Flood Investigation Report

Investigative report into the flooding at Lightwood Road, Buxton on the 31st July 2019

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Document Information

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Executive Summary

This Flood Investigation Report has been produced by Derbyshire County Council (the Council) fulfilling duties under the Flood and Water Management Act (FWMA, 2010) as the Lead Local Flood Authority (LLFA) for Derbyshire.

Section 19 of the FWMA states that on becoming aware of a flood within their local area the LLFA should investigate the flooding event to an extent considered necessary or appropriate.

The Council has produced a LLFA policy which stipulates locally agreed thresholds for undertaking a Section 19 flood investigation in Derbyshire. The LLFA has deemed it necessary to carry out a formal investigation into the flood incident which occurred at Lightwood Road, Buxton on July 31st 2019, as it met locally agreed criteria.

The flood event of July 31st 2019 resulted in internal damage to properties on Lightwood Road. The flooding was a resultant impact of a culverted section of the Hogshaw Brook becoming overwhelmed by a significant volume of water.

Between the 27th and 31st of July the area experienced prolonged rainfall events. On July 31st 2019 the Met office issued a severe yellow weather warning for rain valid for a 24 hour period, during which the area was subject to two intense 6 hour rainfall event.

There are a number of Risk Management Authorities (RMAs) that have relevant flood risk management responsibilities and functions in the affected area.

The identified RMAs, and other groups (including riparian landowners), will continue to work together, sharing information and reports, with the aim of meeting the recommendations and actions contained in this report.

1. Introduction

1.1 Section 19 Investigations – Duty to Investigate

Section 19 of the FWMA states:

(1) On becoming aware of a flood in its area, a LLFA must, to the extent that it considers it necessary or appropriate, investigate :
   a. which RMAs have relevant flood risk management functions, and
   b. whether each of those RMAs has exercised, or is proposing to exercise, those functions in response to a flood event.

(2) Where an authority carries out an investigation under section 1 (above) it must:
   a. publish the results of its investigation, and
   b. notify any relevant RMAs.

1.2 Derbyshire's Locally Agreed Criteria for Formal Investigation

The Council identified local thresholds for formally investigating flood incidents across Derbyshire within LLFA policy. Within this policy each characteristic of flooding has had a threshold pre-determined as to when a formal flood investigation will be triggered within Derbyshire.

- **Number of properties internally flooded -** An event where records or anecdotal evidence shows that five or more residential properties, or two or more non-residential properties (industrial/commercial) affecting employment, have been internally flooded.

More information regarding the LLFA policy and local thresholds can be found online at http://www.derbyshire.gov.uk/environment/flooding/default.asp.

A formal investigation into the flood incident at Lightwood Road, Buxton on the 31st July 2019 has been undertaken because the event triggered one of the locally agreed flooding 'characteristics' as follows:

- According to anecdotal evidence, 32 residential properties were internally flooded.

Although critical infrastructure was not impacted by the flood, water on Lightwood Road had a significant impact on local residents given that access and egress from affected homes was restricted.

2. Background

2.1 Location

The town of Buxton is situated on the North West edge of the county boundary (Figure 1 inset) within the borough of High Peak. Lightwood Road (the location of the main impacts from the flood event) is located to the north of the Town (as annotated on Figure 1).

