

Gamblesby

Flood Investigation Report No 62



Flood Events:
28th June 2012
26th November 2012
18th May 2013

This flood investigation report has been produced by Cumbria County Council as a Lead Local Flood Authority under Section 19 of the Flood and Water Management Act 2010.

| Version | Undertaken by | Reviewed by | Approved by | Date |
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Executive Summary

CCC as LLFA has prepared this report with the assistance of other Flood Risk Management Authorities as it considers necessary to do so under Section 19 of the FWMA.

Three significant flood events have been reported to CCC LFRM since June 2012 that have caused internal flooding to properties. It is known that 3 properties suffered from internal flooding during the events listed below including a further 6 properties that narrowly missed internal flooding.

- 28th June 2012
- 26th November 2012
- 18th May 2013.

The two main causes of flooding were exceedance of watercourses above and through the village and surface water run-off from the surrounding fields.

The report recommends the community to continue to report any flooding events to the relevant Flood Risk Authorities and to continue to work together to ensure the community is resilient to future flood events. CCC LFRM will endeavour to apply for funding from Defra to review the flood risks in the Gamblesby area and to implement any recommendations from the review.

Event Background

This section describes the location of the flood incident and identifies the properties that were flooded.

Flooding Incident

Gamblesby is a rural village about 13.5km northeast of Penrith, on the Melmerby to Renwick road, about 3km north from its junction with the A686. The village is in the foothills of the Pennines, west of Melmerby Fell.

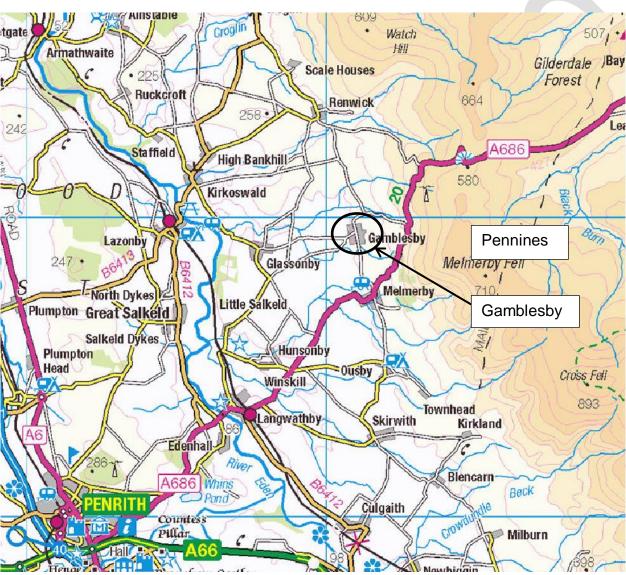


Figure 1: Location Plan.

It is known that 3 properties suffered from internal flooding during the following events 28th June 2012, 26th November 2012 and 18th May 2013. The following plan indicates the location of the properties that were affected by internal flooding. Five other properties were prevented from flooding by timely defensive action by the occupants



Figure 2: Plan identifying properties suffering from internal flooding

The four main areas affected by the flooding include the C3022 / C3004 (Glassonby Road) area, Village Hall area, St John's Church area and an area at the south end of the village.

Investigation

This section provides details of the authorities who have contributed to this investigation, an analysis of rainfall events, flow routes and details of likely causes of flooding. Also included are details of any previous flooding history in the area.

Much of the information provided on the actual events of the flooding has been provided by the various residents who have been affected by the flooding. Information has also been provided by the Parish Council.

Rainfall Events

In all three events heavy rainfall occurred over the catchments above Gamblesby. Radar information from the events indicates the following during the three events:

28th June 2012

The surrounding catchments experienced showers during the morning of the 28th June of low intensity. The intense rainfall event occurred between 13.00 and 14.30 with two peaks at approximately 13.10 and 14.10 where rainfall intensity reached between 30-40mm per hour. The diagram below shows the radar data for 14.10 on 28th June 2012.

