

Braithwaite

Section 19

Flood Investigation Report



Coledale Beck, Braithwaite, Cumbria

Flood Event 5-6th December 2015

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

Version	Prepared by	Reviewed by	Approved by	Date
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Executive Summary

Braithwaite experienced severe flooding on the 5th of December 2015 as a direct result of Storm Desmond. This storm caused a period of prolonged, intense rainfall across Northern England, falling on already saturated catchments, and led to high river levels and flooding throughout Cumbria and beyond.

In response to the flood event, this Section 19 Flood Investigation Report has been completed by the Environment Agency as a key Risk Management Authority (RMA) working in partnership with Cumbria County Council as the Lead Local Flood Authority (LLFA), under the duties as set out in Section 19 of the Flood and Water Management Act 2010. This report provides details on the flooding that occurred in Braithwaite on 5th of December, and has used a range of data collected from residents, professional partners, site visits, surveys of the area, and data collected by observers, along with river and rainfall gauges during the flood event.

On the afternoon of the 5th December 2015, Braithwaite was affected by severe, rapid response flooding from the Coledale Beck. The flooding incident resulted in damage to 41 properties including the village shop, hotel and local pub. The flooding from the Coledale Beck also flowed over the A66 main trunk road that connects West Cumbria with Keswick and Penrith resulting in its closure.

This report details the flooding that occurred from the Coledale Beck, Barrow Gill and from surface water. It identifies the flow routes and the causes of the flooding including where river banks were overtopped in a number of locations in Braithwaite. The section of the Coledale Beck upstream of the Coledale High Bridge is heavily vegetated with large trees growing within close proximity to the river, and in some cases within the channel. Many of these trees were washed out into the watercourses causing multiple blockages, resulting in a wider impact of flooding to the village.

Twenty two actions have been recommended in this report to manage future flood risk in Braithwaite, which will require the involvement of a number of organisations and local communities. In response to the flooding, a number of community meetings have taken place. These will continue in order to ensure that all those affected are given the opportunity to be involved in reducing the flood risk in their area.

Any additional information that the residents and others can provide to the Environment Agency and Cumbria County Council to help develop our understanding of the flooding is welcomed. A lot of information has already been provided, much of which has been used to inform this report. The scale of this report means that not every piece of information can be incorporated into the document. Any additional information should be provided to:

<http://www.cumbria.gov.uk/planning-environment/flooding/floodriskassessment.asp>

The Flood Investigation Report

Under Section 19 of the Flood and Water Management Act (2010) Cumbria County Council, as Lead Local Flood Authority (LLFA), has a statutory duty to produce Flood Investigation Reports for areas affected by flooding. Section 19 of the Flood and Water Management Act states:

- (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.*

This section of the Act leaves the determination of the extent of flood investigation to the LLFA. It is not practical or realistic for Cumbria County Council to carry out a detailed investigation into every flood incident that occurs in the County, but every incident, together with basic details will be recorded by the LLFA.

Only those with 5 or more properties/businesses involved will have investigations published. An investigation will be carried out, and a report prepared and published by the LLFA when the flooding impacts meet the following criteria:

- where there is ambiguity surrounding the source or responsibility of flood incident,
- internal flooding of one property that has been experienced on more than one occasion,
- internal flooding of five properties has been experienced during one single flood incident and
- there is a risk to life as a result of flooding.

As a flood Risk Management Authority (RMA), the Environment Agency have partnered with Cumbria County Council (CCC) to produce the 53 flood investigation reports across Cumbria.

Scope of this report

This Flood Investigation Report **is**:

- an investigation on the what, when, why, and how the flooding took place resulting from the 5th-6th December 2015 flooding event and
- a means of identifying potential recommendations for actions to minimise the risk or impact of future flooding.

This Flood Investigation Report **does not**:

- interpret observations and measurements resulting from this flooding event. Interpretation will be undertaken as part of the subsequent reports,
- provide a complete description of what happens next.

The Flood Investigation Reports outline recommendations and actions that various organisations and authorities can do to minimise flood risk in affected areas. Once agreed, the reports can be used by communities and agencies as the basis for developing future plans to help make areas more resilient to flooding in the future.

For further information on the S19 process, including a timetable of Flood Forum events and associated documentation, please visit the County Council website at:

<http://www.cumbria.gov.uk/floods2015/floodforums.asp>

To provide feedback on the report please email LFRM@cumbria.gov.uk.

Introduction

Geographical Setting

The village of Braithwaite is located 3 kilometres west of Keswick in the Borough of Allerdale within the northern Lake District National Park, **Figure 1**. The village is located at Ordnance Survey National Grid Reference (NGR) NY231236, and is situated around Coledale Beck. The main sources of the flooding in Braithwaite are from the Coledale Beck and the Barrow Gill. However, surface water flooding was observed affecting the B5292 flowing down Whinlatter Pass prior to the overtopping of the main watercourses. Surface water also resulted in the flooding of the cul-de-sac, as the drainage network became overwhelmed. In addition to this, high volumes of overland flow were channelled down the track leading from Braithwaite Lodge.

The Coledale Beck originates from the steep valley west of Braithwaite and flows in an easterly direction through the village before discharging into the Newlands Beck. Newlands Beck subsequently flows in a northerly direction towards Bassenthwaite Lake. Coledale Beck is crossed by two road bridges within Braithwaite which are referred to as the Coledale High Bridge and the Coledale Low Bridge.

The section of the Coledale Beck upstream of the Coledale High Bridge is heavily vegetated with large trees, including oak and silverbirch, growing within close proximity of the river channel. Many of these trees were washed out into the watercourses causing multiple blockages, resulting in a wider impact of flooding to the village. The willow trees located on the common were also washed out into the watercourse.

The Barrow Gill originates south of Braithwaite, draining the area downstream of Barrow Door. This watercourse falls under the remit of Cumbria County Council (CCC) as the Lead Local Flood Authority (LLFA). The Barrow Gill joins the Coledale Beck at the confluence, opposite the camp site at the east of the village. These watercourses respond rapidly to heavy rainfall and are identified as such.

The Environment Agency currently manages flood risk in Braithwaite by operating a large gravel trap on the Coledale Beck and maintaining linear embankments within the village. The Environment Agency does not operate a Flood Warning service in Braithwaite due to the rapid response nature of the catchment although it does fall within the Derwent Flood Alert area.



Figure 1: Location of Braithwaite and the surrounding catchment

Flooding History: November 2009

Braithwaite has a known history of flooding, with the most recent major incident being the November 2009 flooding event which affected many locations within Cumbria.

The November 2009 event was estimated to be an event with a rarity greater than 0.2% Annual Exceedance Probability (AEP)¹. The AEP describes the likelihood of a specified flow rate (or volume of water with specified duration) being exceeded in a given year. There are several ways to express AEP as shown in **Table 1**. Throughout this report AEP is expressed as a percentage. As such an event having a 1 in 100 chance of occurring in any single year will be described as a 1% AEP event.

