

18th February 2015

Buckinghamshire County Council

Flood Investigation Report

Monks Risborough

February 2014



Photographs courtesy of Wycombe District Council

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Revision Schedule

Buckinghamshire County council Flood Investigation Report

18TH February 2015

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Executive Summary

This document has been produced by Buckingham County Council (BCC) to report on the investigation of the flooding that occurred in Monks Risborough around 6th-17th February 2014. The report provides details of the event and makes recommendations for Risk Management Authorities (RMAs) to undertake to reduce flood risk.

A Section 19 Investigation is a statutory requirement for Lead Local Flood Authorities (LLFA) under the Flood and water Management Act (FWMA) 2010. On becoming aware of a flood in its area, the LLFA must, to the extent that it considers it necessary or appropriate to investigate:

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

It was deemed necessary to produce this report as the flood event in Monks Risborough exceeded BCC criteria for carrying out a Section 19 investigation.

The aim of the Section 19 Investigation is to give an explanation of what happened in the flood event and to identify the RMAs responsibilities during the event. The recommendations are there to help the RMAs learn lessons from the event and to move forward with the management of flood risk in the future.

The flood event in Monks Risborough occurred after a prolonged period of above average rainfall which caused groundwater levels in the underlying aquifer to rise to unusually high levels and the surrounding land to become saturated. Subsequent rainfall caused flooding where the flow was unable to pass through restricted culverts and drains and from direct runoff from land where there was no defined watercourse. Recommendations are included which, if undertaken, will reduce the flood risk in Monks Risborough. These recommendations relate predominantly to improving watercourses and of the culverts on the watercourses and improved maintenance of the piped drainage system.

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1. Introduction

1.1 Background to investigation

BCC as the LLFA has a responsibility to record and report flood incidents as detailed within Section 19 of the FWMA 2010:

Section 19

- (1) On becoming aware of a flood in its areas, 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.

BCC has established criteria for section 19 flood investigations which can be found in the appendix.

It was deemed necessary to complete an investigation into the flood incident in Monks Risborough because it meets the following threshold: caused a transport link to be totally impassable:

- Class C highways – 10 hours or more.

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1.2 Site Location

Monks Risborough is a small village located to the immediate north-east of Princes Risborough as shown in Figure 1a and 1b.

1.3 Drainage system and river network

Monks Risborough lies on the north western scarp slope of the Chiltern Hills on the pale grey, chalky clays of the Lower Chalk. Monks Risborough is located on the spring line and springs feed the network of small watercourses throughout the settlement (Figure 2). The watercourses are generally well defined and deeply incised and designated as Ordinary Watercourses. There are no Main Rivers in the vicinity of Monks Risborough. The watercourses have been modified in the past to create cress beds and for a water mill. The mill was located in Mill Lane and in 1839 included a mill pond and two fields marked on the maps as Mill Meadow and Mill Mead. These areas are now developed with residential housing. There are also watercourse diversions associated with the railway line and culverting due to the urban development.

Generally, the springs within the village originate at approximately 110mAOD and flow westwards. However, they are constrained to only two locations where they can pass beneath the railway embankment (Mill Lane and at the railway station) as shown in Figure 2.

