions section in this document.

There have been no previously reported significant flooding incidents in this area. Minor issues and blockages have been previously investigated.

### 2.2.8 Epworth

Flooding was reported at two properties on West End Road Epworth on the 14<sup>th</sup> November 2019.

The LLFA liaised with STW who identified that the flooding event occurred as a result of sewer flooding after Severn Trent Water Assets (STW) foul system became inundated by excess surface water. Additionally, the LLFA identified that the riparian ditch, which runs between 76 West End Rd and Skylar Lodge is the outfall ditch for the CSO from the STW foul pump station, it is approximately 1km from Skyer Lodge. The ditch at the rear of Skyer Lodge is the outfall for the Surface Water sewer serving approximately a 500m linear length of West End Rd and Station Rd and is the consented overflow ditch for the pump station as West End Road, was partially blocked due to lack of general maintenance.

In response to this flooding event, the LLFA sent riparian ownership letters to adjacent landowners to ensure that land drainage features are being properly maintained.

Ongoing progress will be monitored through the Strategic Flood Board and operational Risk Management Authority Group meetings as appropriate, as referenced in the conclusions section in this document.

There have been no previously reported significant flooding incidents in this specific area of Epworth.

### 2.2.9 Flixborough

Flooding was reported at a commercial property on Ninth Avenue in Flixborough on the 8<sup>th</sup> November 2019.

The LLFA liaised with Scunthorpe and Gainsborough WLMB who identified that this flooding event occurred because of excess overland flow which came from the east of this commercial property. Runoff from the Flixborough area flows into the Flixborough Pumping Station and during November 2019, inflow was almost 10x greater than the capacity of the station.

In response to this flooding event, the LLFA liaised with the property owners and carried out an investigation of a riparian drainage system on Wood Bottom, which is located to the north of the commercial property. This drainage investigation highlighted a blockage within a culvert which has since been removed and the culvert has been placed on the LLFA's programme for regular inspections.

Ongoing progress will be monitored through the Strategic Flood Board and operational Risk Management Authority Group meetings as appropriate, as referenced in the conclusions section in this document.

There have been no previously reported significant flooding incidents in this specific area of Flixborough.

### 2.2.10 Goxhill

Flooding was reported at one property on Ruards Lane in Goxhill on the 15<sup>th</sup> November 2019.

The LLFA identified that this internal flooding event occurred because of an issue within a surface water culvert under Ruards Lane. Additionally, blocked dykes and poorly maintained riparian ditches downstream exacerbated the problem as any excess water was unable to divert away from the property.

In response to this flooding event, the LLFA shall repair the surface water culvert under Ruards Lane and send riparian ownership letters to adjacent landowners to ensure that land drainage features are being properly maintained.

Ongoing progress will be monitored through the Strategic Flood Board and operational Risk Management Authority Group meetings as appropriate, as referenced in the conclusions section in this document.

Flooding has occurred at several locations in Goxhill over several years, principally in 2007. This is the first time that flooding has been reported at this location. The settlement of Goxhill was identified in the LFRMS for further surface water drainage investigation and actions.

This is now taking place and several areas within Goxhill have been identified for major drainage improvement works. The drainage study has also identified the need for general maintenance of many riparian drainage systems throughout Goxhill. This area on Ruards Lane is included within these mapped areas of riparian watercourse.

### 2.2.11 Hibaldstow

Flooding was reported at one property on Station Road in Hibaldstow on the 15<sup>th</sup> November 2019.

The LLFA tried to get in contact with the affected resident/s however no contact was made so the exact cause of the flooding is unknown. Third parties and Ancholme Internal Drainage Board (IDB) suggested that the flooding event occurred because of excess overland flow and low-lying ground to the rear of the property. Ancholme IDB identified that the rainfall during November 2019 was a lot higher than that which the land drainage system could accommodate for, thus leading to surface runoff.

The LLFA are currently waiting for a response from affected landowners in order to identify the source of the flooding and suggest appropriate ways to address the issues. This will be further pursued by the LLFA.

Ongoing progress will be monitored through the Strategic Flood Board and operational Risk Management Authority Group meetings as appropriate, as referenced in the conclusions section in this document.

There have been no previously reported significant flooding incidents in this specific area of Hibaldstow.

### 2.2.12 Horkstow

Flooding was reported at one property on Horkstow Road in Horkstow on the 8<sup>th</sup> November 2019.

The LLFA identified that internal flooding event occurred because of excess overland flow from the nearby highway. The low kerb check on the B1204 is suggested to have contributed to the flooding, together with localised run off from private land. This requires further discussion with landowners.

In response to this flooding event, the LLFA completed jet and CCTV investigations into the drainage system on the footway of the highway between Piggery Hill Junction to Bridge Road Junction to establish any historic surface water system extents. Landowners were advised of the findings of these investigations. Additionally, the LLFA completed kerbing works in March 2020 to raise the kerb check to stop the flow of excess water onto the adjacent land. In the future, more works may be carried out on the ditch on the east side of Horkstow Road and the B1204 will be gripped through the low villages.

