

6th June 2014

Buckinghamshire County Council

Flood Investigation Report

Lower Road (B4443), Stoke Mandeville, Winter
2013/2014



Photos from the Bucks Herald and BCC Resilience Team – 5th February 2014

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Revision Schedule

Buckinghamshire County Council **Flood Investigation Report**

06/06/2014

Final Revision number = 3

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1	23/05/2014	Draft for Review	Alex Back	Karen Fisher
2	29/05/2014	Final Draft for Comment	Alex Back	
3	06/06/2014	Final	Alex Back	Karen Fisher

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Executive Summary

This report has been produced by Buckinghamshire County Council to investigate the flooding that occurred on Lower Road (B4443) in Stoke Mandeville during winter 2013/2014. The report is being produced to detail the event and to improve responses to flood events in the future by making recommendations.

A section 19 investigation is a statutory requirement for Lead Local Flood Authorities (LLFA) required under the Flood and Water Management Act (FWMA) 2010. The LLFA in the area of Aylesbury is Buckinghamshire County Council. On becoming aware of a flood in its areas, a LLFA must, to the extent that it considers necessary or appropriate, investigate:

- which risk management authorities have relevant flood risk management functions; and
- whether each of those risk management authorities have exercised, or is proposing to exercise, those functions in response to the flood.

It is necessary to produce this report as the flood incident exceeded Buckinghamshire County Council's criteria for carrying out a Section 19 investigation with a Class A and B highways and other railway links – closed for 4 hours or more. Lower Road (B4443), Stoke Mandeville was closed from 20:16 on 14th February to 12:36 on 16th February a total of 40 hours.

This report will be published for public view and all Risk Management Authorities relevant to the flood event will be informed of the Section 19 report upon publication.

The aim of the Section 19 investigation is to give an explanation of what happened in the flood event and what were the Risk Management Authorities (RMAs) responsibilities during the event. The recommendations are there to help the RMAs learn lessons from the event and to move forward with management of the flood risk in the future.

The flood on 7th February 2014 occurred after a long period (over 6 weeks) of above average rainfall leading to a saturated catchment and the road drainage system close to capacity. The high rainfall in the early hours on 7th February 2014 created too much surface water runoff for the surface water drains to convey away from the roads.

The main conclusions show that the catchment was saturated from heavy rain in the previous months. Resources around the area were very stretched with different flood events. TfB located two blockages in the road drainage system have repair and have planned to repair the other one before the end of this financial year. The

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operational response to this event was not perfect as road closures were not enforced effectively.

A list of recommendations is included in the report which is intended to ensure that the flood management, warning and response to events are improved going forward. All the RMAs will be involved in taking forward these recommendations.

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1. Introduction

1.1 Background to investigation

This report covers a Section 19 flood investigation for Lower Road, Stoke Mandeville. Flooding occurred in this area on 5th February 2014, and on several other dates around this, closing the road on more than one occasion and flooding one property internally.

A section 19 investigation is a statutory requirement for Lead Local Flood Authorities (LLFA) required under the Flood and Water Management Act (FWMA) 2010. The LLFA in the area of Aylesbury is Buckinghamshire County Council. On becoming aware of a flood in its areas, a LLFA must, to the extent that it considers it necessary or appropriate, investigate:

- which risk management authorities have relevant flood risk management functions; and
- whether each of those risk management authorities have exercised, or is proposing to exercise those functions in response to the flood.

Where a LLFA carries out an investigation, it must:

- Publish the results of its investigation; and
- Notify all relevant risk management authorities of its intention to investigate.

Buckinghamshire County Council as LLFA has established a criteria for Section 19 flood investigations which can be found in the appendices. The flood event in the Willows area of Aylesbury is being investigated under section 19 of the FWMA as it meets the criteria of:

- Class A and B highways and other railway links – closed for 4 hours or more Lower Road (B4443), Stoke Mandeville was closed from 20:16 on 14th February to 12:36 on 16th February a total of 40 hours.

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1.2 Site Location

Lower Road is located in Stoke Mandeville to the south of the hospital as shown in Figure 1 (National Grid Reference SP 83048, 10708).