AEP (as percent)	AEP (as probability)
50%	0.5
20%	0.2
10%	0.1
4%	0.04
2%	0.02
1%	0.01
0.1%	0.001

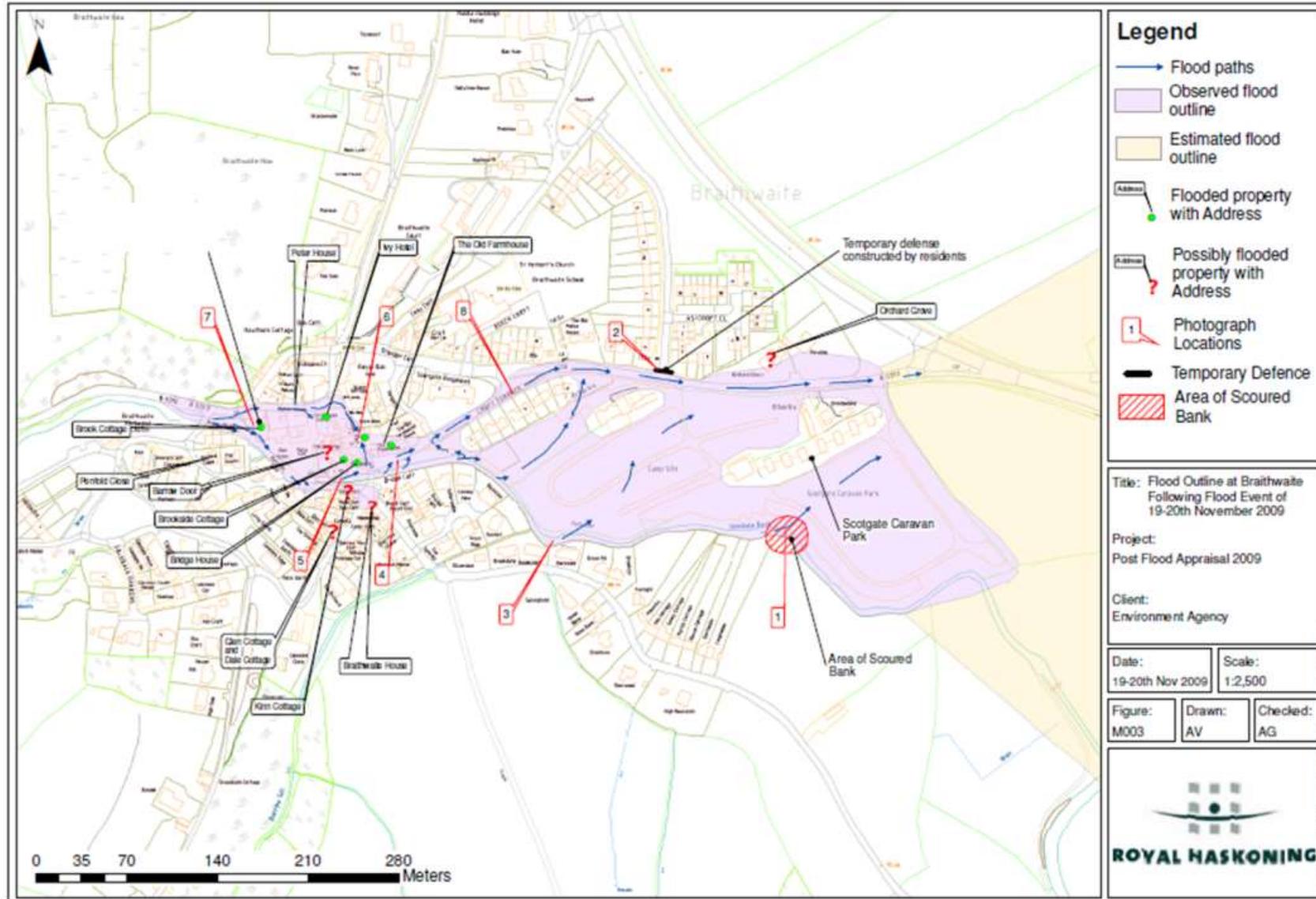
Table 1: Probabilities of Exceedance

Following the November 2009 flood event, a flood investigation was undertaken which identified the flood extent, damaged properties and flooding pathways. This is shown in **Figure 2**. No blockages at the bridges or large scale uprooting of trees were identified during the 2009 event, and there was minimal damage to roads with no evidence of vehicles being washed away, as was the case in the 5th December 2015 event.

Although similarities can be drawn between the 2009 event and the 5th December 2015 event, the flood extent did not incorporate properties located to the south of the Lower Coledale Bridge during 2009.

¹ Estimate taken from CEH briefing note <http://nora.nerc.ac.uk/s510223/1/Nov09Floods-CEH-briefing-note.pdf>

Figure 2: November 2009: Post-Flood Appraisal



Photograph 1 and **Photograph 2** show the extent of the flooding during the November 2009 flooding incident near the junction of the A66 with the B592.



Photograph 1: Floodwater from the Coledale Beck on the A66 during the November 2009 flooding

19th November 2009, NGR NY 23368 23659



Photograph 2: Looking north on the B5292 from the A66 junction during the November 2009 flooding

19th November 2009, NGR NY 23336 23662

Flood Event 5th – 6th December 2015

Background

On the afternoon of the 5th December 2015, Braithwaite was affected by severe flash flooding from the Coledale Beck. The flooding incident resulted in damage to 41 properties including the village shop, the Ivy House hotel, the Royal Oak public house and the campsite. The flooding from the Coledale Beck also crossed the A66 main trunk road that connects West Cumbria with Keswick and Penrith. The flooding resulted in the closure of this vitally important piece of infrastructure.

The flooding incident also damaged the two access bridges within Braithwaite, temporarily preventing all access and egress between the western and eastern sides of the village. The flood defence embankment on the Coledale Beck was also overtopped, with sections washed away during the flooding incident.

A site map of Braithwaite, including the extent of the December 2015 floodwater, is shown in **Figure 3**.

