

# Hertfordshire County Council Flood Investigation Report

## Redbourn, Hertfordshire



*Photos courtesy of local residents*



# Table of Contents

Revision Schedule.....	i
Explanation of Acronyms.....	ii
Executive Summary .....	iii
1. Introduction.....	1
1.1 LLFA Investigation.....	1
1.2 Site Location .....	1
2. Background and History of flooding .....	3
2.1 Previous flood events .....	3
3. Assessment of 7 February 2014 flood event.....	4
3.1 Observations .....	4
3.2 Ground conditions .....	4
3.3 Sources of flooding.....	5
3.3.1 Surface water runoff (pluvial) .....	5
3.4 Highway drainage .....	6
3.5 Structures and features .....	6
3.6 Possible causes of flooding.....	6
4. Responsible authorities and landowners .....	7
4.1 Hertfordshire County Council as Lead Local Flood Authority .....	7
4.2 St Albans City & District Council .....	7
4.3 Hertfordshire County Council as Highways Authority .....	7
4.4 Landowners.....	7
5. Conclusions and recommendations.....	9
5.1 Conclusions.....	9
5.2 Recommendations .....	10
6. Next Steps and Actions.....	12
6.1 Lead Local Flood Authority.....	12
6.2 Highway Authority .....	12
6.3 St Albans City & District Council .....	12
7. Disclaimer .....	13

## List of Figures

Figure 1.1	Redbourn, Hertfordshire – Location Map.....	2
Figure 1.2	Areas affected by flooding in Redbourn.....	2
Figure 3.1	Overland flow paths.....	4
Figure 3.2	Catchment boundary .....	5

# Revision Schedule

## Hertfordshire County Council Redbourn Flood Investigation Report

Wednesday 17 December 2014  
Revision 5 - Final

Rev	Date	Details	Author	Checked and Approved by
1	14/11/14	For internal consultation	Suzanne Phillips Project Officer Flood Risk Management HCC	Andy Hardstaff Flood Risk Management Team Leader HCC
2	18/11/14	Text revision following comments from AH	Suzanne Phillips Project Officer Flood Risk Management HCC	Andy Hardstaff Flood Risk Management Team Leader HCC
3	21/11/14	For RMAs consultation	Suzanne Phillips Project Officer Flood Risk Management HCC	Andy Hardstaff Flood Risk Management Team Leader HCC
4	16/12/14	Further Amendments	Suzanne Phillips Project Officer Flood Risk Management HCC	John Rumble Head of Environmental Resource Planning HCC
5	17/12/14	Final Amendments	Suzanne Phillips Project Officer Flood Risk Management HCC	John Rumble Head of Environmental Resource Planning HCC

## Explanation of Acronyms

Acronym	Explanation
<b>FWMA 2010</b>	<b>Flood and Water Management Act 2010</b> – Legislation that was developed and enacted as a result of the review in to the serious flooding in 2007. It brings new powers and duties to local authorities and other regulatory bodies.
<b>HCC</b>	<b>Hertfordshire County Council</b>
<b>LDA 1991</b>	<b>Land Drainage Act 1991</b> – Legislation that sets out a range of roles and responsibilities relating to flood risk management. It is also the legislation that gives powers to local authorities to manage flood risk and highlights the role of the landowner to manage watercourses on their land to maintain the flow of water.
<b>LLFA</b>	<b>Lead Local Flood Authority</b> – This is the role assigned to the unitary or county council for an area with a range of duties and powers to support the management of local flood risk.
<b>RMAs</b>	<b>Risk Management Authorities</b> – Bodies identified in the FWMA 2010 with roles and powers to manage flood risk. In Hertfordshire this includes the County Council, district councils, Highway Authority, the Environment Agency, the Bedfordshire and River Ivel Internal Drainage Board and water companies.

## Executive Summary

In Redbourn in the early hours of the morning on 7 February 2014, heavy rainfall fell on saturated ground, causing surface water runoff from farmland onto an adjacent road. Fifteen properties were subsequently flooded internally and five properties suffered external flooding as a result of this runoff.