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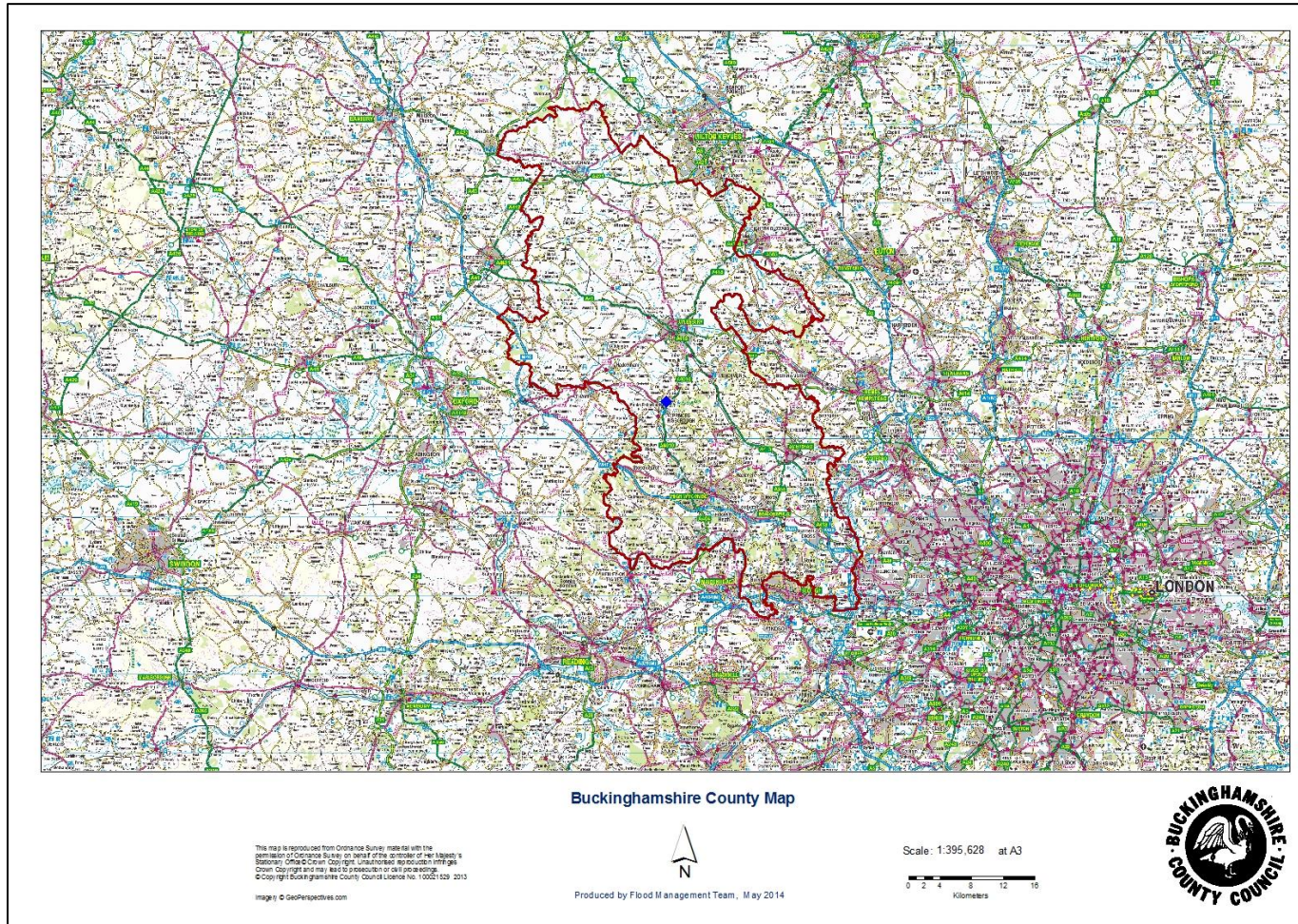
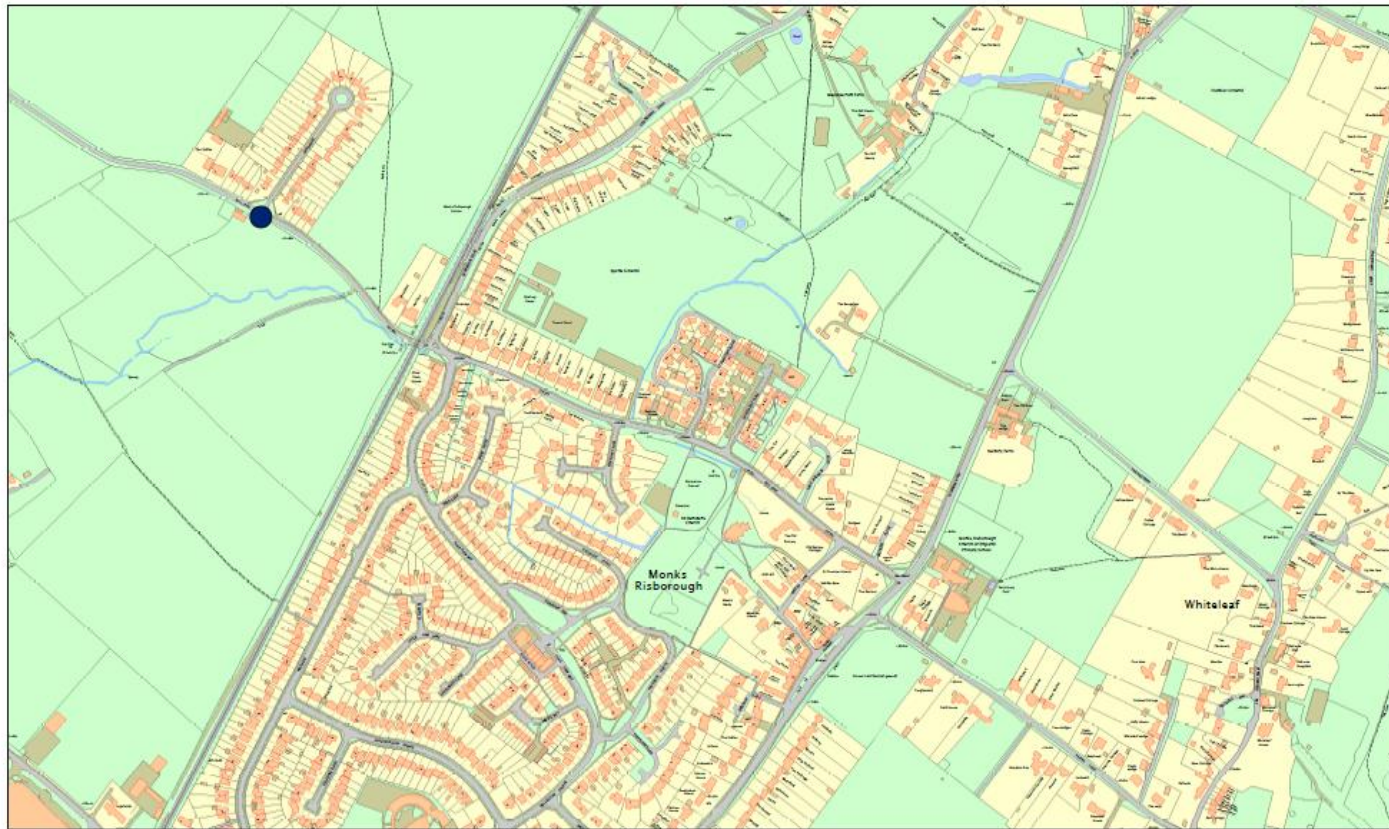


Figure 1a County Level View of Monks Risborough

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Monks Risborough Local Map

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Produced by Flood Management Team, May 2014

Scale: 1:1,500 at A3

0.00 0.03 0.06 0.09 0.12
Kilometers



Figure 1b Local level view of Monks Risborough

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Figure 2 Overview of Monks Risborough Drainage System

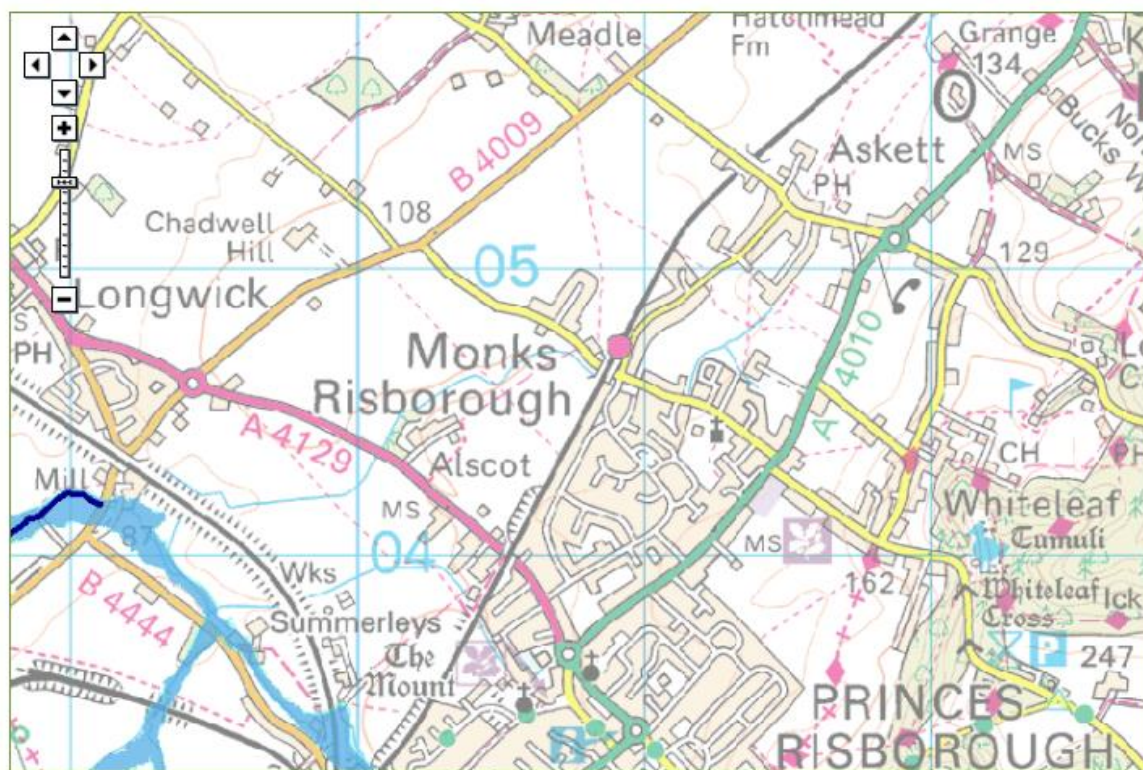
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2. Background