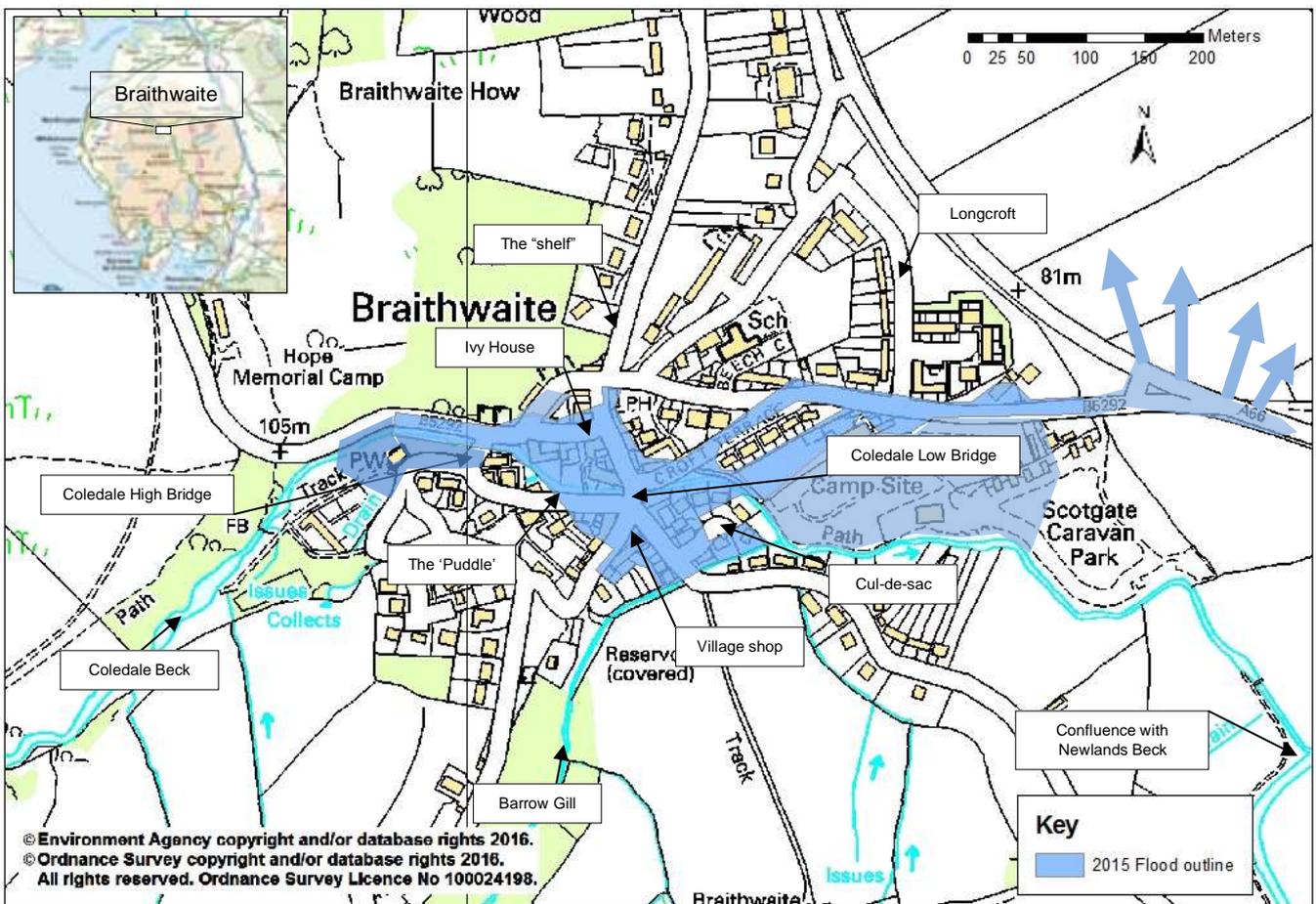


Figure 3: Extent of River (Fluvial) Flooding* in Braithwaite on the 5th December 2015

*The flood outline identifies the maximum extent of flooding. Not all properties within the extent area were flooded.

Rainfall Event

December 2015 was the wettest calendar month on record for the UK, with much of northern England receiving double the average December rainfall. This also followed a particularly wet November and as such, much of the ground within the Cumbria catchments was already saturated.

From the 4th to the 7th of December there was a period of prolonged, intense rainfall caused by Storm Desmond. Over this period, new 24 hour and 48 hour rainfall records were set for the UK. Both of these were within Cumbria and broke the previous records, also within Cumbria, set during the November 2009 floods.

Table 2 shows the UK record levels of rainfall. **Table 3** shows the rainfall more widely recorded on the 4th and 5th December 2015. **Figure 4** shows the location of these rain gauges.

	Previous record			December 2015 Event	
	Date	Location	mm	Location	mm
24 hour rainfall	November 2009	Seathwaite	316.4	Honister Pass	341.4
48 hour rainfall	November 2009	Seathwaite	395.6	Thirlmere	405

Table 2: UK Rainfall Records

Return periods (calculated using historical rainfall event data) have been calculated for this event. Two of these locations have recorded rainfall that is estimated to be rarer than 0.1% AEP.

Monitoring Station	Rainfall (mm)			Estimated Annual Exceedance Probability ²
	4 th December (09:00 – 08:59)	5 th December (09:00 – 08:59)	Max. rainfall in any 24 hour period	
Cornhow	12.8	81.8	94.4	7.1%
High Snab Farm	39.6	159.2	193.0	0.7%
Honister Pass	58.6	294.4	341.4	<0.1%
Seathwaite	36.6	185.2	214	1.33%-1.67%
Thirlmere	35.0	317.6	324.8	<0.1%
Portinscale	Data not within validation tolerances			
Dale Head Hall	Data not within validation tolerances			

Table 3: Rainfall recorded at gauges within the Derwent catchment

² Calculated using FEH DDF methodology, this estimation is not calibrated for values with an AEP less than 0.1%

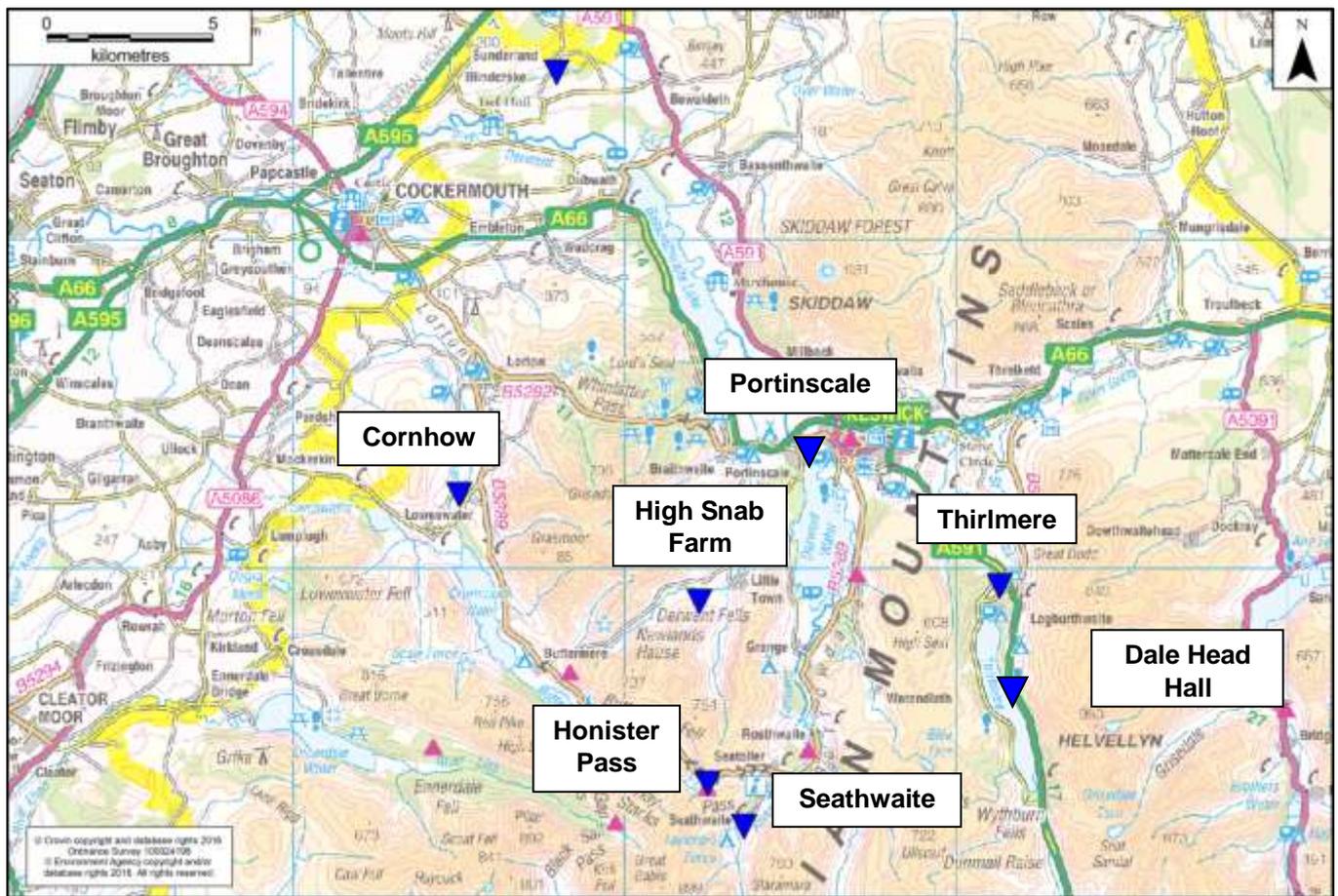


Figure 4: River Derwent catchment and locations of rain gauges

This rainfall event led to exceptionally high river flows across the country and widespread flooding.

Existing Flood Defences

Braithwaite benefits from a number of flood defences, **Figure 5**. The Environment Agency operates a large gravel trap on the Coledale Beck, approximately 200m upstream of Braithwaite, **Photograph 3**. The formal structure was constructed in 2012 to replace the former concrete dam of similar design which was in deteriorating condition, **Photograph 4**. The purpose of the structure is to reduce the velocity of water within Coledale Beck, causing gravel and sediment to drop out of suspension and become trapped behind the structure before it can pass into Braithwaite.