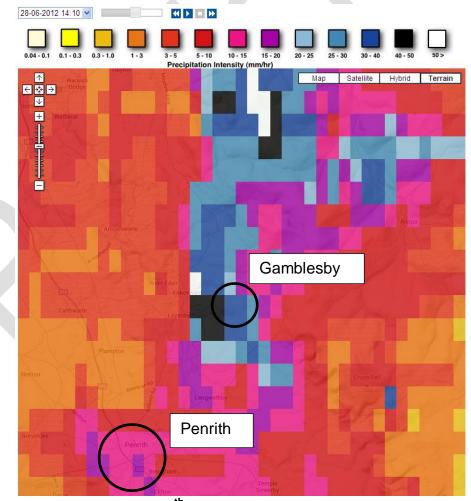


Figure 4: Radar information from 28th June 2012

26th November 2012

The rainfall event on the 26th November began at approximately 22.45 on 25th November with persistent rainfall through the night resulting with the flooding problems at approximately 04.30 on 26th November. The radar information shows that there were small pockets of higher intensity 15mm/hr) rainfall over the fell in the early morning of the 26th. 18th May 2013

The rainfall event began on 17th May 2013 at approximately 23.00 with low intensity rainfall of up to 3mm per hour. This increased to intensities in the order of 5mm per hour around 09.00 on 18th May 2013 and lasted until 13.00 with rainfall completely clearing by 14.00. However, during this event there were three peaks which occurred at approximately 10.00 (intensities 30-40mm), 10.30 (intensities 15-20mm) and 11.35 (intensities 20-25mm).

The Environment Agency (EA) also has a rain gauge located at Haresceugh Castle which is located approximately 3.8km from Gamblesby. The rainfall information obtained from the EA is illustrated in the following hyetograph.

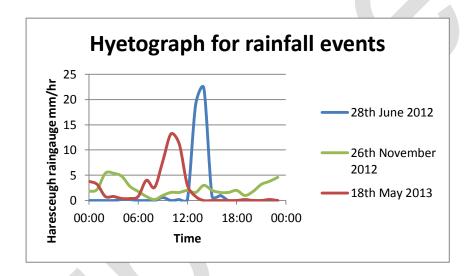


Figure 4: Rainfall hyetograph

The following table also indicates rainfall experienced at Haresceugh rain gauge on the day of the event, the previous day and the fortnight before to demonstrate saturation of the ground prior to the event.

| Date | Rainfall on event date | Rainfall on previous | Rainfall 2 weeks prior |
|--------------------------------|------------------------|----------------------|------------------------|
| | (mm) | day (mm) | to event (mm) |
| 28 th June 2012 | 44.2 | 1.8 | 116 |
| 26 th November 2012 | 46 | 29.4 | 85.2 |
| 18 th May 2013 | 29 | 25.4 | 59 |

Table 1: Comparison of rainfall totals associated with the flood events

The above hyetograph and table indicate the variation in rainfall totals and intensities that have caused flooding in the village of Gamblesby. From the flooding events that have occurred it can be seen that the catchments discharging to Gamblesby are susceptible to both very intense summer events as well as prolonged winter events.

Map of Flow Routes

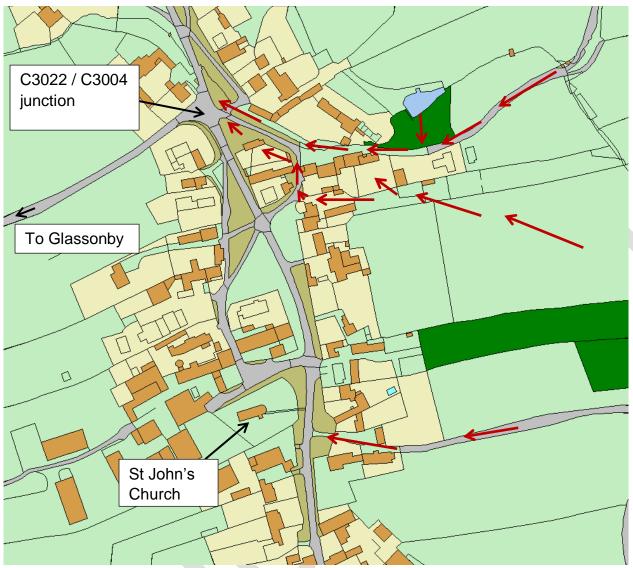


Figure 5: Plan showing the flow routes experienced during the flooding events at C3022/C3004 junction and St John's Church area

Flooding in the area of the C3022 / C3004 Junction (Glassonby road)

Following the flood forum on 5th June 2013 the Parish Council provided the LFRM team with photographic evidence of the event on 18th May 2013. Further information of the upstream flow routes is provided on the following pages. Flooding occurred in this location during all three flood events on 28th June 2012, 26th November 2012 and 18th May 2013.