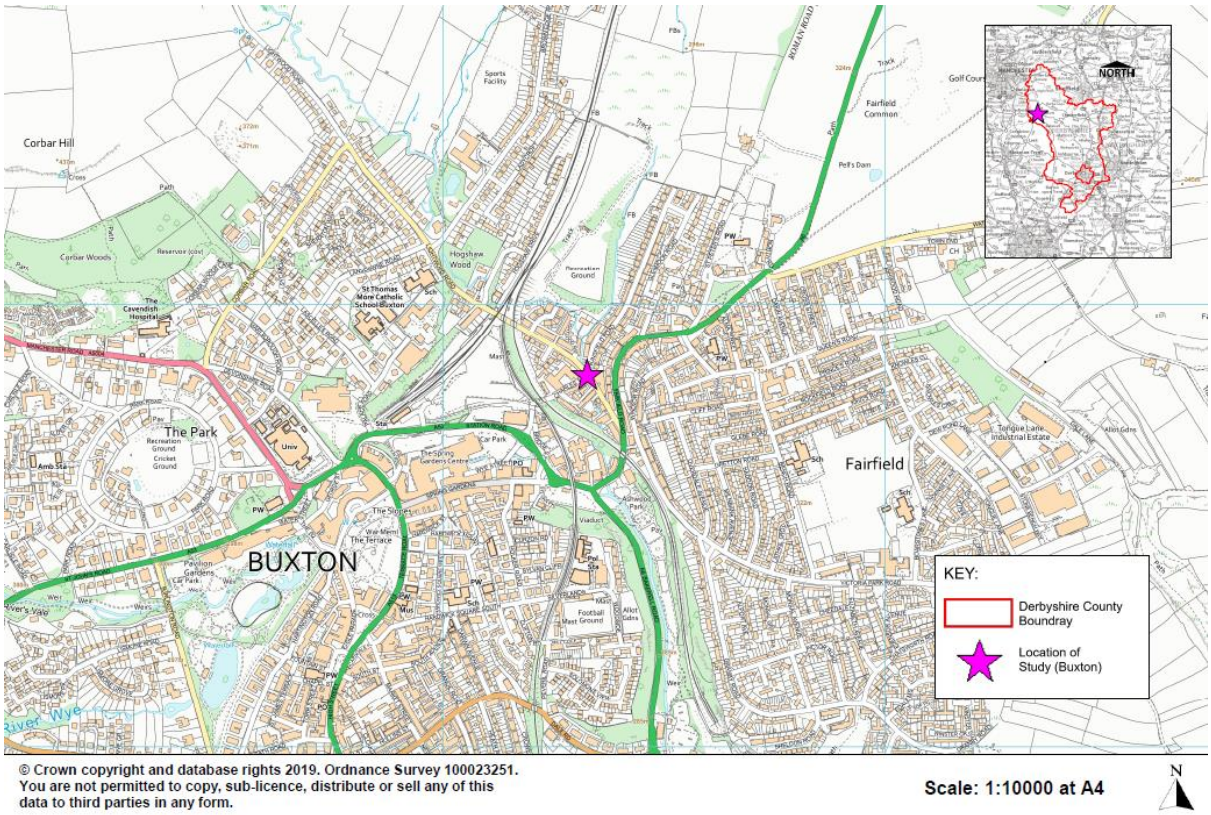

Figure 1: Location Plan

2.2 Local Drainage System

The Hogshaw Brook and Nun Brook converge to the north of the Hogshaw area of Buxton. The watercourse from this point is classed as Main River 'Hogshaw Brook' (as annotated in Figure 2) The Hogshaw Brook flows through a series of culverts, A section of culvert is partially a Derbyshire County Council (highways) asset where it is under the public highway, with the rest of the structure being the responsibility of the riparian owners (see Figure 2) prior to joining the River Wye.