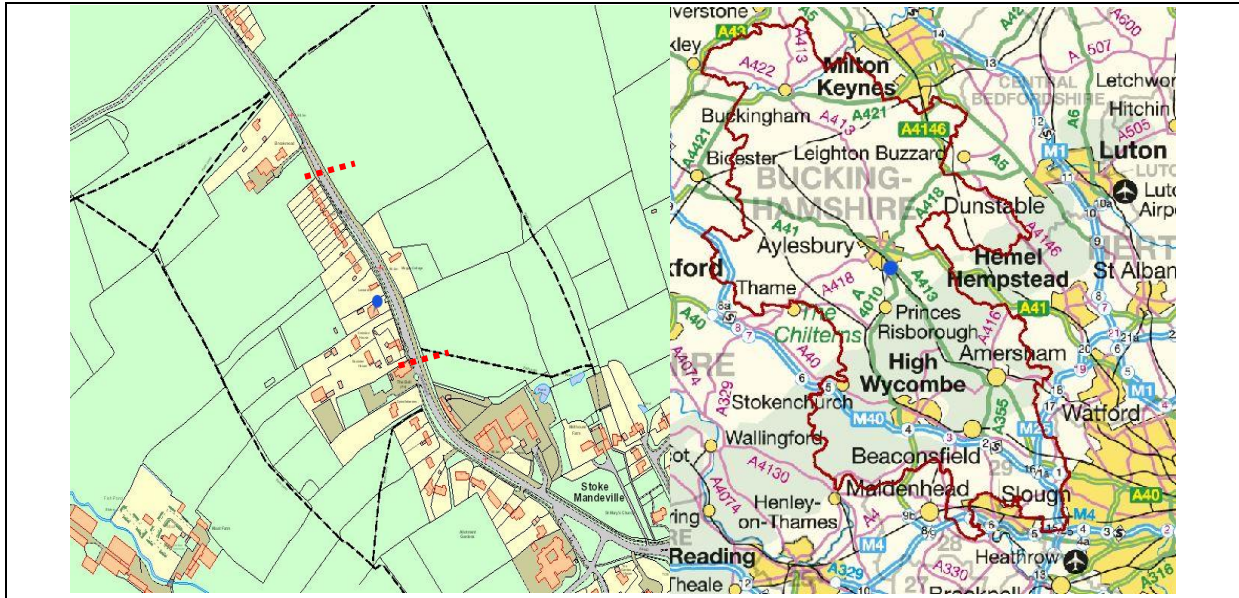


Figure 1 Location maps for Lower Road, Stoke Mandeville at County and local level – road closure marked by red dotted lines (Ordnance Survey License 100021529 2014)

1.3 Timeline of investigation

Lower Road, Stoke Mandeville was highlighted as requiring a flood investigation very soon after the event in discussions with the Risk Management Authorities (Bucks CC, AVDC, TfB). Bucks CC have collected and collated information from a number of sources including other Risk Management Authorities (RMAs), local press reports and local residents.

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2. Background/ History of flooding

2.1 Catchment characteristics

Figures 2 and 3 below show the surface water flood maps for the Lower Road area. The surface water flooding in different events shows the different depths of flooding in 1 in 100 year (fig 2) and 1 in 1000 year (fig 3). The surface water flooding would occur when extreme rainfall falls on the ground and cannot flow into the rivers as the river is either full and/or the volumes of water are too great for the drainage pipes leading to the river.