There have been various changes made to the watercourses flowing towards Gamblesby generally connected to the supply of water to the Mill in the village. It is understood from residents that the original watercourse in this area has also been diverted through a culvert to provide a water supply for the Old Mill. This has included the extensive culverting through land behind Midtown Farm, and the creation of a channel to form Mill Beck from Hazelrigg Beck to connect to Gamblesby Beck. The culverting works were carried out pre 1867 as the 1867-68 1:10,560 Cumberland series maps indicate the culverting has already taken place.

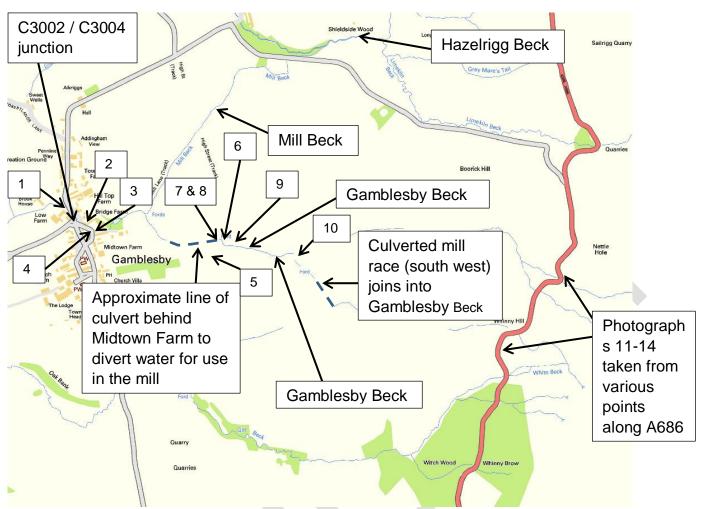


Figure 6: Plan indicating watercourses and drainage issues related to flooding around the C3002 / C3004 junction including location of photographs

The following photographs have been provided by the Parish Council and indicate the flooding issues. They were taken on 18th May 2013.



Photograph 1: Indicating flow from Gamblesby Beck near C3022 / C3044 junction



Photograph 2: Upstream of Bridge Farm / Follys Barn access bridge

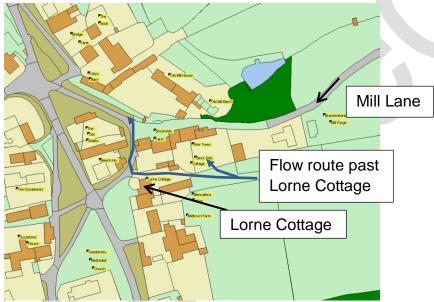


Figure 7: Plan identifying flow route past Lorne Cottage and down Mill Lane



Photograph 3: Looking toward C3022 / C3004 junction

The above photograph highlights the surface water flows that cause the flooding from Lorne Cottage try to find their way back to Gamblesby Beck. Lesser flows also contribute to the flooding from Mill Lane. Residents have used sandbags where possible to divert floodwaters back into Gamblesby Beck.



Photograph 4: Flood waters flowing past Lorne Cottage



Surface water flow towards Gamblesby due to under capacity of culvert on Gamblesby Beck

Photograph 5: Showing surface water flowing down field towards Gamblesby



Flood water unable to enter the culvert indicated as Restriction 1 in Figure 11. The flood water in the track is likely to be 70-80cm deep.

Photograph 6: Bridleway behind Midtown Farm

Photograph 6 shows the surface water that gathers in the bridleway as it is unable to enter the culvert behind Midtown Farm. The surface water builds up and eventually starts to flow through the dry stone wall as shown in photographs 7 & 8 before creating the surface water flow down the field as shown in photograph 5.



Photographs 7 & 8: Floodwater flowing through wall from bridleway shown in photograph 6.



Photograph 9: Floodwater running across field above bridleway



Photograph 10: Upstream of Gamblesby indicating volumes of water from Gamblesby Beck and the culverted mill race from the south west.

The Parish Council have also carried out investigation work to assist in identifying the sources of the surface water from above Gamblesby and provided photographs indicating the volume of water channelled along the A686. The following photographs indicate the volumes of water flowing along the A686 that finds its way into Gamblesby Beck.