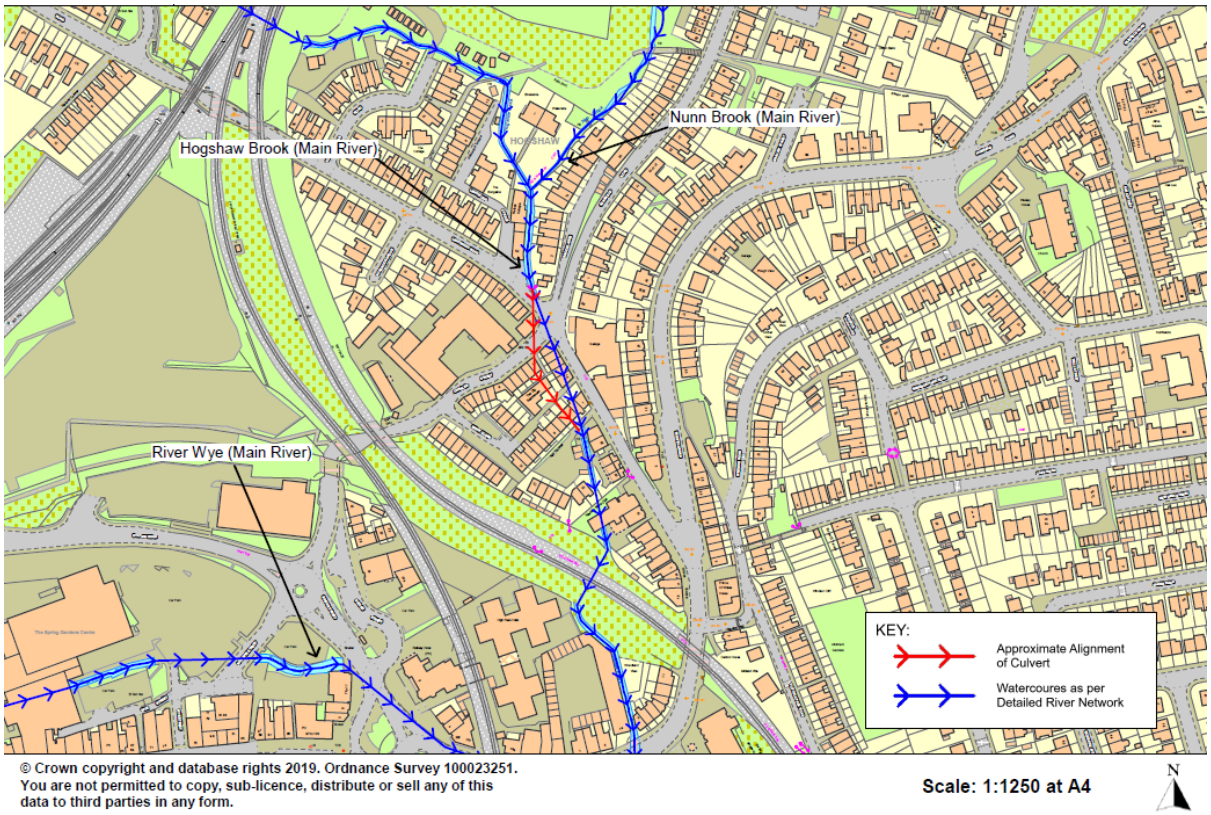

Figure 2: Location of watercourses at Lightwood Road

The Hogshaw Brook and Nun Brook are steeply sided, rapid response catchments. The approximate catchment that drains towards Lightwood road can be seen in Figure 3.

The public sewer network (Severn Trent Water) appears to be predominately made up of surface/combined sewers which all converge through Buxton town centre and flow southward down the valley towards the waste water treatment works near the Morrison's superstore, adjacent to the River Wye. There are localised highway drainage networks, which will discharge through various outfall points into the main rivers and ordinary watercourses.