Ongoing progress will be monitored through the Strategic Flood Board and operational Risk Management Authority Group meetings as appropriate, as referenced in the conclusions section in this document.

There are no previously documented flooding events for this specific area of Horkstow.

### 2.2.13 Keadby

Flooding was reported at two properties on Chesswick Avenue in Keadby on the 14<sup>th</sup> November 2019.

The LLFA liaised with STW who identified that this flooding event occurred because of sewer flooding after STW's foul water system became inundated by excess rainfall. The two properties are on the Hydraulic Sewer Flooding Risk Register (HSFRR) and therefore are known to present a hydraulic risk.

In response to this flooding event, the LLFA will continue to liaise with STW and the Environment Agency to ensure that the sewer flooding issue will be addressed.

Ongoing progress will be monitored through the Strategic Flood Board and operational Risk Management Authority Group meetings as appropriate, as referenced in the conclusions section in this document.

Flooding occurred at this location in June 2007. Work was undertaken by the LLFA to improve surface water outfalls to the area, and several minor works were undertaken including some drain replacements were carried out.

The settlement of Keadby was identified in the LFRMS for further surface water drainage investigation and actions. This is now taking place and several areas within Keadby have been identified for potential drainage improvement works, including the Chesswick Avenue area.

#### 2.2.14 Kirton in Lindsey

Flooding was reported at a commercial property on Station Road in Kirton in Lindsey on the 11th November 2019.

The LLFA suspect that this flooding event occurred because of excess overland flow from the adjacent highway as surface water was not discharging effectively into the highway drain on Station Road.

In response to this flooding event, the LLFA have undertaken survey work on the highway drainage system in the area which highlighted a blockage downstream in a culvert crossing which has since been removed.

Ongoing progress will be monitored through the Strategic Flood Board and operational Risk Management Authority Group meetings as appropriate, as referenced in the conclusions section in this document.

Flooding was reported in several areas of Kirton in Lindsey in 2007. This specific location has not previously been reported as flooding to this extent.

#### 2.2.15 Luddington

Flooding was reported at two properties on Meredyke Road in Luddington on the 14<sup>th</sup> November 2019.

The LLFA suspect that this flooding event occurred because of a pump failure within STW's foul water system. Additionally, it is suspected that that excess overland flow from adjacent field to the rear of property contributed to the flooding event.

In response to this flooding event, the LLFA liaised with STW who investigated the cause of the flood and identified that although the sewers were in a serviceable condition, the local surface water pumping station does become overwhelmed during storm conditions.

Ongoing progress will be monitored through the Strategic Flood Board and operational Risk Management Authority Group meetings as appropriate, as referenced in the conclusions section in this document.

Flooding was reported at this location in June 2007. Some investigations and cleansing of the highway drainage network was carried out at that time.

### 2.2.16 New Holland

Flooding was reported at two properties on Marsh Lane in New Holland flooding on the 20th November 2019.

The LLFA liaised with AW who anticipated that this internal flooding event occurred because of sewer flooding after AWA's foul sewer became inundated by excess rainfall. The resident/s advised that the manhole to the rear of the property became full and as a result overflowed.

In response to this flooding event, AW disinfected the area at one of the properties that was affected, jetted the system to remove any potential blockages within the sewers and installed a tanker near the pumping station to increase storage capacity during storm conditions. Additionally, a meeting was held with local MPs and councillors to discuss the local drainage issues and ways in which the system can be improved to reduce the risk of future flooding events.

Ongoing progress will be monitored through the Strategic Flood Board and operational Risk Management Authority Group meetings as appropriate, as referenced in the conclusions section in this document.

No flooding issues have previously been reported at this specific location in New Holland.

### 2.2.17 Normanby

Flooding was reported at one property on Thealby Road in Normanby on the 14th November 2019.

The LLFA suspect that this internal flooding event occurred because of excess overland flow from the highway to the west of the property.

In response to this flooding event, the LLFA completed apron gully improvement works and introduced verge drainage gripping along C107 and B1430 to improve the capture of excess surface water from the highways. Further wet weather inspections to identify highway run off volumes shall be undertaken, to determine if any further improvements are required. Additionally, the LLFA sent riparian ownership letters to adjacent landowners to ensure that land drainage features are being properly maintained

Ongoing progress will be monitored through the Strategic Flood Board and operational Risk Management Authority Group meetings as appropriate, as referenced in the conclusions section in this document.

No flooding issues have previously been reported at this specific location in Normanby.

### 2.2.18 North Killingholme

Flooding was reported at one property on Church Lane in North Killingholme on the 11<sup>th</sup> November 2019.

The LLFA liaised with AW who anticipated that the flooding event occurred because of a blockage within AWA's foul water system.