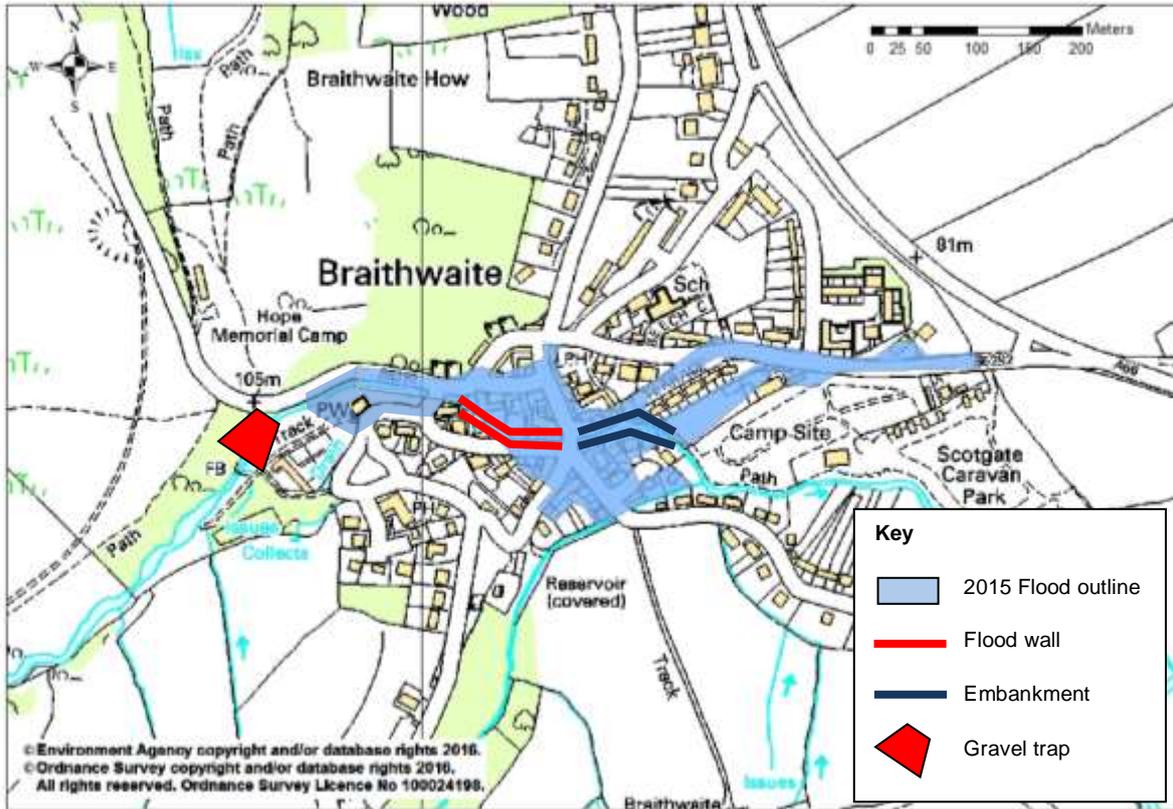


Figure 5: Flood defences within Braithwaite

*The flood outline identifies the maximum extent of flooding. Not all properties within the extent area were flooded.

Trapped sediment is routinely cleaned by Environment Agency operatives via the access ramp on the right bank of the watercourse. This is monitored every fortnight and after rainfall events, and emptied as required. This structure serves to reduce flood risk in Braithwaite by preventing gravel shoals from accumulating within the village which may otherwise create localised reductions in channel capacity.



Photograph 3: Former gravel trap

21st August 2009, NGR NY 22894 23627



Photograph 4: Current Gravel trap on Coledale Beck

9th December 2015, NGR NY 23006 23615

A flood defence embankment is also located on the right bank of the Coledale Beck immediately upstream of the Lower Coledale Bridge, as shown in **Photograph 5** and **Photograph 6**. This localised feature is intended to provide an additional level of protection to the properties on the right bank of the Coledale Beck.

The embankment was refurbished in 2011 when the Environment Agency repaired the river training wall with local stone and built a dwarf wall behind this. The top of the wall was finished with turf to blend this into the existing embankment.

The flood defence embankment was overtopped, with sections washed away, during the 5th December 2015 flooding incident.



**Photograph 5: Embankment under reconstruction in 2011
2011, NGR NY 23133 23580**



**Photograph 6: Embankment covered with turf after completion of the
refurbishment work in 2011, NGR NY 23133 23580**

Investigation

This investigation was carried out by the Environment Agency through surveys of the area and data collected from the communities affected with help from Cumbria County Council.

This report has been compiled by Captia AECOM from the data collected by the Environment Agency.

Impacts and Likely Causes of Flooding

Timeline

The data collected as part of this Flood Investigation Report has been used to produce an approximate timeline for the 5th December flooding incident in Braithwaite. This is shown in **Table 4**.

Friday 4 th December	Event
	Environment Agency initial contact with Flood Action Group.
Saturday 5 th December	Event
10:00	Flow observed running down B5292 Whinlatter Road. High volumes of water observed flowing out from the Hope Memorial Camp onto the B5192. Surface water drains in this area begin to become overwhelmed.
10:44	Coldale Beck begins to overtop the embankments at the campsite.
10:46	Surcharging of the drains on the B5292 Whinlatter Road is observed.
11:10	Flooding into the campsite and Croft Terrace.
12:54	Ponding of water at the A66 junction to Braithwaite.
13:00 (approx.)	Surface water causes flooding as the drains begin to surcharge in the cul-de-sac. The Royal Oak public house is flooded by surface water flowing from the Top Road ("the shelf").
13:45 (approx..)	Coldale Beck overtops the defence walls on the right bank at "the Puddle". Barrow (Chaplains) Gill floods onto the Newlands road as capacity through the culvert is blocked/exceeded, and flows into the cul-de-sac. Flood water is reported to be backing up Barrow Gill and flooding the cul-de-sac as it becomes gravity locked by Coledale Beck. Properties in Main Street, Newlands Road and the cul-de-sac begin to flood.
13:45 onwards (approx.)	A blockage caused by a large number of uprooted trees forms upstream of Coldale High Bridge.
14:00 (approx.)	High volumes of surface water flow down the track from Braithwaite Lodge, contributing to the flooding of properties off the Newlands Road and in the cul-de-sac.
14:45	Coledale Beck overtops its banks near the Braithwaite Village Shop.
14:48	The footbridge upstream of Coledale High Bridge, known as Chicken Bridge, fails.
14:50 (approx..)	Overtopping of walls downstream of the Coledale High Bridge and upstream of the Coledale Low Bridge.
14:55	Flow of water down the B5292 Whinlatter Road is reported as being over 2 inches deep from surface sources.
15:14	The parapet on the Coledale High Bridge fails.
15:15	A sudden surge of water hits Braithwaite. Bridge House, already flooded from the road side of the property is inundated by the surge. A resident is trapped in a room by the rapidly rising water and has to be rescued by another occupant of the property.
15:38	Footbridges upstream of the Coledale Low Bridge fail. Access and egress becomes impossible between the north and south sides of the village.
15:53	Surge of water increasing flow through the village is experienced.

15:53 onwards	Considerable local efforts were made to remove blockages from the bridges and clear trees / debris to improve the conveyance of the water. Two footbridges and a handrail are also removed from the channel. Local efforts were constant from 15:53 throughout the night.
20.00 onwards (approx.)	Mountain Rescue assists residents with egress through floodwater. An woman is rescued from her house in the cul-de-sac by a local farmer using a tractor.
Sunday 6th December	Event
05:30 onwards	Local efforts remove a large tree from under the Low Coledale Bridge and the third footbridge. Clearance of trees and debris continue throughout the day.

Table 4: Braithwaite 5th December Flood Incident Timeline

Table 5 below shows the total number of properties flooded compared to other recent flood events.

Year	2009	2015
Total number of flooded properties	6	50

Table 5: Number of flooded properties

Overview of flow routes

There were a number of flooding flow routes during the event, **Figure 6**, sourced from multiple locations. The details of these flow routes and the associated impact are discussed in further detail in the following section of this report.