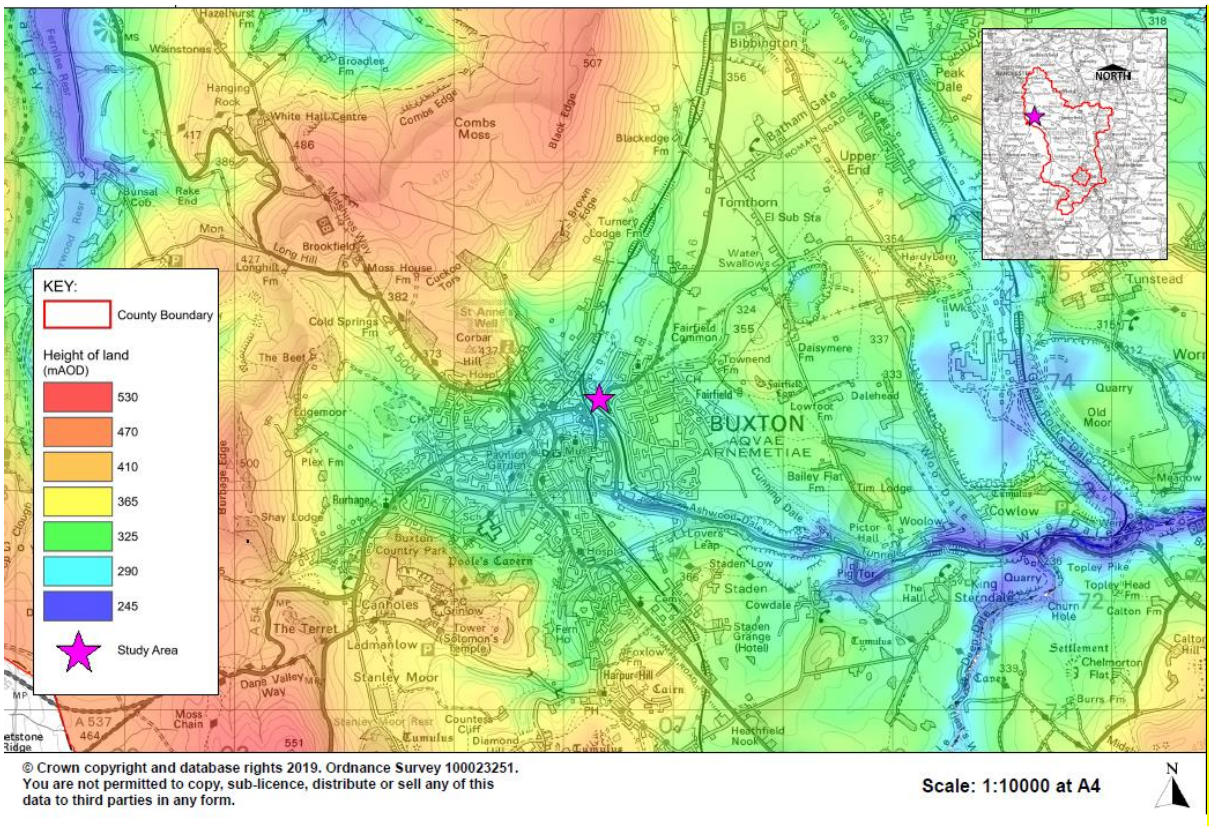

Figure 3: Topographic plan of Buxton

2.3 Historical Flood Information

The Council hold a suite of data relating to flooding for Derbyshire obtained from various sources. Prior to the events of the 31st July 2019, the council had received no historical flood information in the vicinity of Lightwood Road.

Despite the Council not holding historical flood information, we have obtained pictures indicating past flooding events in 1975 and 1998 (Figure 4) on Lightwood Road, which clearly show that on both occasions properties and business, experienced internal flooding

	
1975	1998
	
1975	1998

Figure 4: Historical Flooding onLightwood Road.

3. Flooding on the 31st July 2019

The majority of the information supporting the description of the flooding incident is Based on first-hand accounts of residents obtained by the county council, Environment Agency, & High Peak Borough Council through enquires reported by affected residents and a site visit in response to the reported flooding on 31st July 2019.

3.1 Information Prior to the Event

Prior to the event, on the 30th July 2019 the Met Office issued a yellow severe weather warning for Rain Northern England and part of the East Midlands valid between 00:00 to 23:59 31st July 2019 (Figure 5). The weather warning included the northern part of Derbyshire, including Buxton.