In response to this flooding event, AW's repair team visited the property in November 2019 and identified that the manhole to the rear of the property was clear and without a blockage. It was suggested that the pump station may have been working inefficiently due to the excessive of inflow into the station.

Ongoing progress will be monitored through the Strategic Flood Board and operational Risk Management Authority Group meetings as appropriate, as referenced in the conclusions section in this document.

There have been no previous reports of flooding at this specific location in North Killingholme.

### 2.2.19 Redbourne

Flooding was reported at three properties on Beck Lane, one property on School Lane and one property Park Lane in Redbourne. These five properties all reported flooding on the 7<sup>th</sup> November.

The LLFA have identified that this flooding event, which affected all five properties in Redbourne, occurred because of the River Beck overflowing due to excessive rainfall. The problem was exacerbated by debris collecting at the trash screen at the culvert along the B1206.

In response to this flooding event, the LLFA appointed a consultant to model the water course in order to estimate river flows in order to help determine the likely extent of flooding from the local river. Following the modelling, the LLFA investigated potential flood mitigation measures which could be introduced to increase local protection measures including:

- Replacing the existing trash screen at the culvert along the B1206;
- Introducing upstream storage to the western side of the village (location to be agreed) to slow the flow of water before it enters the village; and
- Introducing a downstream overflow channel on the eastern side of the village.

Furthermore, the LLFA completed a jet and CCTV investigation of the culvert under High Street and identified a crack in the northern culvert. Minor remedial works will be completed to fix this crack. Discussions with local elected members, residents and landowners have also taken place, and are ongoing.

Ongoing progress will be monitored through the Strategic Flood Board and operational Risk Management Authority Group meetings as appropriate, as referenced in the conclusions section in this document.

Similar flooding was reported in Redbourne since 2007.

### 2.2.20 Scunthorpe

Flooding was reported at one property on Brumby Hall Gardens and one property on Rochester Close in Scunthorpe. These two properties reported flooding on the 7<sup>th</sup> and 8<sup>th</sup> of November 2019.

The LLFA liaised with STW who established that the flooding event on Rochester Close occurred because of STW's surface water system becoming overwhelmed. It is anticipated that hydraulic issues within STW's surface water system may have influenced the flooding event at Rochester Close however further investigations shall be completed by STW.

The LLFA established that the flooding event on Brumby Hall Gardens occurred because of elevated groundwater levels. Basement flooding was experienced because of elevated groundwater levels.

In response to the flooding event at Rochester Close, the LLFA shall continue to liaise with STW to ensure that the issue is addressed. The LLFA have advised residents at Brumby

Hall Gardens to liaise with their insurance companies as this is a private issue to be resolved locally.

Ongoing progress will be monitored through the Strategic Flood Board and operational Risk Management Authority Group meetings as appropriate, as referenced in the conclusions section in this document.

There have been no previous reports of flooding at this specific location in Scunthorpe.

#### 2.2.21 South Ferriby

Flooding was reported at one property on Farrishes Lane in South Ferriby on the 14th November 2019.

The LLFA identified that this flooding event occurred because of excess surface water run off due to a blocked highways gully.

In response to this flooding event, the LLFA completed jetting and CCTV investigations along the highway drainage system within the area. Based on the findings of the investigations, a surface water pipe in the vicinity of 'The Rise' was repaired and an additionally gully and ACO drainage system was installed to catch excess water. These measures will be monitored to ensure they are working efficiently to reduce the risk of flooding. Additionally, the LLFA identified that the gas service, which was in a surface water sewer upstream of property, may have added to excessive flows. Subsequently, gas repairs were undertaken to resolve the issue.

Ongoing progress will be monitored through the Strategic Flood Board and operational Risk Management Authority Group meetings as appropriate, as referenced in the conclusions section in this document.

No flooding issues have previously been reported at this specific location in South Ferriby.

#### 2.2.22 South Killingholme

Flooding was reported at two properties on Town Street in South Killingholme on the 7th November 2019.

The LLFA anticipate that this flooding event occurred because of an issue with AWA's foul water system which was exacerbated by excess surface run off from the impermeable car parks to the rear of properties. In April of 2020, the two affected properties were added to the Flood Risk Register which means that they are deemed to be at risk of flooding due to hydraulic incapacity (i.e. not due to blockages, collapses or pumping failure) in a storm event with a return period of 20 years or lower.

In response to this flooding event, AW attended the site to investigate and found a few issues with the private pipework within the property. The resident/s resolved this issued themselves. Additionally, a meeting was held with local MPs and councillors to discuss the local drainage issues and ways in which the system can be improved to reduce the risk of future flooding events. This meeting identified that the car park to the rear of the property is likely to have caused the internal flooding event.

Ongoing progress will be monitored through the Strategic Flood Board and operational Risk Management Authority Group meetings as appropriate, as referenced in the conclusions section in this document.

Flooding has previously been reported in this area several times since 2007. There have previously been issues with sewer system blockages, and surface run off from the highway.