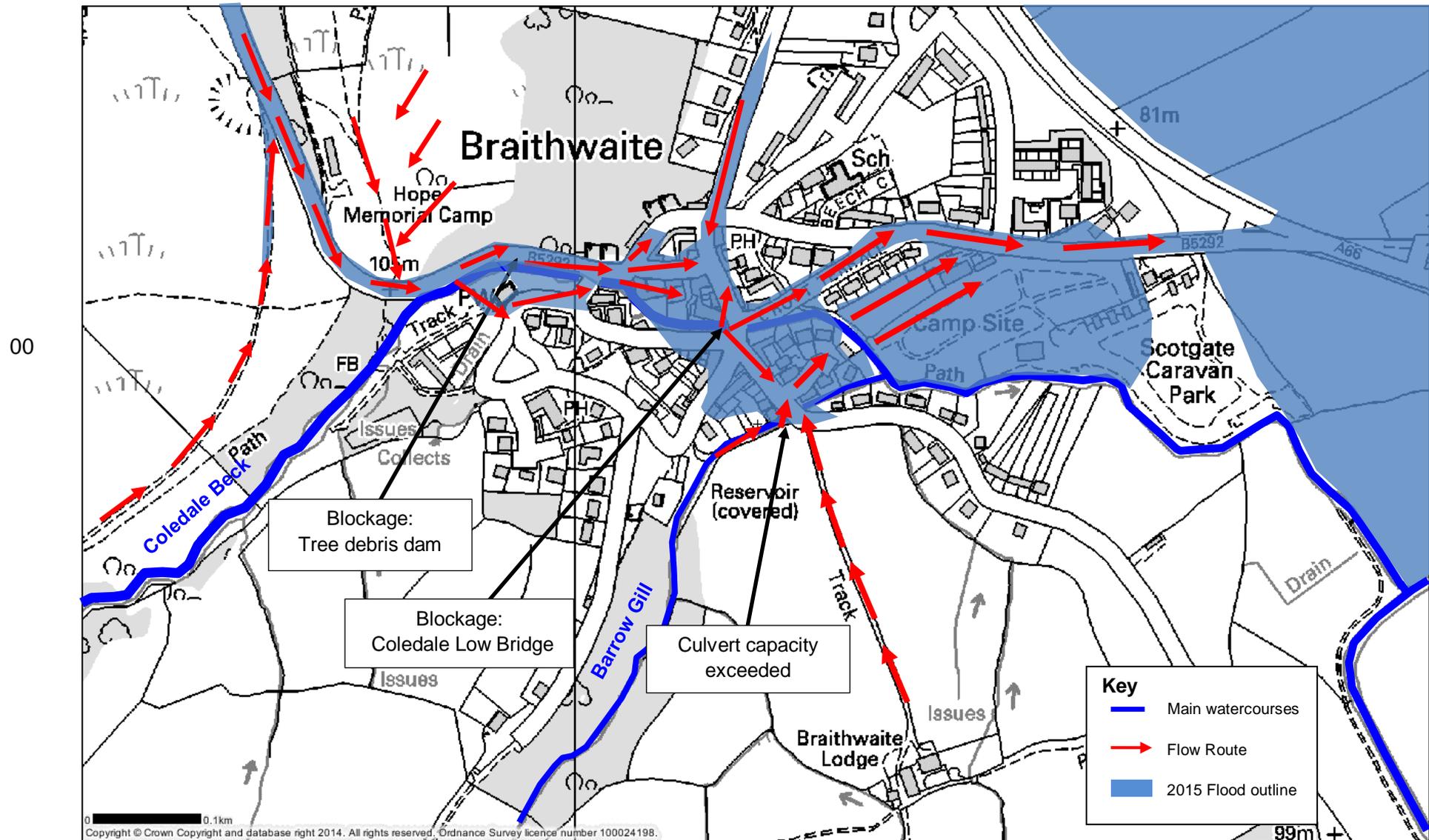


Figure 6: Map of flood flow routes

*The flood outline identifies the maximum extent of flooding. Not all properties within the extent area were flooded.

Accounts from local residents indicate that in the early afternoon of the 5th December water levels within the Coledale Beck rose rapidly. A number of floodwater surges were witnessed. The floodwater uprooted and carried trees, woody debris and sediment from upstream of Braithwaite, **Photograph 7**. This caused localised blockages which further reduced the capacity of the channel upstream of the Coledale High Bridge, with a major blockage reaching approximately 4 metres in height and 10 metres wide, **Photograph 8** and **Photograph 9**. This caused the outflanking of floodwater into the village over the right bank. A number of landslips have also been identified in the upper reach of the watercourse.



Photograph 7: Looking across the Coledale Beck from the right bank of the watercourse, upstream of the Coledale High Bridge

5th December 2015, NGR NY 22923 23639



Photograph 8: Looking upstream at the main blockage above the High Coledale Bridge

6th December 2015, NGR NY 22907 23625



Photograph 9: Looking downstream at the main blockage above the High Coledale Bridge

6th December 2015, NGR NY 22907 23625

The Coledale High Bridge became blocked with tree debris despite being cleared twice earlier that morning by local residents. As flood levels rose, water poured through the parapet of the Coledale High Bridge before it eventually failed, **Photograph 10**. Some of the flood flows which overtopped the access bridge subsequently re-joined the river channel, **Photograph 11**, whilst the remainder was routed along the B5292 into Braithwaite.

Downstream of Coledale High Bridge, the flood flows exceeded the capacity of the river channel where it meanders slightly south, flooding residential properties at this location.



Photograph 10: Damage and overtopping of the Coledale High Bridge over the Coledale Beck

5th December 2015, NGR NY 23009 23626



Photograph 11: Looking downstream on the Coledale Beck towards Brook Cottage, prior to the parapet failure.

5th December 2015, NGR NY 23009 23626

The flood flows which were routed from the Coledale High Bridge onto the B5292 added to the floodwater from overtopping at Brook Cottage. Floodwater flowed along the access road that is adjacent

to the Ivy House Hotel, **Photographs 12 and 13**. This also routed floodwater through the properties and private car park behind Peter House at this location. Parked cars were carried away by the floodwater.



Photograph 12: Flood damage to an adjacent wall on the flowpath near the Ivy House Hotel

9th December 2015, NGR NY 23073 23633



Photograph 13: Flood damage at the Ivy House Hotel

9th December 2015, NGR NY 23107 23631

At the time of the 5th December 2015 flooding event, three footbridges were located over the Coledale Beck at NGR NY 23098 23576, **Photograph 14**. These bridges were washed away at approximately 15:38 hours by the rising water levels within the Coledale Beck, **Photograph 15**. Reports from local residents indicate that water levels within the Coledale Beck rose steadily over a 12 hour period prior to the surges.

The foot bridges impacted on the Coledale Low Bridge and became caught within the opening, creating a blockage. **Photograph 14** and **Photograph 15** also show how during the flooding incident the water level in the Coledale Beck overtopped the crest level of the embankment on the right bank of the watercourse upstream of the Coledale Low Bridge. The severity of the flooding also damaged the embankment.



Photograph 14: Looking downstream at the footbridges on the Coledale Beck

5th December 2015, NGR NY 23084 23576



Photograph 15: Looking downstream at the where the footbridges were located

5th December 2015, NGR NY 23084 23576

The flooding that occurred around Coledale Low Bridge severely impacted upon multiple residential properties at this location, with floodwater being routed down Main Street and the Newlands Road, **Photographs 16, 17 and 18**. This floodwater included water from the Coledale Beck along with water from a surcharging surface water network, runoff contributions from the access road known colloquially as 'The Puddle', surface water from the track leading down from Braithwaite Lodge as well as floodwater from Barrow Gill, directly, and as a result of backing up caused by water not being able to enter a flooding Coledale Beck.