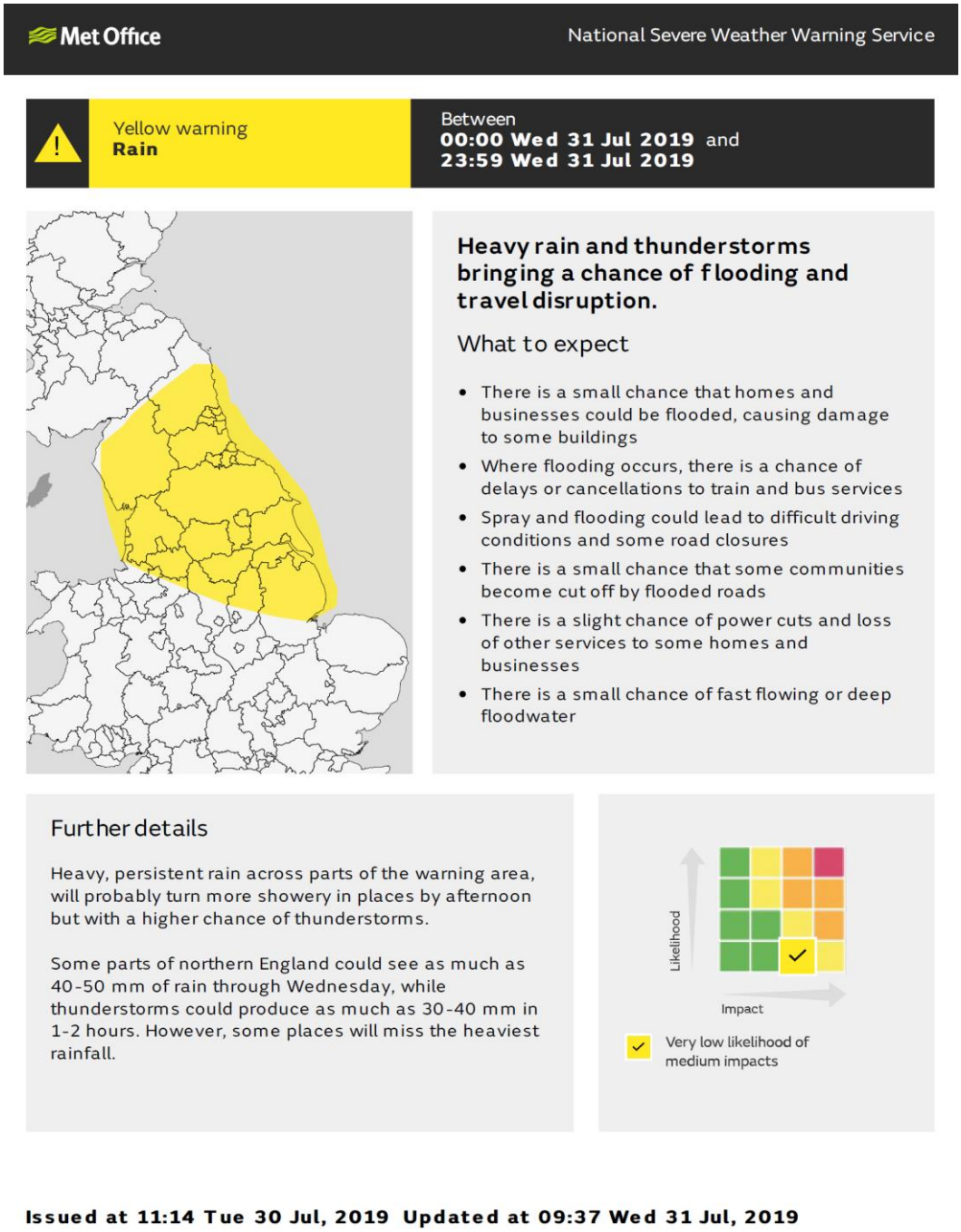

Figure 5: Met Office yellow weather warning for rain

The yellow weather warning predicted some areas of northern England and the East Midlands could receive as much as 40-50 mm of rainfall on the 31st July 2019. It was also predicted that thunderstorms in some areas could produce up to 30-40 mm of rainfall in 1-2 hours.

3.2 Description of the Event

In the preceding few days' successive bands of slow moving showers gave torrential downpours and spells of intense rainfall. It is estimated that rainfall totals of around 200mm fell in the area between Saturday 27th July and Wednesday 31st July.

The rainfall across the Peak District during the period between 26th July and 31st July was 150 to 200% more of the July long term average rainfall, in only 6 days (Met Office)

The Hogshaw Brook and Nun Brook are steeply sided, rapid response catchments which meant there was very little lead time from the rainfall to the flooding impacts which occurred in the area. It has been calculated that this event had a rainfall return period of 1 in 75 years.