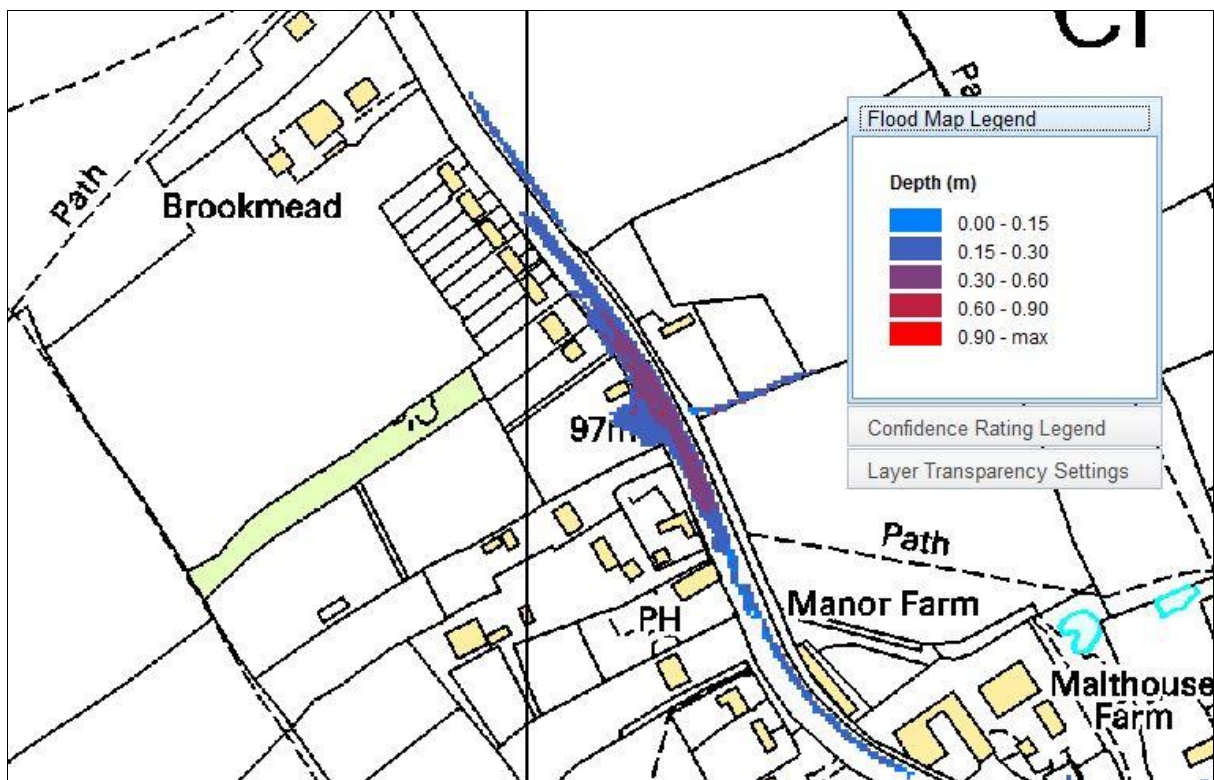


Figure 2 1:100 year Surface Water flood map showing predicted depth in the Lower Road area (EA, 2013)

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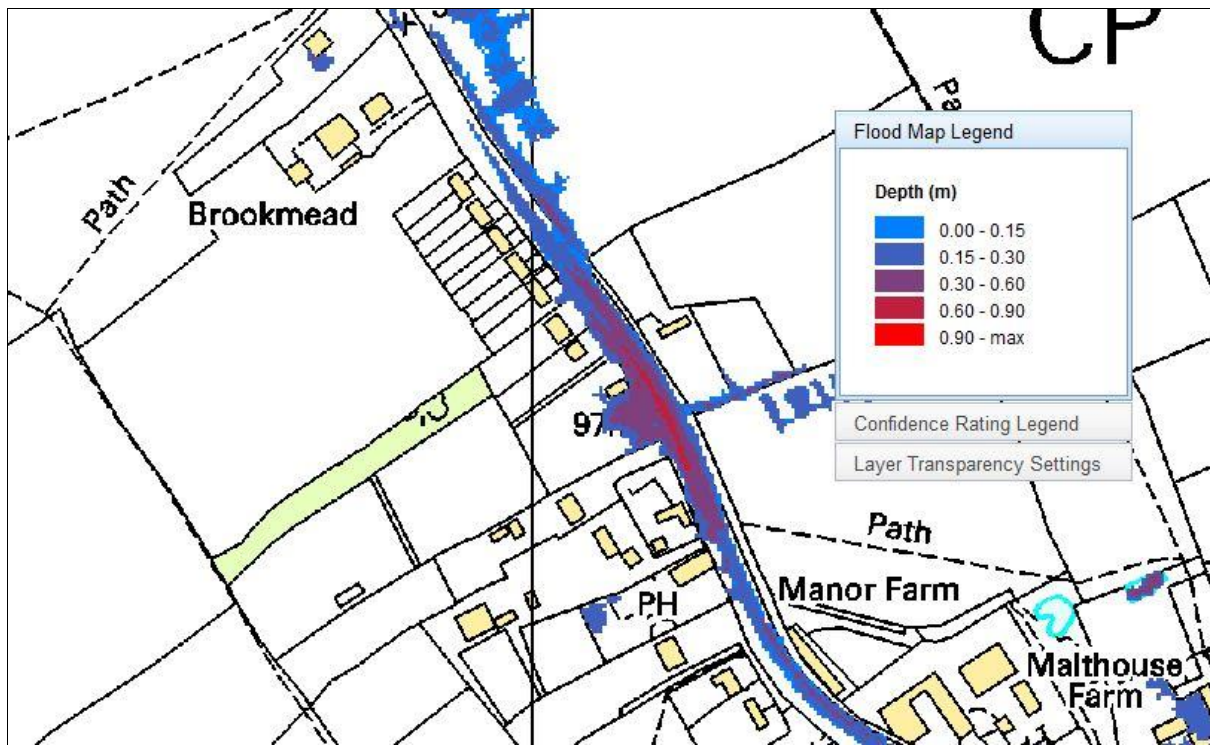