Photographs 11-14: Examples of surface water flow on A686 above Gamblesby

Further investigations carried out by CCC Highways have identified issues with drainage on the track (U3665) to Twotop Hill. This has caused surface water to run from the track on to the A686 and to find its way into Gamblesby Beck. CCC Highways have carried out works in October 2013 to ensure that flows from the track (U3665) flow in to Howgill Beck which reduces the flow into Gamblesby Beck. The following plan indicates the location of the track and the watercourses.

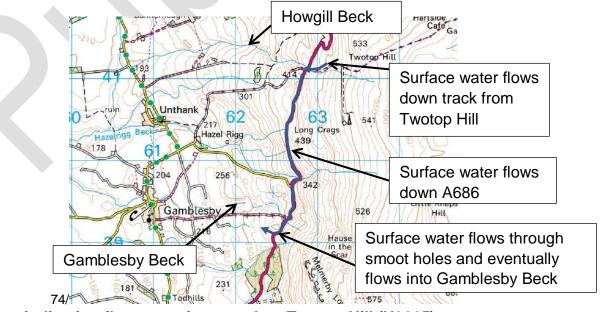


Figure 8: Plan indicating flow route from track to Twotop Hill (U3665)

Flooding in the St John's Church area

During the 28th June 2013 event flooding of one property and the highway occurred. Flooding of a further property was avoided by the prompt action of the resident. The following plan indicates the extent of the flooding and the direction of the surface water flow into Gamblesby.



Figure 9: Plan showing extent of flooding

The parish council have carried out various investigations and ensured that ditches have been cleaned out since the June 2012 event. This appears to have had the effect of reducing the surface water flows to the area around St John's Church as the drainage systems have been able to cope with the flows during the November 2012 and May 2013 events.

The following photographs taken by the parish council on 18th May 2013 indicate that there is still some surface water flow down the track between Westgarth Barn and Hollies Croft but the flow is at a much reduced rate and the highway drainage system appear to be able to cope with the surface water flow. It should be noted that highway drainage is designed to accommodate flow from the carriageway and not surrounding areas.



Photograph 15: Surface water flows down the lane between Westgarth Barn and Hollies Croft



Photograph 16: Surface water discharging to highway gully outside Hollies

Flooding at the south end of the village

During the 28th June 2012 event internal flooding of one property occurred from surface water. The house is located in a farmyard which is mainly concreted. Surface water gathered in the farm yard as it was unable to flow quickly enough through the drainage systems. Run-off via the highway also contributed to the flood water.

Flooding in the Village Hall area

Surface water flooding was also an issue in the highway near to the Village Hall. This caused excessive surface water to flow into a driveway causing flooding to some outbuildings. The resident has since altered the edging of their driveway to deflect floodwater from their outbuildings.

Likely Causes of Flooding

Flooding in the area of the C3022 / C3004 Junction (Glassonby road)

There are several areas of flooding in Gamblesby, however, the area around the C3022/ C3004 is affected by flood water running from the east of the village from the direction of the Pennines. The water appears to be as a result of minor watercourses reaching capacity and overflowing following flow routes towards the village. Surface water mapping carried out by the Environment Agency clearly indicates the line of one of these routes as shown in the following plan.

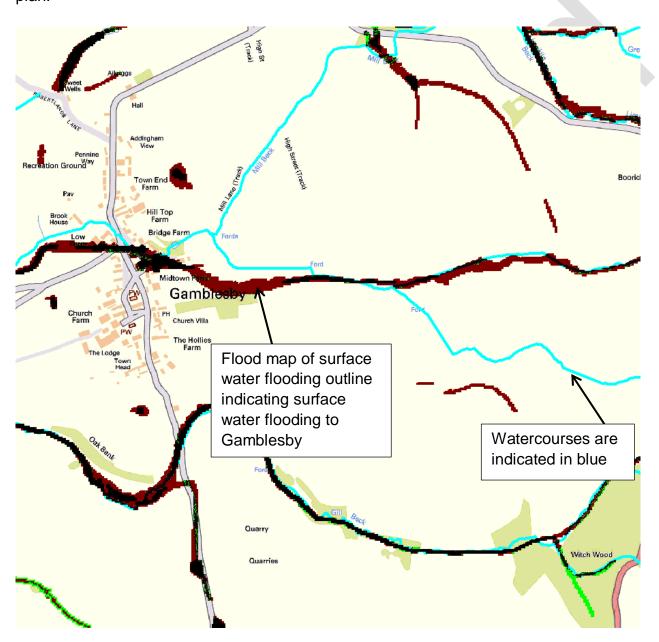


Figure 4: Plan indicating surface water flow as predicted by the Flood Map of Surface Water