Due to the severity of the flooding and the number of properties impacted by this flood event, Hertfordshire County Council (HCC) as Lead Local Flood Authority (LLFA) have investigated the flood incident under Section 19 of the Flood and Water Management Act (FWMA) 2010 and published this report. The aim of this report is to establish the causes of the flooding; identify the relevant Risk Management Authorities (RMAs), highlight their role and responsibilities and confirm if those authorities intend to use their relevant powers to help manage the flood risk to Redbourn.

It has been concluded that the flooding that occurred on 7 February 2014 was primarily as a result of a succession of storms combining with heavy rainfall over an extended period of time. This saturated the surrounding catchment prior to the flood event. Any additional rainfall was unable to soak into the ground resulting in surface water runoff. This runoff made its way to the edge of farmland, overflowing onto Lybury Lane and eventually resulted in the flooding of properties in three distinct locations.

Blocked highway gullies filled with silt and debris carried by runoff from the nearby farmland is considered to be a factor in the 7 February flooding event. However, the ability of the highway drainage system in and around Lybury Lane to cope with the flood water would have been limited.

As part of the Technical Assessment Report, produced by consultants appointed by HCC, a list of recommendations that might help to manage flood risk to Redbourn has been put forward. This report looks at the feasibility of each of these recommendations and highlights which, if any, RMAs would need to be involved.

The main recommendations explored are:

- Survey and clean the highway drainage system;
- Increased frequency of gully cleaning;
- Develop a programme of surface water management measures;
- Individual property level protection;

There is no one solution to resolve the flooding in Redbourn and there is no guarantee that flooding can be prevented particularly under the exceptional conditions similar to those that occurred on 7 February. A collaborative approach will be required between all RMAs, landowners and the local community to manage flood risk in the future.

# **1. Introduction**

## **1.1 LLFA Investigation**

Under Section 19 of the Flood and Water Management Act (FWMA) 2010 Hertfordshire County Council (HCC) as Lead Local Flood Authority (LLFA), on becoming aware of a flood in its area, must, to the extent that it considers it necessary or appropriate:

- investigate the incident;
- identify the Risk Management Authorities (RMAs) with relevant flood risk management functions;
- establish if the relevant RMAs have responded to the flood event or are proposing to respond;
- publish its findings; and
- inform the relevant RMAs of its findings.

As defined under Section 6, subsection 13 of the FWMA 2010, an RMA has certain powers to manage, regulate, assess and mitigate flood risk. We have identified the following RMAs as part of this Section 19 flood investigation for Redbourn:

- HCC as LLFA
- St Albans City & District Council
- HCC as Highway Authority

After 7 February 2014, HCC received reports that several residential properties had suffered internal flooding in Rose Acre, Redbourn.

As a preparatory step to identify if a detailed flood investigation should be carried out, officers from the Flood Risk Management Team at HCC wrote to those believed to have been affected, to gather further information and confirm the number of properties flooded internally.

During the investigation, HCC subsequently discovered that several properties in Ridgedown and Snatchup had also suffered internal flooding and these were then included in the technical assessment.