2.1 Catchment characteristics

The Environment Agency Flood Map for Planning (Rivers and Sea; Figure 3) shows that there is a low risk of flooding from rivers in Monks Risborough. However, the flood map for surface water (Figure 4) shows large areas prone to flooding in the 1 in 30 (3.3% AEP) event. The surface water flood map shows the difference in extent of flooding in the 1 in 30 (3.3% AEP) and the 1 in 1000 (0.1% AEP) events in and around Monks Risborough. Surface water flooding occurs when extreme or prolonged rainfall cannot infiltrate into saturated ground, or flow into the rivers and/or highways drainage due to excess volumes of water.

This surface water flood map clearly shows the flow path from Askett southwards along the Crowbrook Road to Mill Lane. This flow path may be more extensive than shown as the mapping may not correctly represent the presence of the railway line.



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Figure 3 Extract from the Environment Agency Flood Map for Planning

From Figure 4, it can be seen that the Mill Lane/Crowsbrook Road and the Kingsmead

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areas of Monks Risborough are predicted to experience surface water flooding. The geographical extent of the surface water flooding shown in the map is very similar to the flooding which was experienced during the February 2014 flood event.

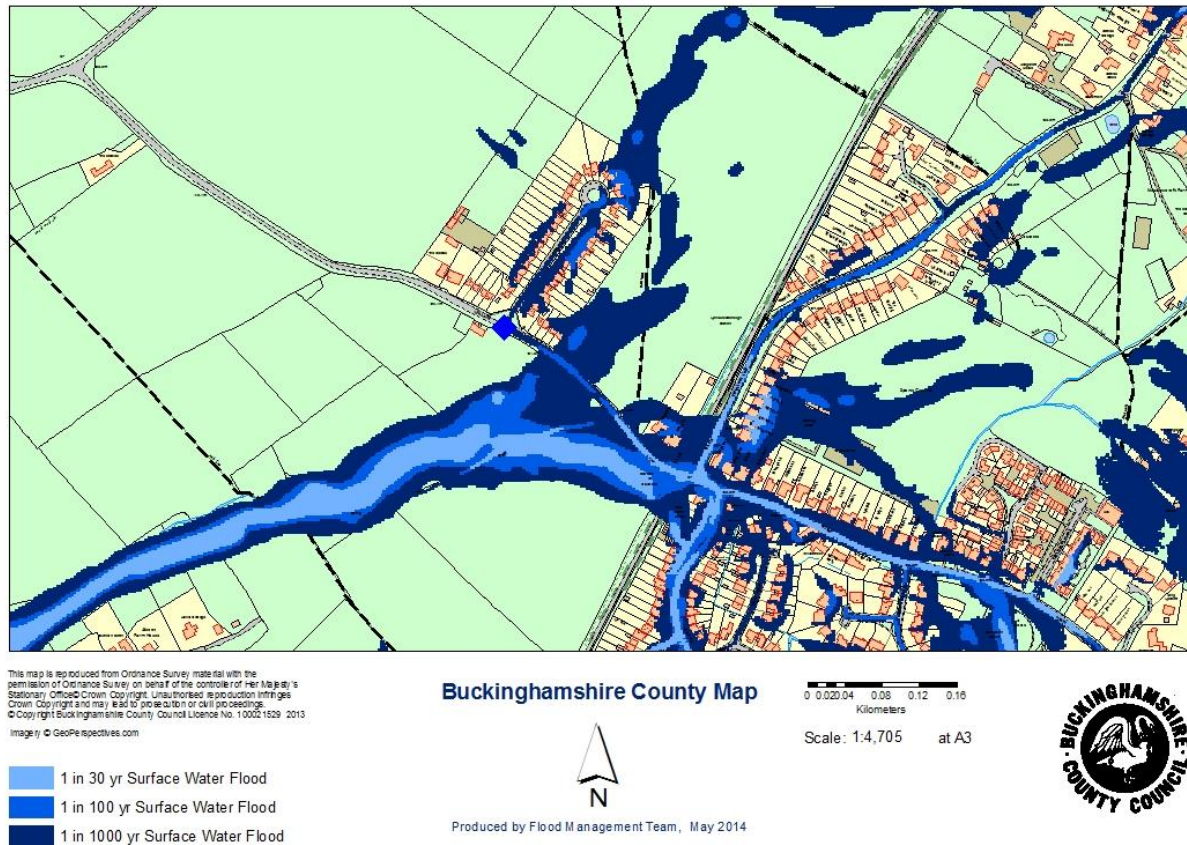


Figure 4 Environment Agency Risk of Flooding from Surface Water

Monks Risborough is located on the junction of the Chalk and the Upper Greensand. It is at this junction that the springs emerge in the village. In this area there are also superficial Head Deposits comprising clay silt and gravels. Figure 5 shows the local geology. The Environment Agency states that groundwater is close to the ground surface in this area. As a consequence, this makes the area vulnerable to groundwater flooding. Groundwater flooding can occur when water levels in the underlying Chalk and Greensand rise and water emerges at the surface. It can emerge as increased flows from existing springs, from new springs or from diffuse sources. Where watercourses draining these areas have insufficient capacity or are obstructed and in those areas where there is no defined watercourse, flooding from groundwater can occur.