Improvements to highway drainage, sewer maintenance, and improvements to surface water outfalls have previously been carried out.

### 2.2.23 Ulceby

Flooding was reported at one property on Carr Road and one property on Station Road in Ulceby. These two properties reported flooding on the 7th and 11th of November 2019.

The exact cause of flooding at the property on Carr Road is unknown as the LLFA have been unable to get in contact with the resident/s however, it is suggested that overland flow from the rear of the property may have led to flooding. Investigations into the cause of the flooding will be further pursued by the LLFA.

The LLFA liaised with AW who anticipate that the flooding event on Station Road likely occurred due to a blockage within their foul water system.

The LLFA are waiting for a response from the resident/s at the property on Carr Road to identify the source of the flooding and suggest appropriate ways to address the issues. In response to the flooding event on Station Road, AW completed a CCTV investigation between manhole 4801 and 5802 which highlighted that a brick was lodged within the pipe between manhole 4801 and 4806 which was subsequently removed. It was also identified that the pipe contained a large amount of silt, debris, unflushables and FOG (Fats, Oil, and Grease). In response to these findings, the system was jetted clear the pipes.

Ongoing progress will be monitored through the Strategic Flood Board and operational Risk Management Authority Group meetings as appropriate, as referenced in the conclusions section in this document.

There have been no previously recorded flooding issues at these specific locations in Ulceby.

### 2.2.24 Walcott

Flooding was reported at one property on Burton Stather Road in Walcott on the 14th November 2019.

The LLFA identified that this flooding event occurred because of excess overland flow from the adjacent land.

In response to this event, the LLFA sent riparian ownership letters to adjacent landowners to ensure that local ditches and culverts are maintained to increase their storage capacity and allow water to flow without obstructions. Additionally, the LLFA have consulted with landowners and carried out the investigations, as necessary.

Ongoing progress will be monitored through the Strategic Flood Board and operational Risk Management Authority Group meetings as appropriate, as referenced in the conclusions section in this document.

Flooding in this area was previously reported in 2007. The LLFA carried out works following this event to improve surface water outfalls to the affected areas.

### 2.2.25 West Halton

Flooding was reported at one property on Water Lane, and one property on Manor Court in West Halton on the 14th November 2019.

The LLFA identified that the flooding event, which affected the property on Water Lane, occurred as a result of the River Beck overflowing due to excessive rainfall. It was also

identified that the other property on Manor Court flooded because of elevated groundwater levels and surface water run-off from higher ground.

The LLFA has previously carried out works to remove a restriction in the watercourse upstream of Water Lane and are further considering options for further flood improvement measures within West Halton, as it is identified as one of the top 10 settlements within the Local Flood Risk Management Strategy (LFRMS) that requires further works and investigation.

In response to the flooding event, the LLFA sent riparian ownership letters to adjacent landowners to ensure that land drainage features are being properly maintained.

Ongoing progress will be monitored through the Strategic Flood Board and operational Risk Management Authority Group meetings as appropriate, as referenced in the conclusions section in this document.

Flooding was previously reported on Water Lane in 2007. This led to the investigation of Beck flows, and the improvements to a culvert upstream of Water Lane by NLC. West Halton was identified in the 2016 LFRMS for potential further works to further improve Beck flows, which may have a need to be carried out by riparian owners.

#### 2.2.26 West Butterwick

Flooding was reported at one property on South Ewsters in West Butterwick on the 14th November 2019.

The LLFA identified that this flooding event occurred because of excess overland flow which is suspected to have been exacerbated by highways run off which travelled from the east of the property.

In response to this flooding event, the LLFA shall conduct wet weather inspections to quantify highway run off volumes. Additionally, the LLFA researched into for potential highway mitigation measures, if available, to improve surface water capture. Following this, highway gripping works have been identified furthermore to a programme along the C213 to improve surface water capture.

Ongoing progress will be monitored through the Strategic Flood Board and operational Risk Management Authority Group meetings as appropriate, as referenced in the conclusions section in this document.

There have been no previously recorded issues at this specific location in West Butterwick.

#### 2.2.27 Westwoodside

Flooding was reported at three properties on Westmoreland Close and one property on The Birches in Westwoodside. These four properties reported flooding between the 8<sup>th</sup> and 22<sup>nd</sup> November 2019.

The LLFA liaised with STW who identified that the flooding event on Westmoreland Close occurred because of foul sewer surcharge from STW's foul water system, which was overwhelmed due to surface water inundation.

STW identified that the pumping station on Doncaster Road and local storm tanks were full for longer than designed due to an excessive influx of surface water encouraged by poorly maintained riparian dyke systems. Although the pump stations efficiency dropped, the station did not fail in November 2019.