Some of the flooding in the C3022 / C3004 junction area of the village can be contributed to restrictions on the watercourse through Gamblesby. The possible restrictions are shown on the following plan.

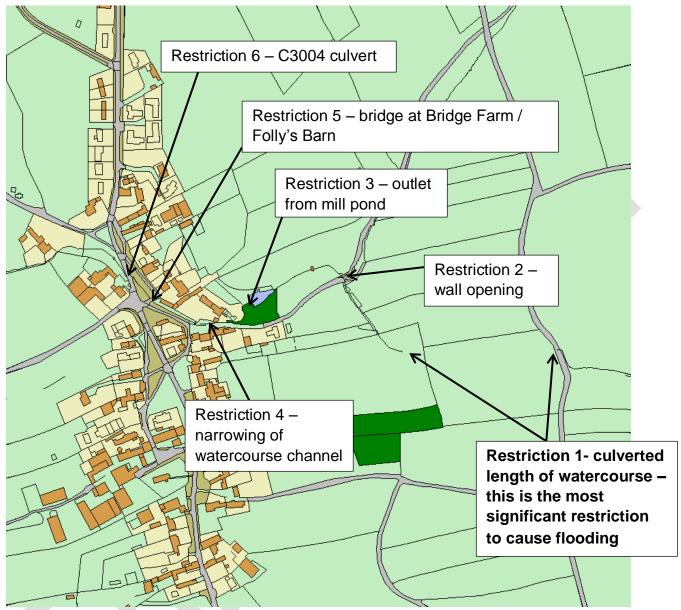


Figure 11 – Restrictions on the watercourse contributing to the flooding in the 'Mill Lane' area.

The most significant restriction on the watercourse in the plan above is the culvert indicated as number 1. This has the effect of both (to some extent) protecting the watercourse downstream and causing flooding by diverting surface water towards properties. The other restrictions have a minimal effect on flooding as the amount of overspill from the watercourse at these points appears to be a more manageable quantity except at restriction 5 where photograph 5 shows that the bridge is causing an overspill onto the C3004.

Other possible contributing factors to the flooding may also be the discharge of highway drainage from the A686 into the catchment. This should be considered as part of the study that CCC proposes to initiate during 2014/15 subject to funding availability.

Flooding History

Flooding has occurred in the village previously to the three events covered by this report. The Parish Council have informed that there has been flooding in the village in 1968 particularly in the area near to St John's Church. Residents in the St John's Church area have stated that flooding in that area has occurred six times in the last 10 years. A property at the south end of the village also suffered from internal flooding in 1968.

Residents in the C3022 / C3004 area have informed CCC that surface water runs down Mill Lane during heavy rainfall but the residents are normally able to manage the water flow to prevent internal flooding.

Recommended Actions

| Action by | Recommended Action | How | |
|----------------------------|--|--|--|
| Residents / Parish Council | Continue to report flooding issues to the appropriate flood authorities | Use telephone numbers and email addresses as indicated at the rear of the report. | |
| Parish Council | Continue to work with landowners in the local area to ensure drainage channels and ditches operate to maximum capacity. | Report any blockages or collapses of ditches or culverts to the relevant landowners. | |
| CCC LFRM | Apply to Defra (through the Environment Agency) for Flood Defence Grant in Aid to carry out a study to identify solutions to mitigate flooding. Possible solutions are upland storage combined with watercourse redirection. | Application to be submitted to Defra June 2013 for funding in 2014/15. Resubmission March 2014 | |
| CCC Highways | Investigate possible sources of surface water flow on to A686. | Site visits during wet weather to identify sources. Surface water flow already identified from Twotop Hill track. Maintenance works carried out to restore surface water from Twotop Hill flows to Howgill Beck. COMPLETED | |
| CCC Highways | Clean drainage channel to Limekiln Beck from A686 | Ensure profile of drainage channel encourages surface water to flow from A686 to Limekiln Beck. | |
| CCC Highways | Inspect highway drainage system at the south end of the village to ensure it operates at full capacity. | Carry out CCTV survey of the drainage systems. COMPLETED | |