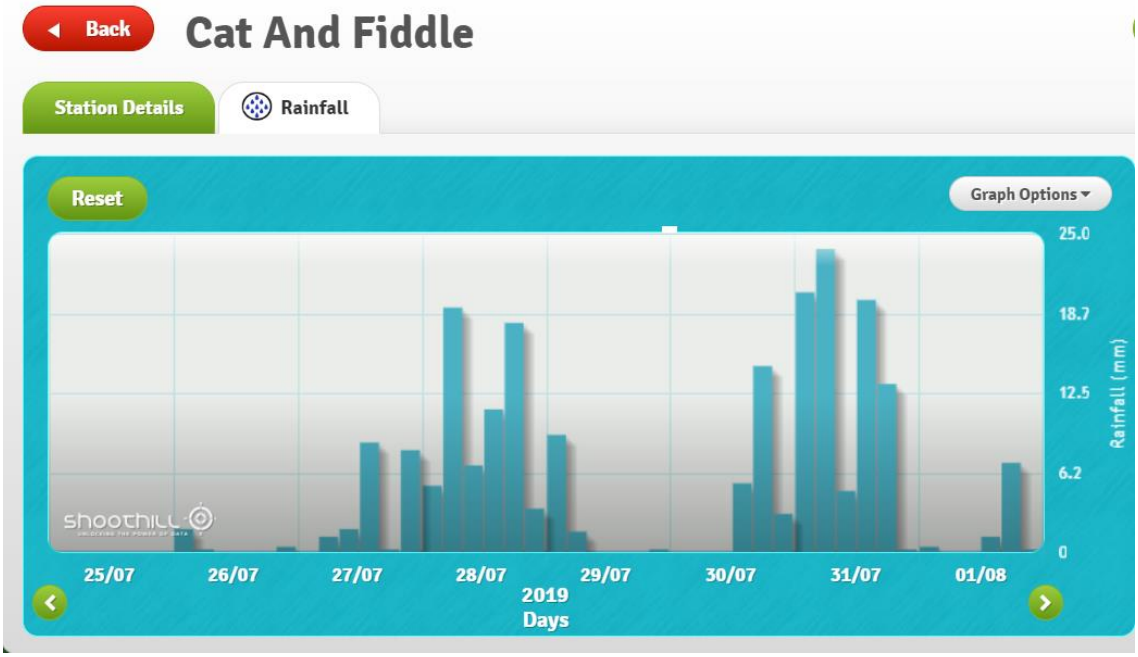

Figure 6: Rainfall Data

A rainfall gauge located to the west of Buxton (Cat and Fiddle Inn, off the A537) recorded 97mm rainfall total in 24 hours. Hydrology analysis showed two periods of intense rainfall on the day of the flood event, 40mm in 6 hours on Wednesday morning with another 35mm in 6 hours in the afternoon.

It should be noted Hogshaw Brook is classed as Main River. (Environment Agency) However it did not have a Flood Warning Area at the time, and therefore no Flood Warnings were issued prior to the event.

The main impacts of the event took place on 31st July 2019. It is reported that 32 properties were flooded during the event as well as the roads in the surrounding area.

Figure 7: Photographs taken of the flooding (Lightwood Road) on 31st July 2019

It is understood that the sheer volume of water overwhelmed the Hogshaw Brook culvert on Lightwood Road, and subsequently overtopped at the points where the watercourse is open, causing significant flooding to the surrounding area. (See Figure 7, above).

It is also very likely that the drainage systems which serve the Lightwood Road Area (public sewers, highway drains and other culverted watercourses/private drainage) would have become inundated and reached/exceeded capacity very quickly, given the steep nature of the catchment, and the heavy rainfall over a short period of time. This would have been compounded by the fact that the majority of the drainage outfalls into the river system, would have been surcharged, and therefore unable to discharge like they would normally do, under dry weather flow conditions.

It is worth noting that the river levels and floodwater did recede relatively quickly (only a few hours) after the rain had stopped.

3.3 Post Event – Damaged Culvert

On the 31st July 2019 the Lightwood road culvert on the Hogshaw Brook, had been significantly damaged due to the volume of water overwhelming the culvert. After investigation by the Council and the Environment Agency it was found that a section of the culvert was structurally damaged which was in multiple private ownership (at least two property owners, 1 residential and 1 business), as highlighted in Figure 8. Due to the scale and complexity of the works required, the public safety risks, and speed in which the situation needed to be rectified, it was concluded by both the Council and the Environment Agency,that this could not be left to the riparian owners to rectify. As it was beyond the capability and financial capacity of the landowners to rectify, using permissive powers under the Land Drainage Act (LDA) 1991, Derbyshire County Council and the Environment Agency stepped in to rectify the situation – primarily due to the increased flood risk at significant depths to the wider population, as well as the risk to life, should the culvert catastrophically fail under the properties. Due to the immediate health and safety concerns the Council contacted 7 residential properties and 1 business advising that evacuated until the culvert repair was completed.