Figure 3 1:1000 year Surface Water flood map showing predicted depth in the Lower Road area (EA, 2013)

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2.2 Previous flood events

There have been previous flood events recorded in this area. During the investigation records from a local resident have shown that Lower Road, Stoke Mandeville flooded on the following dates;

- 24/12/2014
- 01/01/2014
- 04/01/2014
- 07/01/2014
- 09/01/2014
- 16/01/2014
- 26/01/2014
- 29/01/2014
- 31/01/2014
- 03/02/2014
- 05/02/2014
- 06/02/2014
- 07/02/2014
- 13/02/2014
- 14/02/2014
- 15/02/2014
- 16/02/2014

2.3 Data

The rain gauge recorded a cumulative total from 24th December to 16th February was 195mm (Figure 4). The preceding conditions would have been saturated soil meaning that the rain that fell during the events shown in section 2.2 will have runoff quickly into the road and into the surface water drains especially during peaks in rainfall on 23rd December 2013 and 5th and 7th February 2014.

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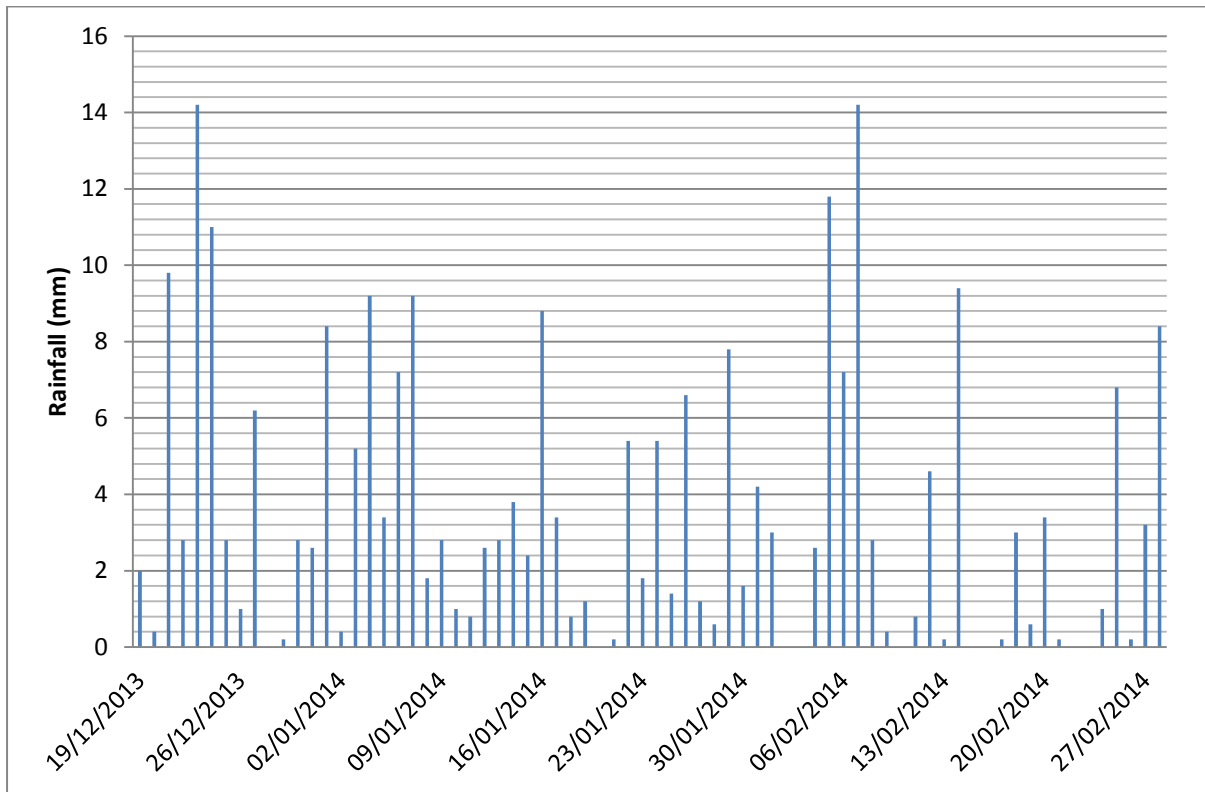