Photograph 16: Flooding at the Braithwaite Village Shop, looking east towards the Coledale Beck

5th December 2015, NGR NY 23125 23536



Photograph 17: Property flooding and debris near Coledale Low Bridge

9th December 2015, NGR NY 23169 23525



Photograph 18: Flood damage at the Braithwaite Village Shop next to Coledale Low Bridge

9th December 2015, NGR NY 231432 3555

This floodwater contained trees and large amount of debris including scrub, fencing, treeguards, and two large 30' hecks, some of which had been conveyed through the river system from the wooded area upstream. A significant amount of gravel and silt was also deposited at this location during the flooding incident. Over 200 tonnes of fine silt was removed from the cul-de-sac area alone.

On the left bank of the Coledale Beck, water was conveyed along Croft Terrace towards the B5292, with the road effectively acting as a conduit for floodwater. Properties on the right hand side of Croft Terrace remained above the flood level in a 'dry island', although some external garden flooding is likely to have occurred.

Improvised flood defences and sandbags were employed by residents on the left side of the B5292 around the entrance to Longcroft as shown in **Photograph 19** and **Photograph 20**. These localised resilience measures acted to assist with the conveyance of floodwater through to the A66 junction and it is estimated that these measures protected approximately 20 residential properties. However, some additional property flooding did occur, **Photograph 21** and **Photograph 22**.

Some floodwater was also routed from the Coledale Beck through the caravan and camp site and subsequently into Newlands Beck at NGR NY 23304 23654.



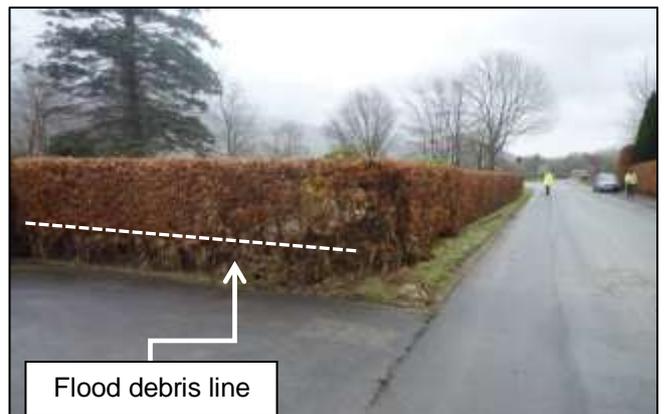
Photograph 19: Improvised flood barricades across the entrance to Longcroft

9th December 2015, NGR NY 23368 23659



Photograph 20: Sandbags defending residential property on the B5292

9th December 2015, NGR NY 23336 23662



Photograph 21: Flooding damage at the corner of Longcroft

9th December 2015, NGR NY 23381 23664

Photograph 22: Flood debris and sediment caught in the hedgerow at the garden boundary on B5292 near the A66 junction

9th December 2015, NGR NY 23474 23655

Summary of flooding sources

- Coledale Beck Blockage within the main channel composed of trees, branches, root balls, two large 30' hecks, and a footbridge upstream of High Coledale Bridge.
- Coledale Beck Blockages/channel capacity exceedance at the High Coledale Bridge.
- Coledale Beck Blockages/channel capacity exceedance at the Low Coledale Bridge. Footbridges from gardens inhibiting conveyance of flood water under the structure.
- Barrow Gill Capacity of the culvert under the Newlands Road exceeded.
- Track from Braithwaite Lodge Surface water flowing down the track onto the Newlands Road and through the cul-de-sac.
- B5192 Water flowing down the B5192 Whinlatter Pass, sourced from steep roadside slopes, the track originating at Force Crag mine and exceedance of the Wicket Gate culvert draining the Hope Memorial camp sub-catchment.
- Exceedance of the drainage capacity Water observed bubbling up from the drainage system in the cul-de-sac before river flooding occurred. Drains also surcharged at Crown House, Newlands Road and the parking place on the right bank of the Coledale Beck immediately downstream of the Coledale Low Bridge.
- Surface water from "the shelf" Surface water flowing down the road known as "the shelf", flooding the Royal Oak public house.

Key Site Observations

A site visit was undertaken by the Capita AECOM survey team incorporating the areas seen in **Figure 7**. Key features, observations and photographs were observed and recorded.

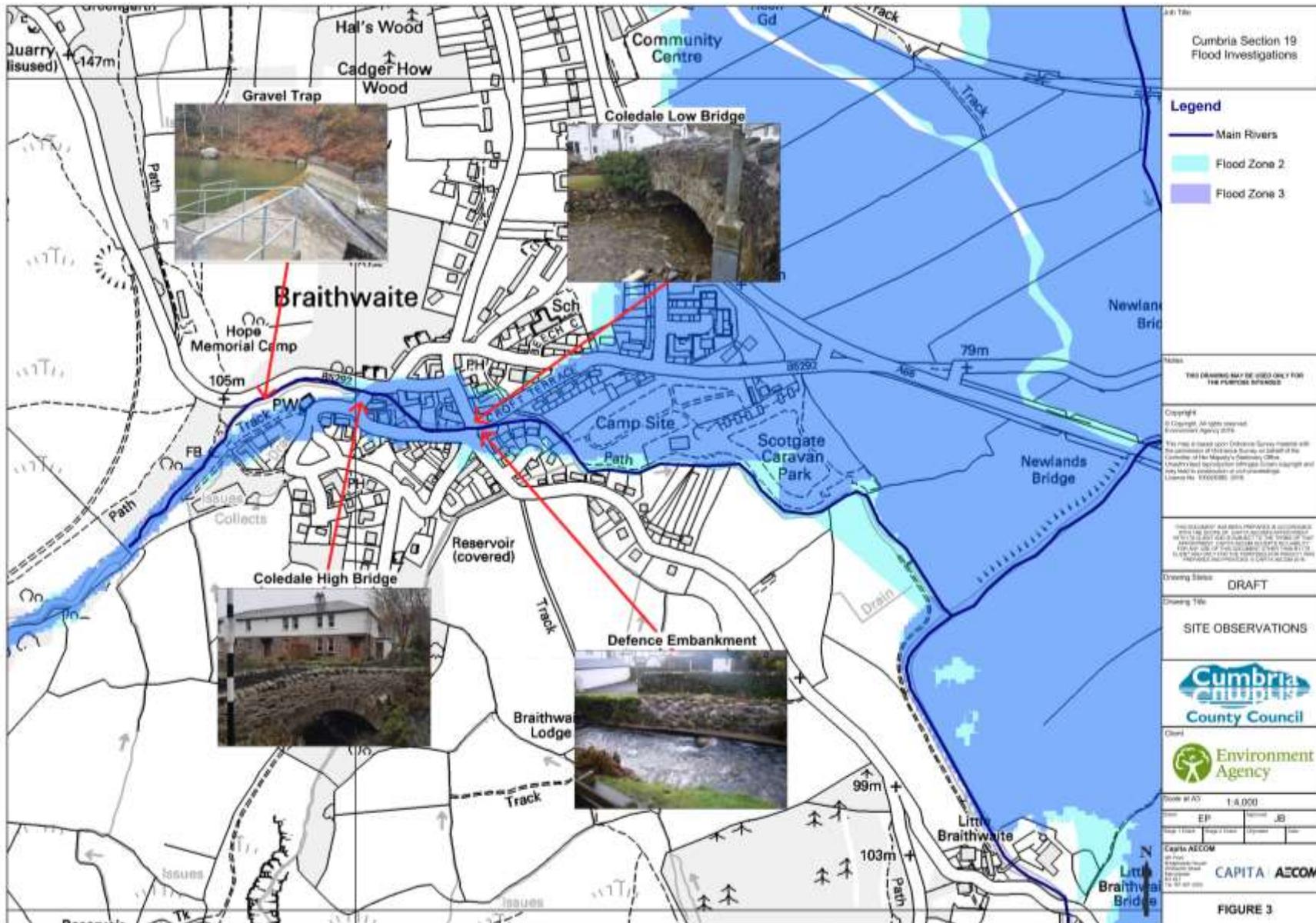


Figure 7: Key observations

The survey team commenced the site visits with a visual inspection of the upper reach of the Coledale Beck, the B5292 and the gravel trap which is located 200m north of the Higher Coledale Bridge. The Coledale Beck river channel showed signs of extensive vegetation clearance and the post-flood recovery works which were undertaken in December 2015, **Photograph 23**. The B5292 appeared to have suffered damage as a result of scour and undermining from the Coledale Beck, **Photograph 24**. The adjacent highways gullies were observed as being completely full of silt.