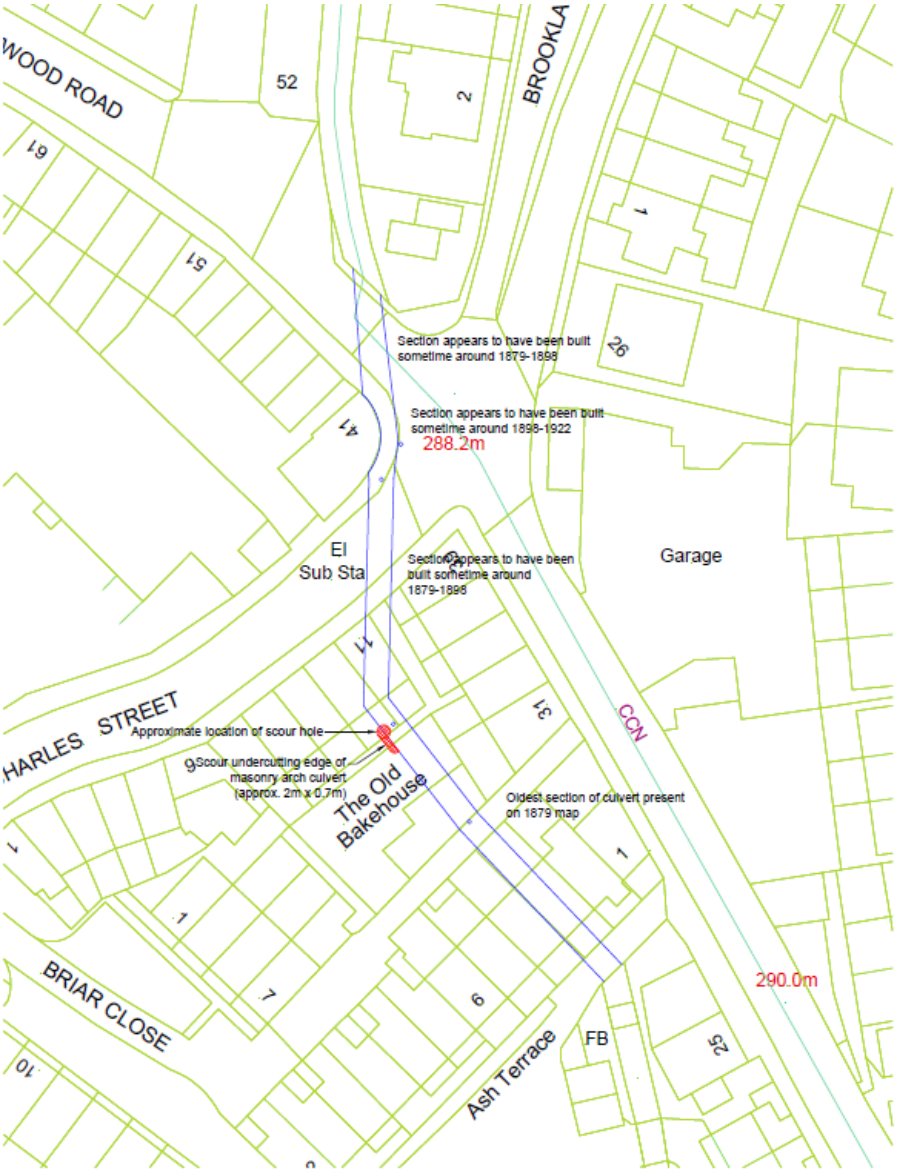

Figure 8: Line of Culvert showing location of defect

Within a matter of hours, the Environment Agency created an emergency flood warning area, in the event of further significant rainfall and the collapse of the culvert. Emergency procedures were created to warn residents which would be affected, and to deploy emergency pumps to the area if required.

The culvert repairs works were successfully completed on the 13th September 2019.