The LLFA identified that the flooding at The Birches, occurred as a result of excess overland flow which travelled from the east of the property

In response to the flooding event that affected both areas in Westwoodside, the LLFA shall liaise with the Isle of Axholme & North Nottinghamshire Water Level Management Board and STW to discuss and resolve any sewage and drainage issues that may have caused the flooding. Additionally, the LLFA sent riparian ownership letters to adjacent landowners along Westmoreland Close and jetted the surface water system, however blocked ditches to the west of Westmoreland Close meant that the system could not be cleared. Overland flow issues to the east of the Birches need to be addressed. Emails have been sent to landowners at this stage.

Ongoing progress will be monitored through the Strategic Flood Board and operational Risk Management Authority Group meetings as appropriate, as referenced in the conclusions section in this document.

Flooding was reported in Westmoreland Close in 2007, but there have been no previous reported incidents of flooding on the Birches.

### 2.2.28 Winteringham

Flooding was reported at four properties on Winterton Road in Winteringham in the vicinity of Mere Farm. These four properties reported flooding on the 13<sup>th</sup> November 2019.

It has been identified that this flooding event occurred because of excess overland flow which travelled from the west of the cottages. Excess surface water, which led to the flooding, was influenced by the poorly maintained riparian ditches and culvert adjacent to Winterton Road. The LLFA liaised with AW who stated that they received no reports of flooding at the property during November 2019.

In response to this flooding event, the LLFA sent riparian ownership letters to adjacent landowners to ensure that land drainage features are being properly maintained. Additionally, the LLFA have jetted the culverts adjacent to Winterton Road and will refresh the verge drainage grips on the highway to improve surface water capture/The landowner has dug out a rough ditch and bund on the west side of Winterton Road at this location.

Ongoing progress will be monitored through the Strategic Flood Board and operational Risk Management Authority Group meetings as appropriate, as referenced in the conclusions section in this document.

There was previous flooding at this location in 2007.

### 3. Response to 2007 Floods

Since the floods of June 2007, which led to the Pitt Report and subsequent Flood and Water Management Act, North Lincolnshire Council have carried out numerous highway and flood alleviation schemes to mitigate against flooding from various sources.

NLC's Flood Risk and Drainage Team was established to manage operational drainage team's year on year, which collectively provide essential drainage improvement works across the area, which contribute to overall flood mitigation. Investigation works are also continuous and as site-specific defects and issues are identified; the council resolves these on a priority basis. Furthermore, the Flood Risk and Drainage Team have a strategic role, liaising extensively with other risk management authority partners. In 2016, North Lincolnshire Council published its Local Flood Risk Management Strategy (LFRMS) based upon earlier drafts.

The council have carried out approximately 40 major flood alleviation schemes throughout the district following these investigations and reports.

These schemes have ranged from new high-capacity highway drainage systems, upsizing of significant ditches and culverts, installation of robust flood banks, strategically placed flood bunds and walls to divert flows, and reshaping/renewing highways to control the flow of water away from properties.

The following list of schemes gives an overview of the works we have carried out following 2007. Since the flood alleviation schemes have been implemented, the local areas have not to date seen repeat significant flooding during extreme rainfall events.

#### 3.1 Barrow, Midby Drain and Cherry Lane Outfall

Scheme cost: £1,400,000

Overview of scheme:

The whole village of Barrow was inundated with surface and ground water during the events of 2007. Springs erupted on higher ground that found its way to Barrow Old Hall and the densely populated areas of Barrow starting at Westoby Lane. The existing Midby drain could not cope with the large volumes of water and inevitably the water found its way into a significant number of properties along the whole route of Midby drain.

The scheme involved creating flood flow paths around Barrow Old Hall to redirect spring water around properties and into Midby drain. The Midby drain open watercourse that ran between properties in Barrow was de-silted and re-levelled to better channel water and keep it within the watercourse. New oversized pipes were installed within the centre of Barrow around the marketplace, and the existing open watercourse along Beck Lane was widened and strengthened using gabion wall baskets that would allow percolation of groundwater directly into the watercourse.

The existing outfall for the North of Barrow that extends from Cherry Lane was deemed to be under capacity and as such NLC constructed a new piped outfall through to the main river Barrow Haven Beck.

#### 3.2 Barnetby, Woodland View / Chestnut Grove

Scheme cost: £1,000,000

Overview of scheme:

The Woodland View / Chestnut Grove estate in Barnetby suffered extensive flooding during 2007 due to the low-lying land and the estate being built on soakaways in an area with a high ground water table.

The scheme essentially rendered the existing soakaway drainage system redundant, and it was replaced with a sealed pipe system and new road gullies. An oversized pipe was installed behind the properties to discharge into and hold the water before being pumped at Greenfield run off rate into the existing Skeggar Beck. A dry pond was also constructed in the Public Open Space area on the estate, designed to store water during extreme events to prevent properties from flooding.

### 3.4 Belton, King Edward Street to Millers Brook

Scheme cost: £500,000

Overview of scheme:

In 2007 there were major reports of flooding, namely around the Millers Brook estate. Following investigation, the connection from north to south of Belton was found to be damaged at various locations.