Figure 4 Daily total rainfall for EA Rain gauge at Aylesbury STW

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2.4 Drainage assets/ structures or features that affect flood risk

Figure 5 shows the gullies and other drainage assets on Lower Road these are all connected into the surface water drainage system.



Figure 5 Map showing road gullies in Lower Road, Stoke Mandeville

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3. Analysis of 7th February 2014 flood event

3.1 Conditions at the time

Rainfall during December 2013, January and early February 2014 meant that the whole catchment was saturated. This meant that when the rain fell during the flood events it ran-off the land straight onto the road and into the surface water drains.

3.2 Condition of features/ structures

There were three blockages within the drainage system within the road drains which, when combined with the heavy rainfall, caused the road to flood.

3.3 What happened? (Flows paths, damage etc.)

The heavy rainfall overwhelmed the drainage system this was exacerbated by a couple of blockages within the drainage system leading to the flooding of Lower Road on several occasions during the winter and flooding of a residential property internally in early February. The flood also almost flooded another residential property but this had a narrow escape but the drive way was unusable throughout the flooding and so the residents had to park their cars elsewhere.

3.4 Incident Response

Lower Road (B4443), Stoke Mandeville was closed for a period of 40 hours from 20:16 on 14th February to 12:36 on 16th February 2014. Flood and slow boards were placed out during January and February 2014 on the following occasions;

01/01/14 @ 21:38 Flood and Slow Boards placed out,
16/01/14 @ 19:37 Flood and Slow Boards placed out,
14/02/14 @ 20:16 Road Closed.
15/02/14 @ 20:00 South Bound Lane Passable,
16/02/14 @ 12:36 Road now passable, but flood boards left out.

During the road closures it was noted on several occasions by local residents that vehicles were not obeying the signs which further exacerbated, by causing waves of flood water to wash up towards the properties, the flooding issues for the two residential properties.

TfB used their heavy duty jetter, operated by a gully crew, on several occasions to clear the silt and debris from the drainage system. Following these site visits TfB excavated the footway/verge in an attempt to identify any problems or reason for the

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flooding issue. Three blockages were identified in the main drainage line, between numbers 69 and 8 on Lower Road which could not be cleared with a jetter and therefore repairs were carried out.

3.5 Possible causes

Conditions of pipes, gullies and culverts

As mentioned above there were three blockages within the drainage lines on Lower Road which would have added to the flooding during the heavy rainfall events of winter 2013/14.

4. Responsible Authorities and landowners

There are different responsibilities for flood management depending on the type of flooding. Organisations responsible for flooding are known as Risk Management Authorities (RMAs) and their responsibilities are detailed below. Riparian landowners also have responsibilities for watercourses across their land and these are also detailed below. These are summaries of the details included in the Bucks CC Local Flood Risk Management Strategy (2013-2018).

4.1 Lead Local Flood Authority

The Lead Local Flood Authority in this area is Buckinghamshire County Council. Bucks CC have a role as a Risk Management Authority in coordinating management of local flood risk from surface water, ground water and ordinary watercourses in the county. Any flooding from surface water comes under Buckinghamshire County Council as the LLFA.

4.2 Aylesbury Vale District Council

Aylesbury Vale District Council (AVDC) have responsibilities to inspect and maintain watercourses on District Council land, respond to requests for assistance during flood events and have the power, if instructed by BCC, to carry out flood risk management work which will benefit management of surface runoff, groundwater and ordinary water courses.