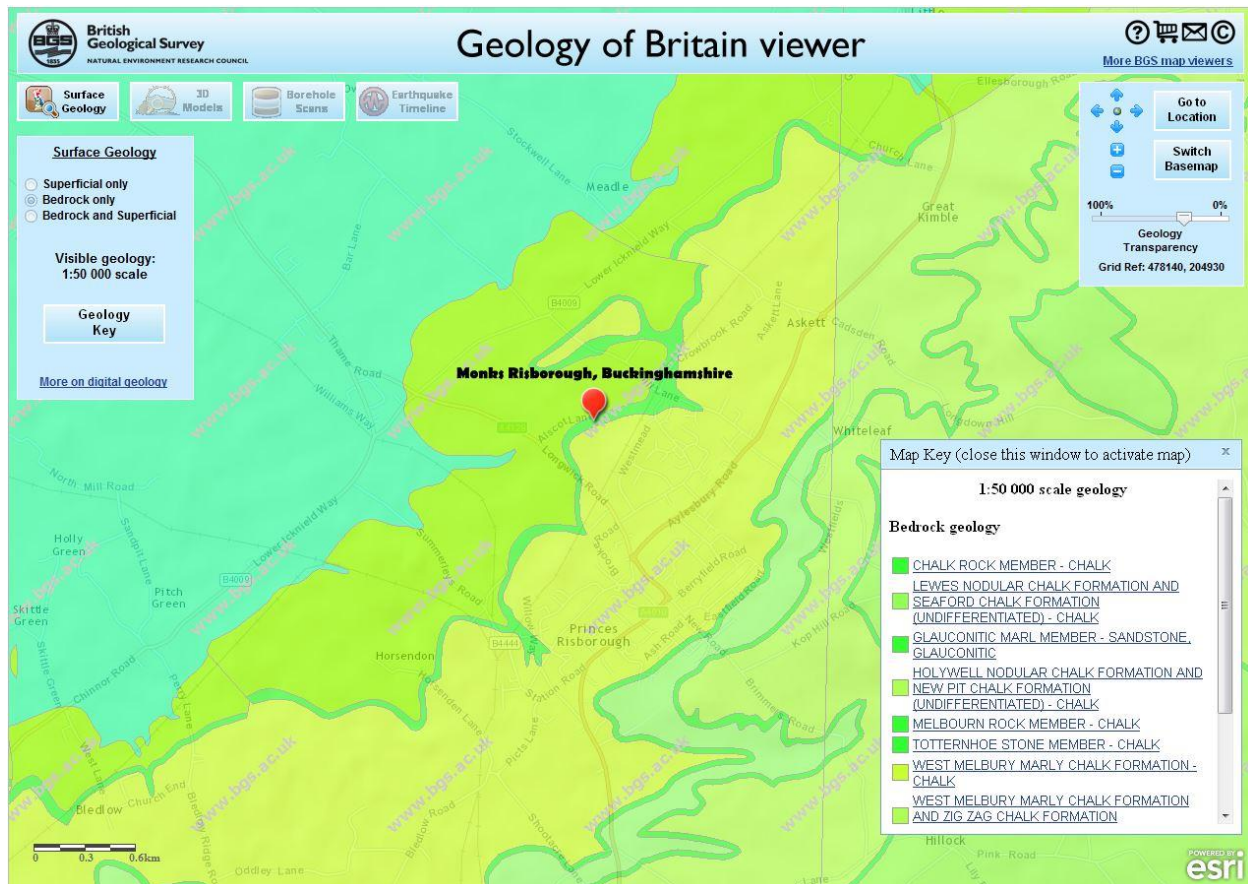
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Figure 5 Geology of Monks Risborough Area (BGS online map, 2014)

Monks Risborough is serviced by Thames Water sewer network. Surface water runoff appears to be to soakaways, however, at the time of writing no response had been received from Thames Water from our request for clarification.

2.2 Previous flood events

From correspondence and conversations with residents, it appears that the fields to the west of the railway line and in close proximity to Kingsmead are waterlogged most winters. This waterlogging is reported to cause visible ponding of water in the field for several months at a time.

Mill Road at the bridge beneath the railway has been closed on previous occasions due to flood water.

Wycombe District Council hold records of past flooding. These include flooding in 2000/01 at Mead Acre and in Mill Lane following intense rainfall. Floods are also recorded in 2002/3 from groundwater, and from surface water runoff in the summers of

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2006, 2008 and 2011.

Conversations with residents (December 2014) suggest that there have been numerous occasions when the foul sewer system performs poorly. This is likely to be due to infiltration of groundwater into the sewers during periods of raised groundwater levels.

3. Analysis of February 2014 flood event

3.1 Conditions at the time

The Environment Agency provided rainfall data for the period 1st December 2013 to the end of February 2014. This data was recorded at the Prestwood Raingauge which lies approximately 3km to the south east of Monk's Risborough and can be considered as representative of the rain that fell in the vicinity of the village. Figure 6 shows the daily rainfall for three months starting December 2013. This winter period was exceptionally wet. There were many days when rain fell and a large number of exceptionally wet days.