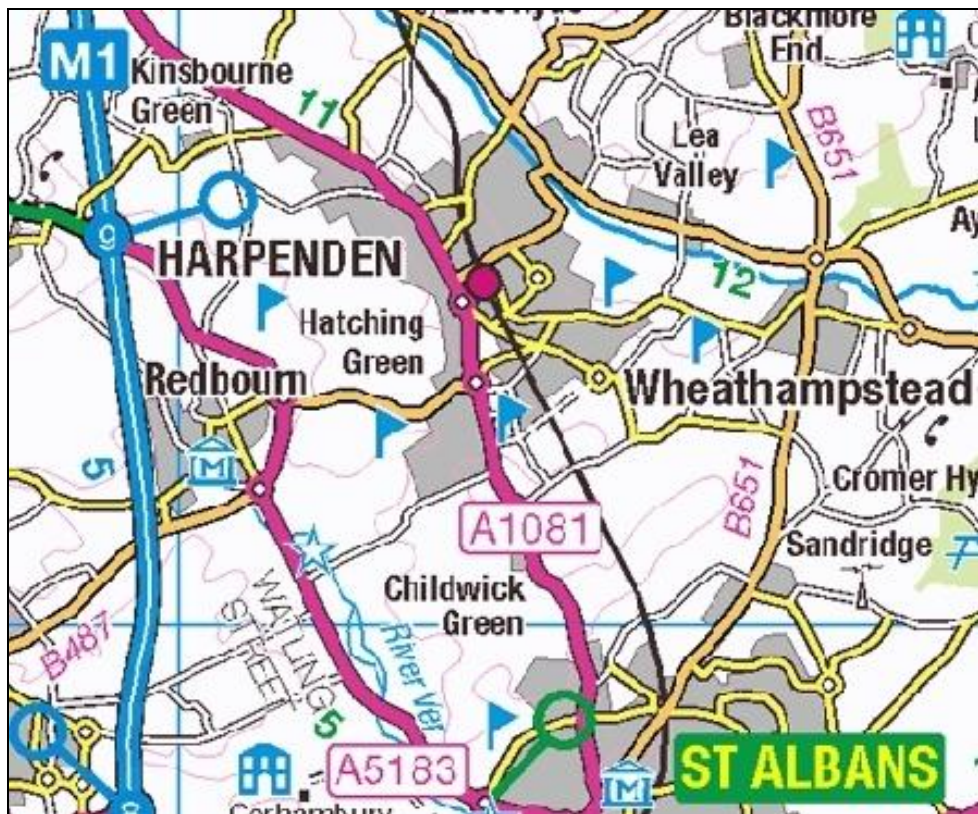
Due to the severity of the flooding, it was determined that this flood incident met the criteria in Policy 2 of HCC's Local Flood Risk Management Strategy (<http://www.hertsdirect.org/services/envplan/water/floods/floodrisk/lfrmsherts/>) and HCC subsequently commissioned a detailed flood investigation.

## **1.2 Site Location**

The village of Redbourn is situated to the north west of St Albans as shown in Figure 1.1. The site affected by flooding is located in the west of Redbourn, east of the M1, as shown in Figure 1.2.



**Figure 1.1 Redbourn, Hertfordshire – Location Map**



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**Figure 1.2 Areas affected by flooding in Redbourn**



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## **2. Background and History of flooding**

### **2.1 Previous flood events**

Information gathered from residents provided some background on historical flooding in the area. In December 2007, properties in Rose Acre were flooded during the construction phase of the M1 widening scheme as a result of inadequate temporary drainage. Adequate balancing ponds were subsequently put in place.

Following the 2007 flooding, the Highway Authority installed a raised speed table at the entrance to Rose Acre to provide a barrier and ensure flows were directed further along Lybury Lane.