Residents and property owners who are aware that they are at risk of flooding should take action to ensure that they and their properties are protected. Community resilience is important in providing information and support to each other if flooding is anticipated. Actions taken can include laying sandbags and moving valuable items to higher ground, to more permanent measures such as installing floodgates, raising electrical sockets and fitting non-return valves on pipes. Anyone affected by flooding should try to document as much information about the incident as possible.

Next Steps

CCC as the LLFA will continue to ensure that any actions identified within the actions table of this report are appropriately taken forward by each Risk Management Authority identified. Actions will continue to be prioritised through the Making Space for Water process and monitored through regular meetings of the group. Details of the MSfWG members and summary of related processes are detailed in Appendix 2.



Appendices

Appendix 1: Glossary

Acronyms

EA Environment Agency
CCC Cumbria County Council

UU United Utilities

LLFA Lead Local Flood Authority
LFRM Local Flood Risk Management
MSfWG Making Space for Water Group

FAG Flood Action Group

FWMA Flood and Water Management Act 2010

LDA Land Drainage Act 1991 WRA Water Resources Act 1991



Appendix 2: Summary of Relevant Legislation and Flood Risk Management Authorities

The Flood Regulations 1999 and the Flood and Water Management Act 2010 (the Act) have established Cumbria County Council (CCC) as the Lead Local Flood Authority (LLFA) for Cumbria. This has placed various responsibilities on CCC including Section 19 of the Act which states:

Section 19

- (1) On becoming aware of a flood in its area, a lead local flood authority must, to the extent that it considers it necessary or appropriate, investigate—
 - (a) which risk management authorities have relevant flood risk management functions, and
 - (b) whether each of those risk management authorities has exercised, or is proposing to exercise, those functions in response to the flood.
- (2) Where an authority carries out an investigation under subsection (1) it must—
 - (a) publish the results of its investigation, and
 - (b) notify any relevant risk management authorities.

A 'Risk Management Authority' (RMA) means:

- (a) the Environment Agency,
- (b) a lead local flood authority,
- (c) a district council for an area for which there is no unitary authority,
- (d) an internal drainage board.
- (e) a water company, and
- (f) a highway authority.

The table below summarises the relevant Risk Management Authority and details the various local source of flooding that they will take a lead on.

| Flood | Environment | Lead Local | District | Water | Highway |
|--------------|-------------|------------|----------|---------|-----------|
| Source | Agency | Flood | Council | Company | Authority |
| | | Authority | | | |
| RIVERS | | | | | |
| Main river | | | | | |
| Ordinary | | | | | |
| watercourse | | | | | |
| SURFACE | | | | | |
| RUNOFF | | | | | |
| Surface | | | | | |
| water | | | | | |
| Surface | | | | | |
| water on the | | | | | |
| highway | | | | | |
| OTHER | | | | | |
| Sewer | | | | | |
| flooding | | | | | |
| The sea | | | | | |
| Groundwater | | | | | |
| Reservoirs | | | | | |

The following information provides a summary of each Risk Management Authority's roles and responsibilities in relation to flood reporting and investigation.

<u>Government</u> – Defra develop national policies to form the basis of the Environment Agency's and Cumbria County Council's work relating to flood risk.

<u>Environment Agency</u> has a strategic overview of all sources of flooding and coastal erosion as defined in the Act. As part of its role concerning flood investigations this requires providing evidence and advice to support other risk management authorities. The EA also collates and reviews assessments, maps and plans for local flood risk management (normally undertaken by LLFA).

<u>Lead Local Flood Authorities (LLFAs)</u> – Cumbria County Council is the LLFA for Cumbria. Part of their role requires them to investigate significant local flooding incidents and publish the results of such investigations. LLFAs have a duty to determine which risk management authority has relevant powers to investigate flood incidents to help understand how they happened, and whether those authorities have or intend to exercise their powers. LLFAs work in partnership with communities and flood risk management authorities to maximise knowledge of flood risk to all involved. This function is carried out at CCC by the Local Flood Risk Management Team.