4. Summary of Findings

- Rainfall data demonstrates that the area was subject to a short intense rainfall event, on what was an already saturated catchment.
- The flooding which affected numerous properties on Lightwood Road, Buxton was a combination of both fluvial and pluvial flooding.
- Given the steep topography of the catchment, both river and drainage systems became inundated very quickly.
- Overtopping of the Hogshaw Brook occurred, at the open sections of the watercourse.
- As a result of the above factors, flooding occurred to 32 properties in the Lightwood Road area of Buxton.
- Due to the significant public safety and flood risk concerns, the damage to the culvert caused by the storm event, were undertaken as quickly as possible.

5. Responsibilities and Future Actions

5.1 Derbyshire County the Lead Local Flood Authority for Derbyshire

As an LLFA, the Council has the responsibility to coordinate the management of flood risk and the interaction of RMAs across Derbyshire.

As stated within the Introduction section, the Council as the LLFA has a duty to investigate flood incidents under Section 19 of the FWMA. Publication of this report is the conclusion of that process.

5.2 Derbyshire County Council Highways

The Highways department have a responsibility to maintain highways across Derbyshire, and for the installation, operation and maintenance of highway drainage infrastructure which falls within the adopted highway curtilage in Derbyshire.

5.3 Other Risk Management Authorities (RMA)

There are also other RMA's that have relevant flood risk management responsibilities and functions in Buxton as follows:

Environment Agency – Is responsible for taking a strategic overview of the management of all sources of flooding, and also has an operational responsibility for managing the risk of flooding from Main Rivers (eg; Hogshaw Brook)

Severn Trent Water - Responsible for maintaining public sewers and managing the risk of flooding from the public sewer network.

High Peak Borough Council - The district and borough councils have responsibilities to inspect and maintain watercourses on their land, respond to requests for assistance during flood events and have the power, if instructed by Derbyshire County Council, to carry out flood risk management work which will benefit management of surface runoff, groundwater and ordinary water courses.

5.3 Actions

Derbyshire County Council and Environment Agency has agreed/ undertaken the following:

- The Environment Agency, Derbyshire County Council and High Peak Borough Council undertook a site visit the day after the event, to obtain further information, and to support the residents and businesses affected by internal flooding.

- DCC and the Environment Agency coordinated a repair of the damaged section of culvert.

- Grant funding has been obtained to implement Natural Flood Risk Management solutions in the upper reaches of the Hogshaw Brook Catchment to try and mitigate the flood risk to properties further downstream (eg Lightwood Road) This work is being undertaken in partnership with DCC, Environment Agency Derbyshire Wildlife Trust and private landowners.

- A permanent Flood Warning area has been created for the Hogshaw Brook Catchment, which enables residents in this area to receive Flood Warnings/Alerts from the Environment Agency.

6. Conclusion

- The Lead Local Flood Authority (Derbyshire County Council) is satisfied that all Risk Management Authorities have exercised, or are proposing to exercise, their respective functions, in response to this flood event (before, during and after).

- The Lead Local Flood Authority will continue to work with all of the Risk Management Authorities, to try and reduce the flood risk to properties and infrastructure, along with trying to ensure that the community is even more resilient and prepared, should there be further events of this nature in future years.

6. Sources of Information

The following documents, reports, records or sources of information have contributed to this report and are available on request:

The following documents, reports, records or sources of information have contributed to this report and are available on request:

- Flood Forecasting Centre and Met Office statements and warnings.
- Reports from affected residents.
- Shoothill Gauge Maps.

6.1 Links to other information on flooding

Derbyshire County Council
Flooding Pages
https://www.derbyshire.gov.uk/environment/flooding/flooding.aspx

National Flood Forum
National Flood Forum website: https://nationalfloodforum.org.uk/

Gov UK Flood Warning Information Service
Website: https://flood-warning-information.service.gov.uk/
Sign up to flood warnings here: https://www.gov.uk/sign-up-for-flood-warnings

7. Status of Report and Disclaimer Information

This report has been prepared as part of the Council's responsibilities under the Floods and Water Management Act 2010.

The findings of the report are based on a subjective assessment of the information available by those undertaking the investigation and therefore may not include all relevant information. As such it should not be considered as a definitive assessment of all factors that may have triggered or contributed to the flood event.

The opinions, conclusions and any recommendations in this report are based on assumptions made by the Council when preparing this report, including, but not limited to those key assumptions noted in the report, including reliance on information provided by others.

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