NLC installed a new oversized culverted system, and a new open watercourse along the bridleway and surround land in Belton to allow the flow of surface water to reach the IDB outfall watercourse. All existing highway drainage within the vicinity was connected into this new drain, along with new road gullies to collect the surface water.

### 3.5 Ulceby, Spruce Lane / Coronation Road

Scheme Cost: £475,000

Overview of scheme:

Ulceby has been blighted by flooding since 2007 throughout the whole town. Whilst numerous minor works schemes have been completed, the main surface water outfall for the catchment required upgrading to facilitate the amount of water falling onto the area.

The scheme required construction of a new outfall from Spruce Lane and down Coronation Road alongside the existing to provide a conduit for surface water away from properties. The new upsized culverted network was design to cope with the 1 in 100-year storm event. New road gullies at strategic locations along with raised combined kerb and drainage systems were also installed as part of the scheme.

### 3.6 Other Works

The above schemes give a representation and a basic overview of major flood alleviation schemes carried out since 2007. NLC have carried out similar schemes following parish council and resident meetings including:

- Epworth, Reapers Rise
- West Butterwick, Parklands
- Garthorpe, West End
- Luddington, High Street
- East Halton, Kettlebridge Lane + College Road
- Kirton, Traingate + Endell Drive
- Kirton, Grayingham Road
- Brigg, Ash Grove + Redcombe Lane
- Haxey, Hunters Croft
- Haxey, War Memorial

- Main Street, Saxby
- Sandoft Ind. Est.
- Ville Road Scunthorpe
- Roxby, South Street
- Whitton. Blacksmith Hill
- Messingham, Parish Culverted Drain
- Low Burnham, Hallgarth Lane
- Ealand, Outgate
- Winterton, King Street
- Owston Ferry, Tempertons Lane
- Scawby. The Rookery
- Crowle, Eastoft Road
- Manton, Main Street
- Scunthorpe, West Common Lane

This list is not exhaustive but gives an indication towards areas that have had confirmed flooding in the past and that NLC have investigated and completed schemes to mitigate against flooding, resulting in no significant repeat occurrences.

Each scheme NLC have delivered is evidence of innovative flood risk management in the existing environment, and whilst indicative numbers of properties protected are shown within the Local Flood Risk Management Strategy, wider benefits were achieved through good design, consideration of wider settlement issues and delivery of schemes.

## 4. The Local Flood Risk Management Strategy (LFRMS)

As the Lead Local Flood Authority, North Lincolnshire Council is responsible for managing flood risk from 'local' sources including that from surface water run-off, groundwater, and Ordinary Watercourses (generally small rivers and streams not under the jurisdiction of the Environment Agency). Following public consultation, NLC published its first Local Flood Risk Management Strategy (LFRMS1) as directed by the Flood and Water Management Act 2010 in August 2016 and this document is available for public viewing.

The LFRMS identifies the key flood risk areas in North Lincolnshire and suggests why these key areas demonstrate an elevated flood risk. Additionally, the LFRMS presents a summary of North Lincolnshire's preferred strategy for managing 'local' surface water, groundwater and fluvial flood risks within North Lincolnshire. The LFRMS presents the roles and responsibilities of all the appropriate local RMA's such as the Environment Agency, Internal Drainage Boards and Water Companies. The LFRMS also covers other elements in flood risk management, for example riparian responsibilities, developing telemetry, updating the significant asset register, delivering Sustainable Drainage Systems (SuDS) and local flood risk mitigation in the planning process.

Various sources of data such as the National Receptor Database, 1 in 100-year storm event modelling, local and historic flooding knowledge and various reports have been used to identify priority settlements within the district that present the greatest risk of flooding. The strategy is essentially a live document that needs to be revisited and updated as time goes on, but it forms a priority list of settlements that NLC as LLFA are working its way through to mitigate against flooding. Table 1, which has been extracted from Table 3-2 in the LFRMS, presents the settlements within North Lincolnshire that have the highest estimated number of people and critical assets at risk.

*Table 1 - Settlements Identified to be at Highest Risk of Flooding from Local Sources\**

Settlement	Estimated number of people at local flood risk	Estimated number of critical assets at local flood risk	Priority category
<b>Scunthorpe &amp; Bottesford Urban Area</b>	143	17	2
<b>Goxhill</b>	140	2	2
<b>Brigg, Scawby Brook &amp; Castlethorpe</b>	138	3	2
<b>Barton upon Humber</b>	103	3	2
<b>Redbourne</b>	101	0	2
<b>Keadby</b>	70	0	2
<b>Ulceby</b>	68	0	2
<b>Barrow upon Humber</b>	61	1	2
<b>Barnetby le Wold</b>	47	1	2
<b>Winterton</b>	44	0	3
<b>Bonby</b>	40	0	3
<b>New Holland</b>	35	1	2
<b>Kirton in Lindsey</b>	30	2	2
<b>Messingham</b>	30	0	3
<b>Westwoodside</b>	28	1	2
<b>South Humber Bank</b>	26	1	2
<b>Graizelound</b>	26	1	2