<u>District and Borough Councils</u> – These organisations perform a significant amount of work relating to flood risk management including providing advice to communities and gathering information on flooding.

<u>Water and Sewerage Companies</u> manage the risk of flooding to water supply and sewerage facilities and the risk to others from the failure of their infrastructure. They make sure their systems have the appropriate level of resilience to flooding and where frequent and severe flooding occurs they are required to address this through their capital investment plans. It should also be noted that following the Transfer of Private Sewers Regulations 2011 water and sewerage companies are responsible for a larger number of sewers than prior to the regulation.

<u>Highway Authorities</u> have the lead responsibility for providing and managing highway drainage and certain roadside ditches that they have created under the Highways Act 1980. The owners of land adjoining a highway also have a common-law duty to maintain ditches to prevent them causing a nuisance to road users.

Flood risk in Cumbria is managed through the Making Space for Water process which involves the cooperation and regular meeting of the Environment Agency, United Utilities, District/Borough Councils and CCC's Highway and LFRM Teams to develop processes and schemes to minimise flood risk. The MSfWGs meet approximately 4 times per year to cooperate and work together to improve the flood risk in the vulnerable areas identified in this report by completing the recommended actions. CCC as LLFA has a responsibility to oversee the delivery of these actions.

Where minor works or quick win schemes can be identified, these will be prioritised and subject to available funding and resources will be carried out as soon as possible. Any major works requiring capital investment will be considered through the Environment Agency's Medium Term Plan or a partners own capital investment process.

Flood Action Groups are usually formed by local residents who wish to work together to resolve flooding in their area. The FAGs are often supported by either CCC or the EA and provide a useful mechanism for residents to forward information to the MSfWG.



Appendix 3: Useful contacts and links

Cumbria County Council (Local Flood Risk Management):

Ifrm@cumbria.gov.uk, www.cumbria.gov.uk, tel: 01228 221331

Cumbria County Council (Highways):

highways@cumbria.gov.uk, www.cumbria.gov.uk, tel: 0845 609 6609

Cumbria County Council (Neighbourhood forum):

Jeff.tweddle@cumbria.gov.uk, www.cumbria.gov.uk, tel: 01768 812661

United Utilities: www.unitedutilities.co.uk, tel: 0845 746 2200

Eden District Council:

www.eden.gov.uk, tel: 01768 817817

Environment Agency:

www.environment-agency.gov.uk, tel: 03708 506 506

Floodline: 0845 988 1188 (24 hour service) or Type talk 0845 602 6340

Flood and Water Management Act 2010:

http://www.legislation.gov.uk/ukpga/2010/29/contents

Water Resources Act 1991:

http://www.legislation.gov.uk/all?title=water%20resources%20act

Land Drainage Act:

http://www.legislation.gov.uk/all?title=land%20drainage%20act

Highways Act 1980:

http://www.legislation.gov.uk/all?title=highways%20act

EA – 'Living on the Edge' a guide to the rights and responsibilities of riverside occupation: http://www.environment-agency.gov.uk/homeandleisure/floods/31626.aspx

EA – 'Prepare your property for flooding' how to reduce flood damage including flood protection products and services:

http://www.environment-agency.gov.uk/homeandleisure/floods/31644.aspx

Appendix 4: Summary of feedback to draft report

The following information has been received either at the Flood Forum held in Gamblesby on 6th June 2013, or forwarded after from various members of the community including residents, the Parish Council and members of the MSFW group.

- Photographs showing flood water in various parts of the catchment upstream of the village and along the A689.
- Information on various surface water flow routes on A689.
- Information from the Highway's Area Steward detailing source of surface water flow onto the A689 and details of works they have carried out.
- Old photograph of millrace through village
- Information on line of old watercourse and confirmation of flow routes during event
- Comments on restrictions identified in the report and further information
- Information on manmade drain into Gamblesby Beck
- Scour and erosion on Hazelrigg Beck (CCC Highways are aware of this and will continue to monitor accordingly)

Translation services

If you require this document in another format (e.g. CD, audio cassette, Braille or large type) or in another language, please telephone 01228 606060.

আপনি যদি এই তথ্য আপনার নিজের ভাষায় পেতে চান তাহলে অনুগ্রহ করে 01228 606060 নম্বরে টেলিফোন করুন।

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