4.3 Environment Agency

The Environment Agency is one of the risk management authorities (RMAs) as defined by the Flood and Water Management Act (FWMA) 2010. Protecting the river environment and managing flood risk is part of their job. The Environment Agency is the RMA for flooding from main rivers.

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4.4 Highways Authority – Transport for Buckinghamshire

Any flooding from highways is managed by the Highways Authority which is Buckinghamshire County Council and the highways function is managed by Transport for Buckinghamshire.

4.5 Water Utility Company – Thames Water

Thames Water are responsible for flooding from foul sewers and surface water sewers which they own. Whilst undertaking this they must manage flood risk from sewers.

4.6 Landowners and riparian owners

Landowners and riparian owners must maintain any culvert, or the bed and banks of any adjacent watercourse. They should clear away any debris from the watercourse or culvert even if it did not originate from their land.

Riparian owners can find further guidance on their responsibilities as landowners in the Environment Agency document “Living on the Edge” which can be found online at; https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/297423/LI_T_7114_c70612.pdf.

4.7 Residents

Residents have a responsibility to take measures to protect themselves and their property when flooding is imminent.

4.8 Emergency Responsibilities

The emergency responsibilities are outlined in table 1 below.

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Table 1 Roles and responsibilities in an emergency, during and after a flood event

Local (County and District) Authorities <ul style="list-style-type: none"> • Coordinate emergency support within their own functions • Deal with emergencies on 'non main rivers' • Coordinate emergency support from the voluntary sector • Liaise with central and regional government departments • Liaise with essential service providers • Open rest centres • Manage the local transport and traffic networks • Mobilise trained emergency social workers • Provide emergency assistance • Deal with environmental health issues, such as contamination and pollution • Coordinate the recovery process • Manage public health issues • Provide advice and management of public health • Provide support and advice to individuals • Assist with business continuity 	
Police Force <ul style="list-style-type: none"> • Save life • Coordination and communication between emergency services and organisations providing support • Coordinate the preparation and dissemination Fire and Rescue Service <ul style="list-style-type: none"> • Save life rescuing people and animals • Carry out other specialist work, including flood rescue services • Where appropriate, assist people where the use of fire service personnel and equipment is relevant Ambulance Service <ul style="list-style-type: none"> • Save life • Provide treatment, stabilisation and care at the scene 	Utility Providers <ul style="list-style-type: none"> • Attend emergencies relating to their services putting life at risk • Assess and manage risk of service failure • Assist with recovery process, that is, water utilities manage public health considerations Internal Drainage Board <ul style="list-style-type: none"> • Operate strategic assets to reduce flood risk in partnership with RMAs and public Town and Parish Councils <ul style="list-style-type: none"> • Support emergency responders • Increase community resilience through support of community emergency plan development Voluntary services <ul style="list-style-type: none"> • Support rest centres • Provide practical and emotional support to those affected • Support transport and communications • Provide administration • Provide telephone helpline support
Environment Agency <ul style="list-style-type: none"> • Issue Flood Warnings and ensure systems display current flooding information • Provide information to the public on what they can do before, during and after a flood event • Monitor river levels and flows • Work with professional Partners and stakeholders and respond to requests for flooding information and updates • Receive and record details of flooding and related information • Operate water level control structures within its jurisdiction and in line with permissive powers • Flood event data collection • Arrange and take part in flood event exercises • Respond to pollution incidents and advise on disposal • Assist with the recovery process, for example, by advising on the disposal of silt, attending flood surgeries 	

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5. Conclusions and recommendations

5.1 Conclusions

- There was high rainfall on the night of 6th/7th Feb.
- Catchment was saturated due to wet conditions in preceding three months.
- The road and one residential property flooded as a result of the heavy rainfall and the three blockages found within the surface water drainage system.

5.2 Recommendations

- **Bucks CC** to ensure that owners of culverts, watercourses and drainage infrastructure are aware of their responsibilities.
- **TfB** to continue to clear and maintain the surface water drains and gullies in Lower Road as part of their ongoing maintenance schedule.
- **TfB** to ensure that road closures are properly enforced in partnership with the police.
- **Residents** to take measures to protect themselves and their property when flooding is imminent.
- **Residents** to document and photograph flood incidents where possible and report flooding to AVDC and/or Bucks CC and EA.
- **All RMAs** to make improvements to the emergency response and co-ordination from all organisations.
- **All RMAs** should fully understand the Thames Valley Local Resilience Forum Flood Plan and how Operational or Tactical Command Posts can aid the emergency response of all RMAs during an event.