Photograph 23: Coledale Beck after the post-flood emergency recovery works, looking upstream towards the gravel trap

30th April 2015, NGR NY 22941 23637



Photograph 24: Scour and undermining of the B5292 immediately north of Braithwaite

30th April 2016, NGR NY 22941 23637

Further downstream, the parapet on the Upper Coledale Bridge was observed as having been recently repaired, **Photograph 25**. The opening under the bridge was observed as being constrained and a potential throttle to flood flows due to its low opening and effective capacity. Immediately downstream of this sandbags were present on the crest of the left bank of the Coledale Beck, **Photograph 26**. These temporary measures were deployed on the 26th December 2015 when Storm Frank brought further rainfall and elevated water levels across Cumbria. Further flooding was experienced by Brook Cottage.



Photograph 25: Refurbished parapet over the High Coledale Bridge

30th April 2016, NGR NY 23009 23626



Photograph 26: Sandbags placed by Army Engineers on the left bank of the Coledale Beck during Storm Frank

30th April 2016, NGR NY 23009 23626

Extensive flood damage was observed at properties on the flowpath downstream of the Coledale High Bridge.

High water (wrack) lines were observed as being approximately a foot and a half above property thresholds in this area, **Photograph 27**. The flood defence embankment located immediately upstream of the Coledale Lower Bridge showed signs of temporary repair undertaken following the 5 December 2015 flooding event, **Photograph 28**.



Photograph 27: Wrack marks on property near the Ivy House Hotel

30th April 2016, NGR NY 23115 23612



Photograph 28: Flood defence embankment on the right bank of the Coledale Beck

30th April 2016, NGR NY 23133 23580

Like the Coledale High Bridge, the Low Bridge was observed as having little capacity beneath the structure due to its low opening and narrow width. Deposition of gravels was evident throughout the Coledale Beck and 150 tonnes had been removed from downstream of the Coledale High Bridge by local residents prior to Storm Frank.

Summary of observations

Based upon the flood incident details and site observations, it is concluded that the December 5th 2015 flooding mechanisms in Braithwaite were as follows:

- A significant volume of floodwater was conveyed through the Coledale Beck very quickly as the upper catchment responded to a period of intense and severe rainfall.
- Trees had been observed in the Coledale Beck from 10:00, with a large percentage of these reported as willow. A sudden rise in floodwater washed further trees, and large amounts of debris, silt and gravel into the reach of the Coledale Beck, upstream of the Coledale High Bridge. This caused localised blockages both within the channel and under the bridge which would have acted as a throttle to river flows. The blockage upstream of the Coledale High Bridge was approximately 4 metres in height and 10 metres wide, causing the outflanking of floodwater into the village over the right bank.
- As the river levels continued to rise, the river began spilling over the top of the Coledale High Bridge and subsequently destroyed the parapet on the structure due to the force of the water. Water was subsequently routed onto the B5292 where it washed through the village on the adjoining access road, following the topography towards the Ivy House Hotel and the Coledale Low Bridge.
- Surface water contributed to the flooding. The main contributions to surface water flooding were from the B5292 Whinlatter Road, Hope Memorial Camp area, the Force Crag mine track and from the track leading down from Braithwaite Lodge.
- At approximately 15.15 the resident's account of the event suggests a sudden rise in floodwater within the Coledale Beck; this was likely attributable to a landslip upstream of Braithwaite resulting a surge of floodwater.
- The sudden surge in floodwater subsequently destroyed the three footbridges over the Coledale Beck and the debris was washed under the Coledale Low Bridge, blocking the structure and reducing its effective capacity. The adjacent linear flood defence embankment was also damaged and overtopped during this time.
- The blockage under the Coledale Low Bridge and elevated water levels caused a significant amount of flow to be routed through the Braithwaite Village Shop and the two adjoining roads, causing a substantial impact on property at this location. Large amounts of silt and flood debris also dropped out of suspension around this area. Over 200 tonnes of silt was removed from the cul-de-sac alone.
- The Barrow Gill contributed to the flooding at this location and to the cul-de-sac. The capacity of the culvert under the road was exceeded and the watercourse overtopped onto the Newlands Road.
- Much of the floodwater re-joined the Coledale Beck via the cul-de-sac.
- Immediately downstream of the Coledale Low Bridge floodwater overtopped the left bank and onto Croft Terrace. This was then conveyed along the road, forming a dry island around the properties on the right hand side of the road.
- The flows from Croft Terrace subsequently passed onto the B5292, where it was routed by the topography towards the junction with the A66. Flood barricade and sandbags deployed by local residents assisted with routing the water along the roadway, though some additional property flooding did occur at this location.

- Some floodwater was routed through the caravan park towards Newlands Beck.

Environment Agency and Cumbria County Council Incident Response

Following the 5th December 2015 flooding the following actions were undertaken by the Risk Management Authorities in the month after the incident:

- The Environment Agency began emergency works on the 9th December 2015 to remove the high volume of trees, gravel and debris from the Coledale Beck upstream of the Coledale High Bridge, **Photograph 29**. These works improved the conveyance of flow by reforming the shape of the river channel in this reach. Debris was also removed from the adjacent B5292 road.
- Since December 5th 2015, the gravel trap on the Coledale Beck, upstream of Braithwaite, has been emptied on six occasions, with between 100 and 180 tonnes of material being removed each time.
- Cumbria County Council cordoned off the Coledale Upper Bridge, **Photograph 30**.
- The damage to the flood defence embankment on the right bank of the Coledale was temporarily filled in. Demountable defences were later deployed on the 26th December by Army Engineers working with the Environment Agency. Both measures can be seen in **Photograph 31**.
- Debris and other material was removed from the Coledale Beck and areas within the village, including the footbridges which were washed away during the flooding incident, **Photograph 32**.



Photograph 29: Emergency works to re-engineer Coledale Beck upstream of the Coledale High Bridge

9th December 2015, NGR NY 22894 23627

Photograph 30: Partially destroyed access bridge over the Coledale Beck

9th December 2015, NGR NY 23006 23615



Photograph 31: Infilled flood defence embankment and demountable defences on the right bank of the Coledale Beck (looking upstream)

26th December 2015, NGR NY 23133 23580



Photograph 32: Remains of the two footbridges which were removed from the Coledale Beck lower bridge

9th December 2015, NGR NY 231672 3592

Recommended Actions

Table 5 details recommended actions for various organisations and members of the public to consider using the Cumbria Floods Partnerships 5 Themes: Community Resilience, Upstream Management, Strengthening Defences, Maintenance, and Internal Drainage Boards (IDB's). Some of these recommendations may have already been carried out or are ongoing.