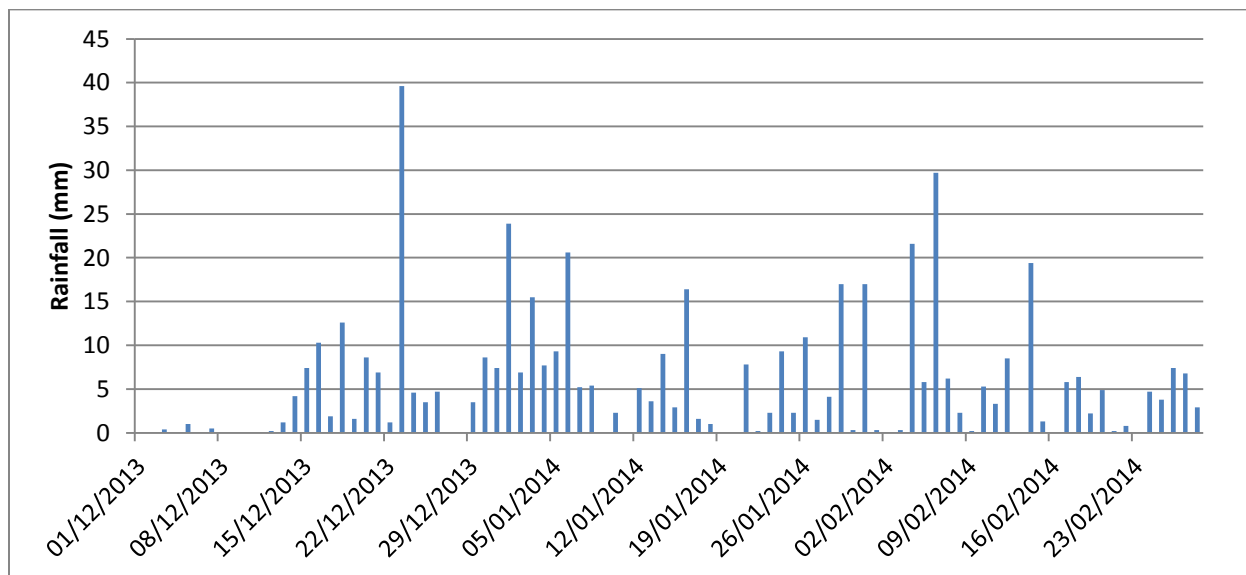


Figure 6 Prestwood Rainfall Totals 1st December 2013 to 28th February 2014

To put this into context, from October 2013 to the end of February 2014, the area received 193% of the long term average rainfall. February 2014 was unusually wet receiving 334% of the long term average rainfall for February making it the wettest February on record in the area (Environment Agency, 2014).

Where the rain falls on the Chalk hills, it infiltrates into the Chalk and causes water

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levels in the Chalk to rise. Groundwater was 'exceptionally high' as measured at Ashley Green (Chilterns) during the period of flooding under investigation; 'exceptionally high' is the maximum category for high groundwater levels, meaning levels are likely to rise into this category only 5% of the time (Environment Agency, February 2014).

The wet period continued into February with almost 30mm recorded on the 6th and almost 20mm on the 14th (Figure 7). Flooding arose in response to the rainfall on the 6th and lasted for approximately three weeks.

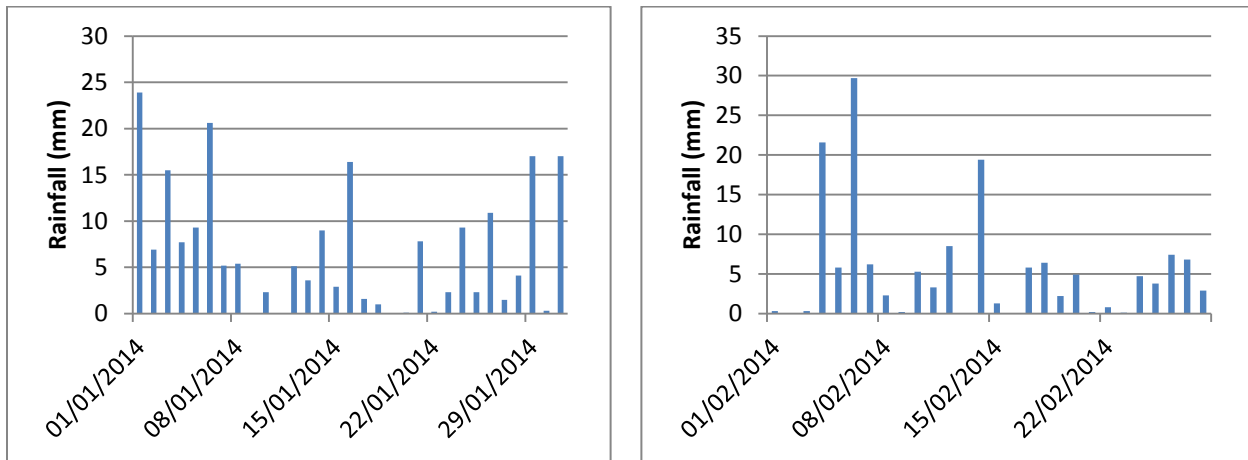


Figure 7 Prestwood Rainfall January and February 2014

3.2 Condition of features

During a site visit made in December 2014 the following were noted:

- The road drain beneath the Mill Lane railway bridge was blocked and had water visible at almost road-grill level (Figure 8A).
- The watercourse that passes under the railway through a culvert in Mill Lane was partially obstructed with vegetation and the culvert heavily silted up and appears to have a much reduced capacity (Figures 8B and 8C)
- There have been recent works associated with the drainage under the railway station in Crowbrook Road (Figure 8D).

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Figure 8 Condition of structures

3.3 Condition of watercourse

At the time of the site visit the majority of the watercourses seen in Monk’s Risborough were flowing freely in deeply incised channels. The exceptions to this were the Crow Brook watercourse running parallel to the railway line and the Mill Stream at the railway bridge.

It was not possible to access the majority of the Crow Brook watercourse running parallel to the railway line. From the railway bridge the route of the watercourse appeared heavily congested with vegetation although there was evidence of recent maintenance in the vicinity of the station (Figures 9 A and B).

In the vicinity of the railway line, the Mill Stream was heavily overgrown with vegetation

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and had reduced capacity due to silt accumulation. The railings from the footbridge crossing were lying in the watercourse (Figure 9C)

The field between Kingsmead and the railway line was water logged (Figure 9D)



Figure 9 Condition of watercourses

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3.4 What happened?

Excess water arrived in Monks Risborough from:

- Springs and seepage from the underlying Chalk;
- Surface water runoff; and
- Surcharging sewers.

A detailed account of the events is given below, while the main stages of the emergency response are covered in section 3.6. Flooding will have been slow and dispersed initially and therefore it is difficult to assign a start date. Therefore, the heavy rain of the 6th February that was followed by the closure of the road on the 7th is taken as the start date. The end date is defined by the reopening of the road on the 17th February. It is appreciated that some areas would have remained saturated or underwater for a longer period.

Groundwater levels in the aquifer were exceptionally high during January and February 2014 and soils were fully saturated as a consequence of the many weeks of wet weather. Groundwater rose to the surface through both widespread seepage and through springs.