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Explanation of Acronyms

Acronym	Definition
Bucks CC	Buckinghamshire County Council
BCC	Buckinghamshire County Council
AVDC	Aylesbury Vale District Council
EA	Environment Agency
TfB	Transport for Buckinghamshire
LLFA	Lead Local Flood Authority
RMA	Risk Management Authority
FWMA	Flood and Water Management Act 2010
IDB	Internal Drainage Board
BFRS	Buckinghamshire Fire and Rescue Service
NGR	National Grid Reference
BGS	British Geological Survey
STW	Sewage Treatment Works

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References

Reference in Document	Refers to
EA, 2013	uFFMS http://www.ufmfsw.com

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Contacts

Lead Local Flood Authority



Flood Risk Management Team, Place Services, Buckinghamshire County Council, 9th Floor, County Hall, Walton Street, Aylesbury, HP20 1UY
email: floodmanagement@buckscc.gov.uk

Website: www.buckscc.gov.uk/flooding

Telephone: 0845 3708090 Monday to Friday 9am-5.30pm

Environment Agency



**Environment
Agency**

National Customer Contact Centre
PO Box 544
Rotherham
S60 1BY

Email enquiries@environment-agency.gov.uk

Telephone 03708 506 506

Minicom (for the hard of hearing) 03702 422 549 Monday to Friday, 8am to 6pm

Website <https://www.gov.uk/government/organisations/environment-agency>

District Council



Aylesbury Vale District
Council
The Gateway
Gatehouse Road
Aylesbury
Bucks HP19 8FF

Opening times

Monday - Thursday
8.45am - 5:15pm

Friday
8.45am - 4.45pm*

Tel
01296585858

*Customer service centre closes at 4pm on
Friday.

Highways Authority

Transport for Buckinghamshire

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Transport and roads - 0845 2302882

Out of hours emergencies (Highways) - 01296 486630

E-mail: tfb@buckscc.gov.uk

Web: <http://www.transportforbucks.net/Transport-and-roads.aspx>

Water Utility



Thames Water

PO Box 286

Swindon

SN38 2RA

Telephone: 0845 9200 800

Web: <http://www.thameswater.co.uk/help-and-advice/16739.htm>

Emergency Response

Buckinghamshire Fire and Rescue Service

Address: Buckinghamshire Fire & Rescue Service, Brigade HQ, Stocklake, Aylesbury, Bucks, HP20 1BD

Telephone: 01296 744400

Website: <http://www.bucksfire.gov.uk/BucksFire/Contact+Us/>

Thames Valley Police

Telephone: 101 in non-emergency 999 in emergency

Website: <http://www.thamesvalley.police.uk/contactus-phone.htm>

Buckinghamshire Ambulance Service

Telephone: 111 in non-emergency 999 in emergency

Website: <http://www.southcentralambulance.nhs.uk/content/press-release/buckinghamshire/flooding-advice.ashx>

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Appendices

Section 19 Flood Investigation Criteria

A section 19 flood investigation is carried out if significant flooding has occurred within the county the definition of this is shown below.

Definition of Significant Flooding in Buckinghamshire

- Caused internal¹ flooding to five or more residential properties² per 1km²; or
- Internal flooding of two or more business premises³ per 1km²; or
- one or more items of critical infrastructure⁴; or
- caused a transport link to be totally impassable:
 - Motorways, trunk roads and major rail links – 2 hours or more
 - Class A and B highways and other railway links – 4 hours or more
 - Class C⁵ highways – 10 hours or more
 - Class U⁶ highways – 24 hours or more.

¹ Internal including basement flooding

² Residential property (Class C3 (a,b))

³ Business premises (Class A1-3, B1-8, C1, D1(d-e), D2)

⁴ Critical infrastructure are (Class D1 (a, b, c), C2) - hospitals, health centres, clinics, surgeries, colleges, schools, day nurseries, nursing homes, emergency services (police, fire, ambulance) stations, utilities, substations

⁵ Unless the route is the only means of access, or is primary route for critical infrastructure then reduce to 4 hours

⁶ Unless the route is the only means of access, or is primary route for critical infrastructure then reduce to 4 hours