<sup>1</sup> <https://www.northlincs.gov.uk/wp-content/uploads/2018/07/Local-Flood-Risk-Management-Strategy.pdf>

Settlement	Estimated number of people at local flood risk	Estimated number of critical assets at local flood risk	Priority category
<b>West Butterwick &amp; East Butterwick</b>	23	1	2
<b>Crowle</b>	21	1	2
<b>Scawby</b>	21	1	2
<b>Luddington</b>	19	1	2
<b>Elsham</b>	16	0	3
<b>Owston Ferry</b>	16	0	3
<b>Ealand</b>	14	1	2
<b>West Halton</b>	14	1	2
<b>Broughton</b>	12	1	2
<b>Haxey</b>	12	0	3
<b>Worlaby</b>	12	0	3
<b>Wrawby</b>	12	0	3
<b>Whitton</b>	12	1	2

Following the events of November 2019, and any possible future rainfall events, this priority list may need to be reviewed to address the needs of North Lincolnshire and its residents. The LFRMS is due to be updated in 2022.

NLC have also published a list of significant drainage assets as required by the FWMA, which are inspected regularly based upon the significance of the asset. This asset database is constantly being updated following investigations. All investigation works since 2007 has helped create a relatively comprehensive map of integral flood risk management assets.

Since April 2015 NLC, as LLFA, became a statutory consultee for surface water and groundwater flood risk related to major developments to the Local Planning Authority (LPA). Major developments class as new housing developments which include 10+ dwellings or being over 0.5 hectares, or commercial/industrial buildings with a footprint of over 1,000m<sup>2</sup> or being over 1 hectare. The LFFA also comment on smaller planning applications if there is a perceived risk of flooding.

The LLFA also engages with other partners and has a significant contribution to overarching strategies for the district, for example the Humber 2100+ Strategy and the Isle of Axholme Strategy, Flood Risk Management Plans and Parish and Community Strategies, to assist in managing flood risk holistically.

NLC are currently completing five Outline Business Cases (OBC) for Localised (Surface Water, Groundwater and Ordinary Watercourses) Flood Alleviation Schemes (FAS) in:

- Goxhill
- Brigg
- Barton
- Keadby
- Redbourne.

FAS's are designed to help manage the risk of flooding in areas that are identified as having a high localised flood risk by recommending a series of measures to mitigate against. North Lincolnshire's LFRMS has influenced the areas that have been chosen to implement a Flood

Alleviation Scheme based on the settlements identified to be at highest risk of flooding from local sources.

## 5. Response to the 2019 Floods

### 5.1 Immediate Actions

In response to the 2019 floods, a flood incident emergency room was set up to organise and coordinate operations to deal with the impact of flooding. North Lincolnshire Council, drainage improvement teams, Highways England and local neighbourhood services all provided emergency flooding support. Approximately 100 members of Highways and neighbourhood Services directly responded to these flooding incidents. Many more NLC staff were involved during the event and subsequent flood recovery.

NLC and Anglian Water released information to the public on how to respond to the different types of flooding for example residents were asked to refer to the NLC website on flooding, and the Flood Response Booklet<sup>2</sup> which was issued by the Humber Local Resilience Forum.

### 5.2 Forward Steps

Based upon the priority areas presented within the LFRMS, the LLFA have applied for Flood Defence Grant in Aid (FDGiA) funding for settlement areas that present the greatest risks. The LLFA have received FDGiA funding to complete robust Outline Business Case's for Flood Alleviation Schemes (FAS) in five priority settlements namely Goxhill, Brigg, Barton, Keadby and Redbourne. FAS's are designed to help manage the risk of flooding in areas that are identified as having a high flood risk by recommending a series of measures to protect as many properties as possible. FAS's identify key flood risk areas, propose why these key areas demonstrate an elevated flood risk, suggest appropriate mitigation and state the benefits of such mitigation measures. This approach has been welcomed by the Environment Agency and we have indicative funding which will require match funding from the council to provide flooding protection measures for the settlements that demonstrate the greatest risks.

In addition to the FAS's, North Lincolnshire Council are using a range of flood management and mitigation measures to reduce the impact of future flooding such as:

- Using a combination of flood alerts (ie MET Office and EA Flood Alerts) across North Lincolnshire;
- Continued liaison with the appropriate RMAs to address the problems identified through investigations into the 2019 flooding event.
- Continued discussions with residents and affected stakeholders.
- Issuing riparian ownership letters to ensure that all local watercourses are maintained to increase the storage capacity and allow the free flow of water.
- Having protection measures ready to restrict the movement of flood water for example 6,000 sandbags and small number of pumps are stored to deploy in the eventuality of bad weather.
- Provide information on SuDS to ensure that measures to reduce surface water runoff are applied to new developments, where applicable.
- Effective maintenance and ongoing identification and inspection of significant assets based upon the identified priority areas.