Heavy rainfall in early February was unable to infiltrate into the already saturated soil and flowed over the surface along with the emerging groundwater. There was insufficient capacity in the local drainage network to take all the water. There are two locations where there are restrictions to the flow in recognised watercourses (Figure 10). The first is on the Crow Brook at the culvert beneath the railway at Monks Risborough Railway Station. Excess water that could not pass beneath the railway then flowed down Crowbrook Road to Mill Lane. At Mill Lane there are further restrictions to flow both in the Mill Brook culvert and in the road drain. The lack of capacity in the road drainage under the Mill Road railway bridge prevented flood water draining away and resulted in extensive flooding in Mill Lane and Crowbrook Road (Figure 10). It is also likely that the Mill Brook and the Crow Brook watercourses spilled in this area. Flood depths on Crowbrook Road were reported as 'knee deep' and they were considerably deeper under the railway bridge. The Buckinghamshire Fire and Rescue Service (BFRS) Incidents database has a record for the 7th February where they assisted in the removal of a vehicle from floodwaters in Mill Lane.

A second flood mechanism occurred where there was no clearly defined watercourse most notably in the vicinity of Kingsmead and Molins Sports ground.

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West of the railway line at Kingsmead and Mill Lane, surface water runoff from surrounding farmland probably in addition to excess flow from the Crow Brook caused internal flooding (to at least the height of floorboards) and to gardens and to both Kingsmead and Mill Lane roads. More extensive internal flooding is likely to have been experienced without the mitigation measures undertaken (e.g. bailing out water, sandbags and digging of trenches).

Runoff and groundwater flowed off the Molins sports ground and flooded towards the south into the rear gardens and garages of properties in Mill Lane (east of the railway) and Crowbrook Road. In both areas water levels came close to causing internal flooding of residential properties. At least one property lost power supply as a consequence of the flooding. Flood depths in February 2014 of between 3” (0.07m) and 5” (0.13m) in rear gardens were reported by residents at the junction of Crowbrook Road and Mill Lane.

Surface water also flowed down Peters Lane, Burton Lane and past the church with the church reported to being close to flooding internally.



Overview of Flood Mechanism

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Produced by Flood Management Team, May 2014

Scale: 1:1,383 at A3

0 0.5 1 Kilometers



Figure 10 Overview of Flood Mechanism

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Residents in Kingsmead, Mill Lane and Crowbrook Drive reported problems with the sewer system with Kingsmead residents stated that floodwater was seen to be contaminated with sewage. Residents also reported surcharging of the sewer in the field between Kingsmead and the railway.

In Kingsmead, flooding was reported to rise and fall very rapidly (within an hour). Elsewhere, flooding in February 2014, whilst responsive to rainfall, was reported to last for days before slowly receding.

3.5 Possible causes

The weather conditions

- Unusually wet December 2013, January and February 2014
- Intense rainfall in February 2014

The ground conditions

- Water levels in the Chalk in and around Monks Risborough were unusually high causing groundwater to emerge at the surface
- Soils were completely waterlogged and unable to hold any further rainfall.

The condition of the watercourses and drainage systems

- The highway drain in the road beneath the railway bridge was completely blocked at the time of the site visit (December 2014) and may have been blocked at the time of the flood.
- The culvert taking the Mill Stream beneath the railway is heavily silted and has reduced capacity
- The section of the Crow Brook watercourse running alongside the railway that is visible from the road appears to be poorly maintained.
- The culvert beneath the railway in Crowbrook Road was reported by residents to have been blocked at the time of the flood. At the time of the site visit a new culvert structure has been built.
- Surface water flows towards Kingsmead without any defined drainage network and consequently flows in and around properties and along the roads.
- Surface water and groundwater flows off Molins sports ground without any defined drainage system and consequently flows in and around properties in Crowbrook Road and Mill Lane.

The surface water flood map suggests that there is a surface water flow path arising in Askett that crosses the railway line and flows towards Kingsmead. However, it appears

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that it may actually flow to Crowbrook Road in Monks Risborough. Once on the road there is little opportunity for it to get back into the watercourse alongside the railway. The refurbished railway culvert in Crowbrook Road under the railway line close to the station is unlikely to have sufficient capacity to accommodate this additional flow from the road. Therefore once the water gets onto Crowbrook Road it flows down to the junction with Mill Lane.

Even without the contribution of surface water flows from Askett, there is a large area of land that drains towards the Kingsmead area and there are no defined watercourses. As a consequence, surface water makes its way around and under the properties in Kingsmead and on to Mill Lane.

3.6 Incident response

Table 1 below summarises the main incident response activities that took place in relation to this event. The Environment Agency declined to provide access to their incident logs. However, as there are no Main Rivers associated with the flooding, the Environment Agency is unlikely to have been part of the incident response. The EA did make available their Winter Floods 2013/14 West Thames Area (Final Version July 2014) report. As to be expected, no direct reference is made to Monks Risborough in that report.

Date and time	Activity/event	Agency
7th February 2014	Car recovered from flood water in Mill Lane	BFRS
7th -17th February 2014	Mill Lane closed at railway bridge (Temporary Traffic Regulation Order submitted 5/2/2014)	TfB
7th February 2014	Mill Lane 100 sandbags delivered	TfB
14 February 2014	Groundwater flood alert issued for High Wycombe area	EA

Table 1 Incident Response

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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 Buckinghamshire County Councils 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 (BCC). BCC has a role as a RMA in coordinating management of local flood risk from surface water, groundwater and ordinary watercourses in the county.

4.2 Wycombe District Council

Wycombe District Council 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 watercourses.

4.3 Environment Agency

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

4.4 Highways Authority – Transport for Buckinghamshire

Any flooding from highways is managed by the Highways Authority which is BCC and the highways function is managed by Transport for Buckinghamshire (TfB).

4.5 Water Utility Company – Thames Water

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

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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/LIT_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. Please note that Parish and Town Councils do not have a legal obligation to respond to emergencies. Whatever service they provide is voluntary and unique to each Parish or Town Council.