### 3. Assessment of 7 February 2014 flood event

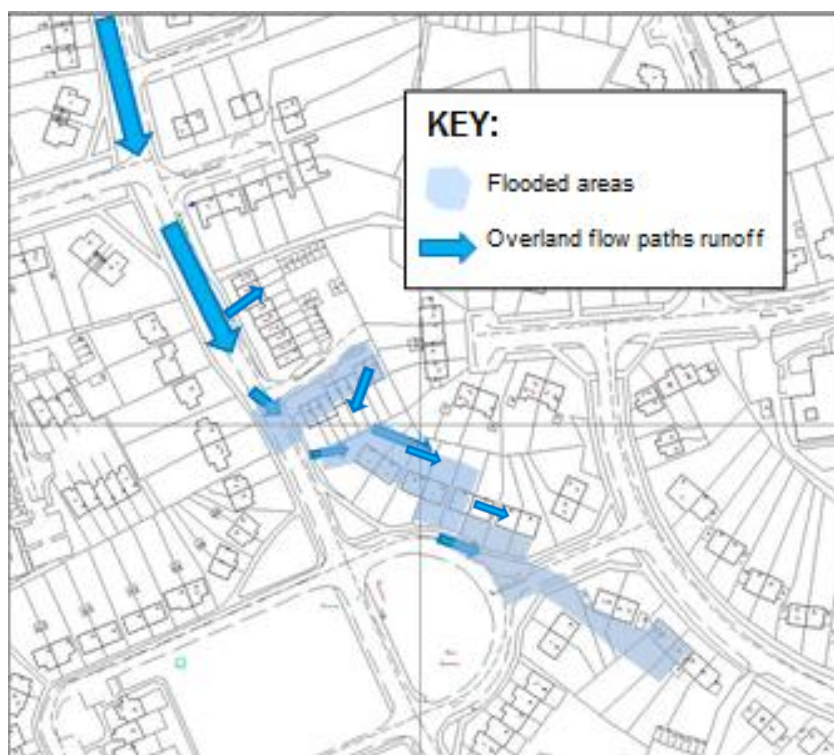
#### 3.1 Observations

In Redbourn in the early hours of the morning on 7 February 2014, heavy rainfall fell on saturated ground, causing surface water runoff from farmland onto an adjacent road, Lybury Lane. Water flowed down Lybury Lane, following the gradient of the land. The water spilled over the speed table at the entrance to Rose Acre, causing properties in this road to flood. The water continued down Lybury Lane and into the back gardens and properties of Ridgedown. The flow returned to the main road between two Ridgedown properties and subsequently flooded a number of properties in Snatchup.

Overland flow paths run southwards from farmland in the north, down Lybury Lane, then southeastwards into Rose Acre, Ridgedown and Snatchup, following the lowest point of the land.

A total of 20 properties were flooded; 15 internally. Figure 3.1 shows the flow route the water took.

**Figure 3.1 Overland flow paths**



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#### 3.2 Ground conditions

Following a series of heavy storms the ground in the catchment surrounding Redbourn was saturated, with no capacity to allow for the infiltration of additional rainfall.

### 3.3 Sources of flooding

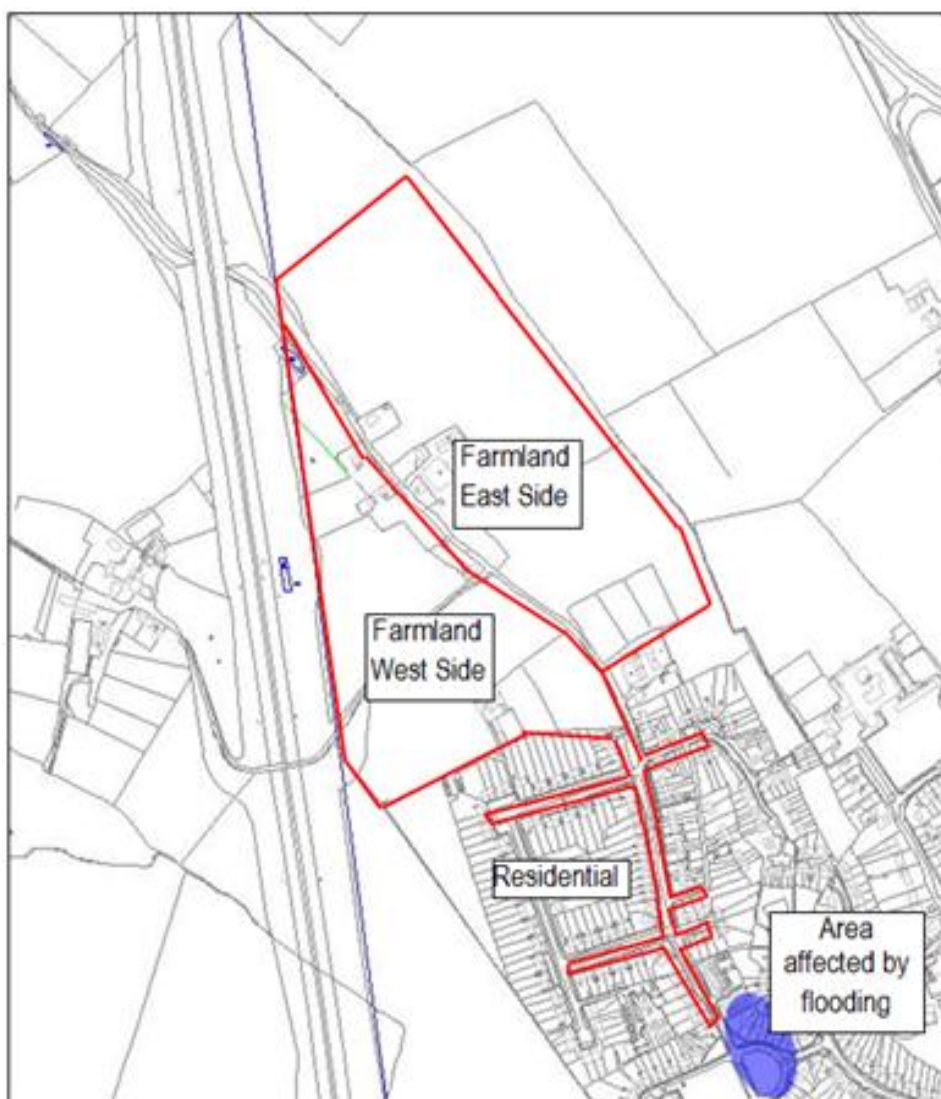
#### 3.3.1 Surface water runoff (pluvial)