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<sup>2</sup> <https://www.northlincs.gov.uk/wp-content/uploads/2019/11/Flood-Response-Booklet-Humber-Local-Resilience-Forum-1.pdf>

Although it is impossible to foresee the occurrence and impact of flooding in advance, the scale of the impacts can be drastically reduced by forward preparation, planning and the effective deployment of both internal and external resources. Flooding events rely on reactive resource deployment however there will always be limitations to response and difficult decisions must be made at the time to ensure resources are deployed to the most important areas.

NLC currently own in-house 3 number gully tankers, approximately 6,000 sandbags on stock and a small number of pumps to help alleviate flooding during rainfall events. Unfortunately, this number is far from capable of delivering an efficient emergency service. The flooding events which occurred in November 2019 demonstrated that NLC assets could not be everywhere at once meaning additional resource such as hired water tankers from external companies had to be utilised. We are assessing the impact on our own internal resources and our external partners to ensure we have the most practical plans in place to respond to future flooding events.

It is apparent that many of the individual flooding events of November 2019 were either encouraged or exacerbated by poor riparian maintenance. Any landowner is responsible for managing the flow of water through their land, may this be open watercourses, ground water springs, or culverts.

RMA's have permissive powers to enforce management and maintenance of these watercourses under the Land Drainage Act, however, currently lack enforcement resource to do so. A combination of preventative measures to cleanse principal highway drainage systems and resources to enforce riparian responsibilities, would put NLC in a much better position to manage flood risk within its county. NLC are dedicated to raising awareness to riparian owners, and offering advice based upon an investigational priority list.

To better understand on the ground assets and mechanisms that contribute to flooding, we will focus on formulating a more robust and comprehensive digital asset database. We do hold a lot of the data currently within our published significant drainage asset register.

NLC has an experienced and diverse workforce and will look to utilise this to deliver an excellence in service for flood risk management as 'one council'. This includes ensuring enhancements of infrastructure through the planning system to provide for a sustainable future.

## 6. North Lincolnshire's Local Plan

North Lincolnshire Council is preparing a new single Local Plan for North Lincolnshire. Once agreed (formally adopted), it will replace the current North Lincolnshire Local Plan, the Core Strategy and the Housing and Employment Land Allocations Development Plan Documents (DPDs).

A Local Plan sets out:

- The vision and objectives for the future development of the area, addressing needs and opportunities in relation to housing, the economy, community facilities and infrastructure – as well as a basis for safeguarding the environment, adapting to climate change and securing good design.
- The policies and proposals will guide decisions and investment on development and regeneration up to 2036.

It is important that we get the Local Plan right so that North Lincolnshire continues to be a place where people want to live, work, visit and invest. The plan will help to deliver the council's vision – to be the 'best place' for our residents.

A Local Plan should be aspirational but realistic and provide enough flexibility to adjust to rapid change. Therefore, it must be based upon up-to-date facts (sound evidence).

Flood investigations and our LFRMS feed into the Local Plan and address potential land allocations that may be susceptible to localised flood risk.

NLC in, partnership with the Environment Agency, are helping to formulate the 'Humber 2100+ Strategy' which considers a multitude of benefits with flood risk, economy and growth being the leading factors. This strategy ties in neatly with the Local Plan and will ensure a joined up holistic approach towards a sustainable future for residents in North Lincolnshire.

## 7. Conclusions

The significant rainfall events of November 2019 resulted in the flooding of **54** properties including **3** commercial/industrial businesses. These figures only represent the number of properties that reported the occurrence of internal flooding whereas the actual figures are likely to be much higher.

Along with property damage because of the flooding events of November 2019, the local highways faced extensive flooding which led to multiple road closures and traffic disturbance across the district.

North Lincolnshire Council, as Lead Local Flood Authority, have worked and shall continue to work with the appropriate RMA's to thoroughly investigate the cause and extent of flooding across North Lincolnshire to suggest appropriate resolutions to reduce the impact of future flooding events.

North Lincolnshire Council hold regular operational flood liaison meetings with Risk Management Authorities. Strategic Flood Board meetings are held and are jointly chaired by NLC. An evaluation of the ongoing progress with the issues raised in this S19 report will be included on the agendas at these meetings.

At this stage, the Lead Local Flood Authority are satisfied that appropriate RMA's have been identified and appropriate information has been shared in order that any appropriate actions can be taken.

Substantial works across the district since 2007 have no doubt reduced the risk of significant flooding in many settlements.

The LFRMS, along with any changes in protocol, will continue to define future priorities and works to further reduce flood risk in North Lincolnshire.

The findings of the investigations following the flooding events of November 2019 have been detailed within this FWMA Section 19 flood report, at the time of publication.