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Table 2 Roles and responsibilities in an emergency, during and after a flood event

<p>Local (County and District) Authorities</p> <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 	
<p>Police Force</p> <ul style="list-style-type: none"> • Save life • Coordination and communication between emergency services and organisations providing support • Coordinate the preparation and dissemination <p>Fire and Rescue Service</p> <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 <p>Ambulance Service</p> <ul style="list-style-type: none"> • Save life • Provide treatment, stabilisation and care at the scene 	<p>Utility Providers</p> <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 <p>Internal Drainage Board</p> <ul style="list-style-type: none"> • Operate strategic assets to reduce flood risk in partnership with RMAs and public <p>Town and Parish Councils</p> <ul style="list-style-type: none"> • Support emergency responders • Increase community resilience through support of community emergency plan development <p>Voluntary services</p> <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
<p>Environment Agency</p> <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 surges 	

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5. Conclusions and recommendations

5.1 Conclusions

A number of issues contributed to the prolonged flooding that occurred in Monks Risborough in February 2014. These are summarised as follows:

- The water levels in watercourses in and around Monks Risborough were high due to above-average prolonged rainfall and exceptionally high groundwater levels.
- The culvert under Monks Risborough Railway Station was partially restricted and unable to accommodate the runoff from the surrounding land.
- Surface water that could not get beneath the railway at the station flowed down Crowbrook Road and accumulated at the lowest point; beneath the railway bridge.
- Surface water was unable to drain away from under the Mill Road railway bridge due to either a blockage or insufficient capacity in the drainage system.
- Surface water runoff flowed across the fields to Kingsmead flooding the road and probably into properties below the floor boards.
- Surface water flowed down St Peters Road towards the church, however, local measures prevented internal flooding of the church properties.
- Infiltration into the foul sewers caused surcharging in Kingsmead and Mill Lane and residents were unable to use the sewer system in the vicinity of Mill Lane railway crossing.

5.2 Recommendations

The recommendations are summarised in Table 3 below. Many of the actions cover the maintenance of watercourses and highway drainage. The recommendations are not only for the RMAs but also for riparian owners.

Table 3 Recommended Actions

Authority/Stakeholder	Recommended actions
TfB	<ul style="list-style-type: none"> • Clear the highway drain under the railway at Mill Lane and undertake regular and frequent maintenance checks • Investigate drainage network throughout Monks Risborough and carry out cleansing of all gullies, culverts and highway drainage throughout as part of the ongoing maintenance schedule.

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Authority/Stakeholder	Recommended actions
BCC	<ul style="list-style-type: none"> • Identify all the riparian owners within Monks Risborough. • Ensure the owners of culverts and watercourses/ditches within the area are aware of their responsibilities. • Organise a vegetation management demonstration day for local residents and landowners. • Undertake a drainage study of the area around Kingsmead with the aim of diverting flow away from properties. • Undertake a drainage study in Crowbrook Road to identify whether water can be forced back into the watercourse (at the station culvert)/off the road. • Facilitate sharing of information between RMAs and the community. • Improve and maintain the flow path in Peters Lane, Burton Lane and through the church grounds. • Distribute information on groundwater flooding to residents.
WDC	<ul style="list-style-type: none"> • Improve access to sand and sandbags
Network Rail	<ul style="list-style-type: none"> • Enlarge the Crowbrook Road culvert under the railway station and maintain at design capacity.
Thames Water	<ul style="list-style-type: none"> • Work with other RMAs to address potential infiltration problems. • Share the outcomes of their information gathering exercise for catchments affected by infiltration problems with other RMAs.
Riparian Landowners	<ul style="list-style-type: none"> • Ensure that the watercourses are maintained in a suitable manner. The guidance given in the EA's 'Living on the Edge' booklet regarding riparian owner responsibilities should be followed. Especially in the vicinity of the railway bridge. • Undertake clearance of vegetation with guidance from relevant RMAs.

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Glossary

Term	Definition
Act (or The Act)	The Act refers to the Flood & Water Management Act 2010
AEP	Annual Exceedance Probability. A flood or rainfall event with a 1 in 100 (1%) chance of being exceeded in any year has an AEP of 1/100 or 1%.
Attenuate	Providing temporary storage or other measures designed to reduce the volume of surface runoff which could cause flooding. A particular focus is on reducing the peak flow.
BCC	Buckinghamshire County Council
BFRS	Buckinghamshire Fire & Rescue Service
BGS	British Geological Survey
BSFMG	The Buckinghamshire Strategic Flood Management Group was formed in 2009 to co-ordinate work amongst relevant stakeholders and Partners.
CFMP / Catchment Flood Management Plan	Catchment Flood Management Plans are produced by the Environment Agency to give an overview of the flood risk in the two primary catchments in BCC's area: Great Ouse and Thames.
Defra	Department for Environment, Food and Rural Affairs
EA	Environment Agency, which has a Strategic overview role for flood and coastal erosion risk management
Flood	The temporary inundation by water of property or land not normally covered with water
FMfSW	Flood Map for Surface Water
Flood & Water Management Act 2010 (FWMA)	Part of the UK Government's response to Sir Michael Pitt's Report on the Summer 2007 floods, the aim of which (partly) is to clarify the legislative framework for managing local flood risk in England.
Fluvial Flooding	Flooding resulting from water levels exceeding the bank level of a river.
Groundwater flooding	Occurs when water levels in the ground rise above the natural surface. Low lying areas underlain by permeable strata (e.g. Chalk) are particularly susceptible.
IDB	Internal Drainage Board. Applicable to only one area in Buckinghamshire for which the Buckingham and River Ouzel Internal Drainage Board has flood risk management responsibilities.
LLFA / Lead Local Flood Authority	Local Authority responsible for taking the lead on local flood risk management
Local Flood Risk	Flooding from sources other than Main Rivers, which principally concerns surface runoff, groundwater and ordinary watercourses. BCC has a responsibility under the Flood & Water Management Act to manage flooding from these sources.
Main River	A watercourse shown as such on the Main River Map, and for which the Environment Agency has responsibilities and powers.
Multiple Benefits	As well as reducing the risks to people and property, flood risk management can bring economic, environmental and social benefits.
Ordinary Watercourses	All watercourses that are not designated Main River, and which are the responsibility of local authorities or IDBs
Partner	A person or organisation with responsibility relating to flood risk management for the decision or actions that need to be taken.