The catchment that drains to the area which flooded measures approximately 20.4ha. This is shown below in Figure 3.2. The catchment is relatively steep, sloping from a high point to the north of approximately 123m elevation, to the lowest point in Rose Acre, at an elevation of approximately 110m. Snatchup is located at a further lower elevation of 108m.

There is farmland to the east and west of Lybury Lane, forming the northern catchment boundary. Residential areas form the southern part of the catchment.

Surface water runoff from farmland is funnelled to a low point, which eventually overflows into Lybury Lane, flowing southwards, making its way down the lane and into Rose Acre, Ridgedown and Snatchup.

**Figure 3.2 Catchment boundary**



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### **3.4 Highway drainage**

Lybury Lane has a number of road gullies, which connect further south into Ridgedown and subsequently into Snatchup. Whilst a road gully in Rose Acre connects into this system, the road is not part of the adopted highway and hence any maintenance for this gully is the responsibility of Rose Acre residents.

### **3.5 Structures and features**

The speed table at the entrance to Rose Acre is a significant barrier in protecting these properties from flood water coming down Lybury Lane, even though water spilled over into Rose Acre during the 7 February flood event. It is recommended that the speed table be placed on HCC's Flood Risk Asset Register as a structure which has a significant effect on flood risk in the area.

### **3.6 Possible causes of flooding**

The following are the key findings of the pluvial analysis and other flooding mechanisms that have been determined as part of this investigation:

- Winter 2013/2014 was one of the wettest on record for the region; and heavy (while not extreme) rainfall falling on already highly saturated ground with an elevated groundwater table has caused flood flows.
- Rainfall onto saturated farmland to the north-west of the site caused surface water runoff to flow directly towards the affected area.
- As the surface water flowed down Lybury Lane, accompanying silt and debris from farmland caused gullies to become blocked, limiting their effectiveness at draining water from the highway.

## **4. Responsible authorities and landowners**

HCC as the LLFA has investigated the flooding at Redbourn to establish the relevant RMAs that have Flood Risk Management Functions in accordance with the FWMA 2010. Those RMAs and their relevant powers and functions are set out below.

### **4.1 Hertfordshire County Council as Lead Local Flood Authority**

HCC as the LLFA for Hertfordshire has fulfilled its legal responsibility to carry out a Flood Investigation under Section 19 of the FWMA 2010, to;

1. Identify the relevant RMAs and;
2. Establish if those authorities intend to utilise their own powers and to what extent. The actions that the relevant RMAs have agreed to take are set out in Section 6.

In order to achieve the responsibilities under Section 19, HCC as LLFA must first establish the cause and impacts of the flooding and then identify, where possible, potential solutions as discussed in this report.

HCC as LLFA for Hertfordshire has powers to carry out flood risk management works for flooding from surface water runoff and ground water in accordance with the Local Flood Risk Management Strategy for Hertfordshire.

### **4.2 St Albans City & District Council**

St Albans City & District Council are the local planning authority for the Redbourn area and their role is to determine planning applications for new development, approve and assess any impacts from all sources of flooding and any associated proposed drainage.

### **4.3 Hertfordshire County Council as Highways Authority**

Lybury Lane, Ridgedown and Snatchup are adopted highways. HCC are the responsible authority to maintain and manage adopted highways, including associated drainage infrastructure such as gullies, drainage pipes, soakaways and any assets that lie within the highway boundary.

HCC Highways have powers to manage water on an adopted road under the Highways Act 1981, however where this water originates from third party land and not from runoff from the highway, these powers are limited.

### **4.4 Landowners**

Landowners are responsible for the management of their land, including any associated drainage. This will encompass drainage ditches, land management

practices and surface water runoff. They also have the right to allow their land to drain naturally but must manage this so that it does not cause a nuisance to others.