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Term	Definition
PFRA / Preliminary Flood Risk Review	A report produced by BCC in response to the Flood Risk Regulations 2009 which summarises local flood risk across BCC's area and provides a number of detailed maps recording local flood incidents
Resilience Measures	Measures designed to reduce the impact of water that enters property and businesses; could include measures such as raising electrical appliances.
Resistance Measures	Measures designed to keep flood water out of properties and businesses; could include flood guards for example.
Risk	In flood risk management, risk is defined as a product of the probability or likelihood of a flood occurring, and the consequence of the flood.
Risk Management Authorities (RMA)	Organisations that have a key role in flood and coastal erosion risk management as defined by the Flood & Water Management Act 2010. These are BCC (the Lead Local Flood Authority and Highways Authority), District Councils, Environment Agency, Buckingham and River Ouzel Internal Drainage Board, Anglian Water and Thames Water
SBDC	South Bucks District Council
SFRA	Strategic Flood Risk Assessment. These are produced by each District to give an assessment of flood risk from all sources and its implications for land use planning.
Stakeholder	A person or organisation affected by the problem or solution, or interested in the problem or solution. They can be individuals or organisations; includes the public and communities.
Strategy	Under the Flood & Water Management Act 2010, BCC have a duty to develop, maintain, apply and monitor a strategy for local flood risk management
Sustainability	In the context of this Strategy, the risk of flooding must be reduced now, but in a way which does not compromise the interconnected needs of the economy, society and environment in the future.
SuDS / Sustainable Drainage Systems	Methods of management practices and control structures that are designed to drain surface water in a more sustainable manner than some conventional techniques.
Surface water/runoff	Rainwater (including snow and other precipitation) which is on the surface of the ground (whether or not it is moving), and has not entered a watercourse, drainage system or public sewer. The term 'surface water' is used generically to refer to water on the surface and is often associated with periods of intense rainfall.
Swale	A shallow vegetated channel designed to conduct and retain water, but also may permit infiltration. The vegetation filters particulate matter.
SWMP	Surface Water Management Plan
Symology	A Geographical Information System (GIS) database used by Buckinghamshire County Council (BCC) to record information on highway assets as well as other themes e.g. flood incidents
TfB	Transport for Buckinghamshire
TW	Thames Water Utilities Ltd
WDC	Wycombe District Council

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References

Reference in document	Refers to:
Environment Agency (2014)	Environment Agency Monthly Water Situation Report South East Region. February 2014
Buckinghamshire County Councils Local Flood Risk Management Strategy (2013-2018)	http://www.buckscc.gov.uk/environment/flooding/
Environment Agency 'Living on the Edge'	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/297423/LIT_7114_c70612.pdf

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Contacts

Lead Local Flood Authority



Flood Management Team
Buckinghamshire County Council
County Hall
Walton Street
Aylesbury
Bucks HP20 1UY

Telephone: 084537 08090

Email: FloodManagement@buckscc.gov.uk

Website: www.buckscc.gov.uk/flooding

Environment Agency



**Environment
Agency**

National Customer Contact Centre
PO Box 544
Rotherham
S60 1BY

Telephone: 03708 506506

Email: enquiries@environment-agency.gov.uk

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

District Council



Wycombe District Council
Queen Victoria Road
High Wycombe
HP11 1BB

Opening times

Monday - Thursday

8.45am – 5.15pm

Friday

8.45am – 4.45pm

Telephone: 01494 461 000

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Highways Authority

Transport for Buckinghamshire

Telephone: Transport and roads – 0845 2302882

Out of hours emergencies (Highways) – 01296 486630

Email: ffb@buckscc.gov.uk

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

Water Utility



Thames Water

PO Box 286

Swindon

SN38 2RA

Telephone: 0845 9200 800

Website: <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

Appendix A: BCC criteria for a Section 19 Investigation

- Internal flooding (including to basements) to five or more residential properties within an area of 1km²
- Internal flooding of two or more business premises within an area of 1km²
- Internal flooding (including to basement) of at least one property for one week or longer
- Flooding of one or more items of critical infrastructure, which could include hospitals, health centres, clinics, surgeries, colleges, schools, day nurseries, nursing homes, emergency services (police, fire, ambulance) stations, utilities and substations.

- Caused a transport link to be impassable for the following periods:
 - 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 C highways – 10 hours or more unless the route is the only means of access, or is primary route for critical infrastructure then reduce to 4 hours
 - Class U highways – 24 hours or more unless the route is the only means of access, or is primary route for critical infrastructure then reduce to 4 hours

- Any flooding event that a risk management authority deems significant but does not meet the agreed thresholds should be brought to the next strategic flood management committee for consideration.

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Appendix B Photos taken by residents of Monks Risborough and RMAs

	<p>February 2014</p> <p>View west towards Kingsmead</p> <p>Courtesy Wycombe DC</p>
	<p>February 2014</p> <p>View north from Mill Lane</p> <p>Courtesy Wycombe DC</p>

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	<p>February 2014</p> <p>Mill Lane west of railway</p> <p>Courtesy Wycombe DC</p>
	<p>February 2014</p> <p>Mill Lane west of railway</p> <p>Courtesy Wycombe DC</p>

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 A photograph showing a road junction that is completely flooded with water. The water is murky and reflects the overcast sky. The road surface is visible through the water. There are grassy areas on either side of the road and some trees in the background under a grey, cloudy sky.	<p>February 2014</p> <p>Junction of Kingsmead and Mill Lane</p> <p>Courtesy Wycombe DC</p>
 A second photograph of the same flooded road junction. This view shows a different angle of the road curving to the right. The water is still high, covering the entire road surface. A street sign is visible on the left side of the road, and a hedge runs along the right side. The background shows more trees and a cloudy sky.	<p>February 2014</p> <p>Junction of Kingsmead and Mill Lane</p> <p>Courtesy Wycombe DC</p>

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February 2014

**Mill Lane
looking east
from
Kingsmead**

**Courtesy
Wycombe DC**




February 2014

**Mill Lane
looking north
near
Kingsmead**

**Courtesy
Wycombe DC**

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	<p>February 2014 Kingsmead Courtesy Wycombe DC</p>
	<p>February 2014 Mill Lane west of railway Courtesy Wycombe DC</p>

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February 2014

**Mill Lane west
of railway**

**Courtesy
Wycombe DC**





February 2014

**Mill Lane west
of railway**

**Courtesy
Wycombe DC**

18th February 2015

	<p>February 2014</p> <p>Mill Lane west of railway</p> <p>Courtesy Wycombe DC</p>
	<p>February 2014</p> <p>Mill Lane west of railway</p> <p>Courtesy Wycombe DC</p>

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	<p>February 2014</p> <p>Mill Lane west of railway</p> <p>Courtesy Wycombe DC</p>
	<p>February 2014</p> <p>Mill Lane west of railway</p> <p>Courtesy Wycombe DC</p>

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February 2014

**Mill Lane west
of railway**

**Courtesy
Wycombe DC**



February 2014

**Mill Lane at
railway bridge**

**Courtesy
Wycombe DC**

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	<p>February 2014</p> <p>Mill Lane railway bridge culvert</p> <p>Courtesy Wycombe DC</p>
	<p>February 2014</p> <p>Mill Lane (East of railway)</p> <p>Courtesy Wycombe DC</p>

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