## **5. Conclusions and recommendations**

### **5.1 Conclusions**

A major factor contributing to the flooding was the amount, longevity and intensity of the rainfall during the days immediately preceding the flood event on 7 February 2014. The winter of 2013/14 has been confirmed to be the wettest winter on record for the UK.

This meant that with saturated soils throughout the catchment, the rain water could not enter the natural drainage system.

Whilst gullies in Lybury Lane were blocked with silt and debris during the flood event, the highway drainage system would have had a limited capacity in reducing the flood flows.

In order to develop and provide a suitable resolution to the flooding, there needs to be a collaborative approach between the LLFA, relevant landowners and all of the identified relevant RMAs.

## 5.2 Recommendations

The following are the recommendations of the county council, in its capacity as LLFA and follow from the main findings from the Section 19 flood investigation carried out into the flood event in Redbourn on 7 February 2014.

No.	Recommendations	Comments	RMA's and other parties to be involved
1.	Investigation of Property level protection	That individual properties have flood risk assessments with a view to retro-fitting protection to properties to increase resilience to flooding. This is for individual property owners to organise and fund, although there is a Repair & Renew Grant available for people that suffered internal flooding between 1 April 2013 and 31 March 2014. Advice is available from St Albans City & District Council.	<ul style="list-style-type: none"><li>• St Albans City &amp; District Council</li></ul>
2.	Survey and clean highway drainage system	That the highway drainage system in Lybury lane and surrounding roads affected by flooding be surveyed using CCTV to establish any serious structural defects which may be affecting performance. That any identified blockages be removed to ensure that the system free of debris and silt.	<ul style="list-style-type: none"><li>• HCC – Highways Authority</li></ul>
3.	Increase frequency of gully cleaning	That consideration is given to adding the gullies along Lybury Lane and in surrounding roads to the list of vulnerable gullies to increase the frequency of their cleaning schedule to greater than the current 18 month cycle.	<ul style="list-style-type: none"><li>• HCC – Highways Authority</li></ul>
4.	The development of a programme of surface water management	This to include a programme of measures that could include highways related works and land management measures in the upper rural catchment. These options	<ul style="list-style-type: none"><li>• HCC – LLFA</li><li>• HCC – Highways Authority</li><li>• St Albans City &amp; District</li></ul>

No.	Recommendations	Comments	RMA's and other parties to be involved
	measures to minimise, manage and mitigate any surface water runoff entering Lybury lane.	will need to be modelled to ensure that they carry no increased flood risk downstream. Any identified programme will be subject to appropriate cost-benefit appraisal as part of any bid process for funds to implement it	Council

## **6. Next Steps and Actions**

### **6.1 Lead Local Flood Authority**

The following are agreed actions to be undertaken by HCC in its capacity as LLFA;

1. To work with relevant partners, including the Highways Authority, St Albans City & District Council and local landowners to develop and test a programme of surface water management measures to minimise, manage and mitigate any surface water runoff entering Lybury Lane.

### **6.2 Highway Authority**

The following are suggested actions to be undertaken by HCC in its capacity as Highways Authority;

2. To survey and clean the highway drainage system in and around Lybury Lane.
3. To consider adding highways gulleys along and in the vicinity of Lybury Lane to the list of vulnerable gullies in order to increase the frequency of their cleaning to greater than the current 18 month cycle.
4. To work with the LLFA and other partners to develop and test a programme of surface water management measures to minimise, manage and mitigate any surface water runoff entering Lybury Lane.

### **6.3 St Albans City & District Council**

The following are suggested actions to be undertaken by St Albans City & District Council;

5. To support affected residents in securing nationally funded Repair and Renew Grant for the installation of appropriate property flood protection measures.
6. To work with the LLFA and other partners to develop and test a programme of surface water management measures to minimise, manage and mitigate any surface water runoff entering Lybury lane.

## **7. Disclaimer**

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

The findings of the report are based on a subjective assessment of the information available by those undertaking the investigation and therefore may not include all relevant information. As such it should not be considered as a definitive assessment of all factors that may have triggered or contributed to the flood event. NHTB Consultancy and Hertfordshire County Council expressly disclaim responsibility for any error in, or omission from, this report and the supporting technical assessment Report arising from or in connection with any of the assumptions being incorrect.

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