Cumbria Flood Partnership Theme	Action by	Recommended Action	Timescale
Community Resilience	Cumbria Local Resilience Forum *	Review and update plans to enable homes & business to be better prepared for flooding & reduce the impacts of flooding.	Complete
	Environment Agency, Cumbria County Council Highways, and Electricity North West.	To review the flood risk and resilience of critical transport, communication, and power supply infrastructure.	2016/17
	Cumbria Planning Group, Allerdale District Council	Review Local Development Plans and Strategic Flood Risk Assessment to reflect current understanding of flooding.	2016/17
	Environment Agency	Ensure all properties at risk can register to receive flood warnings and details are up-to-date.	Complete
	Environment Agency	All Risk Management Authorities to work proactively with the local communities to improve awareness of flood risk and resilience.	Summer 2016
Upstream Management	Cumbria Floods Partnership (CFP)	The CFP action plan will consider natural flood management options to reduce flood risk across the catchment. This may also include land use changes and or flood storage.	Complete
	Environment Agency	Investigate options for managing gravel and sediment upstream of Braithwaite, to reduce the risk of significant accumulation within the village.	March/April 2017

Maintenance	Environment Agency	Complete on-going inspections and repairs to assets, which may have been damaged during the flood event.	Complete
	Environment Agency	Review maintenance programme in response to the flooding events of 2015.	Autumn 2016
	Environment Agency	Remove accumulated gravel in Coledale Beck through Braithwaite.	Complete
	Cumbria County Council	Complete road repairs to the flood damaged section of the B5292.	TBC
	Environment Agency	An action plan is to be developed for Braithwaite as a pilot location, produced as part of the Cumbria Flood Partnership.	TBC
Strengthening Defences	Environment Agency	Review modelling data to ensure that models for the Derwent catchment reflect real conditions as accurately as possible, and use this information to make any improvements to the flood warnings service. This will also be used to inform future investment plans.	March/April 2017
	Environment Agency	Review scheme performance and consider what worked well, and where improvements to defences are required.	March/April 2017
	Environment Agency	Construction of a flood defence scheme in Braithwaite. Funding has been secured.	Options list to be discussed with community May/June 2017
	Environment Agency	Enable ability for demountable defences to be deployed.	TBC
	Environment Agency	Permanent repairs to the right bank wall in the "Puddle" area.	Complete
	Environment Agency	Repairs to the embankment downstream of Low Bridge to near the toilet block at the campsite.	Complete

	Environment Agency	Investigate if Derwentwater and Bassenthwaite lake levels can be managed differently to reduce flood risk, including the use of “the bog”.	2017
	United Utilities working with Keswick Flood Action Group and the Environment Agency.	Review operational arrangements for Thirlmere Reservoir and investigate possibility of revised arrangements to provide flood risk benefit to areas downstream.	Ongoing
	Environment Agency and Cumbria County Council	Investigate impacts of transport infrastructure downstream of Keswick on flood risk – A66, B5289, old railway embankment, old Portinscale Road.	2017
	Environment Agency	The Environment Agency is carrying out a series of repairs to flood defence assets that were damaged during the floods as part of the c.£10m Asset Recovery Programme which covers Cumbria & Lancashire. This programme of repairs is scheduled to be complete before winter 2016/17.	Complete

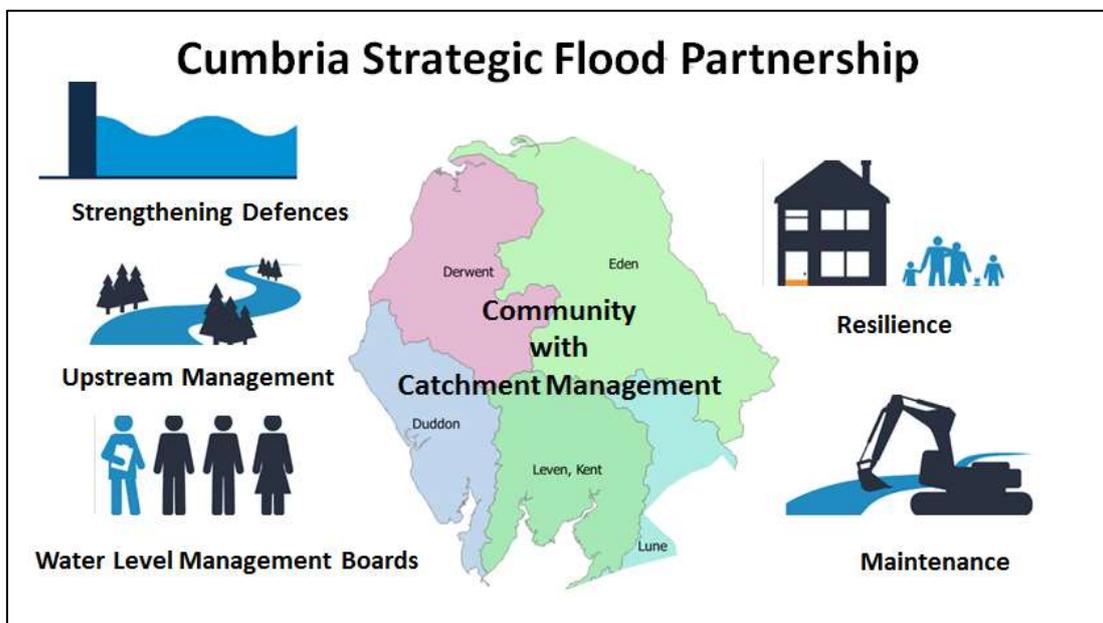
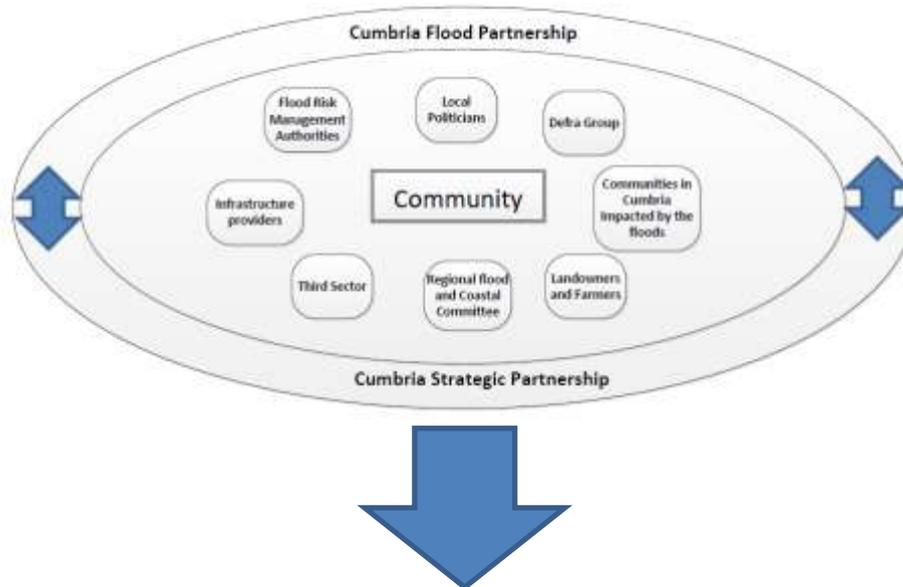
Table 5: Recommended actions

* The Cumbria Local Resilience Forum includes emergency services, Local Authorities, Cumbria County Council, Environment Agency, Maritime Coastguard Agency and health agencies along with voluntary and private agencies. Under the Civil Contingencies Act (2004) every part of the United Kingdom is required to establish a resilience forum.

Next Steps – Community & Catchment Action Plan

The Cumbria Floods Partnership has brought together a wide range of community representatives and stakeholders from a variety of sectors to plan and take action to reduce flood risk. The Cumbria Floods Partnership, led by the Environment Agency, is producing a 25 year flood action plan for the Cumbrian catchments worst affected by the December 2015 flooding, including Carlisle. The plan will consider options to reduce flood risk across the whole length of a river catchment including upstream land management, strengthening flood defences, reviewing maintenance of banks and channels, considering water level management boards and increasing property resilience. The Cumbria Floods Partnership structure below details how these 5 themes are being delivered in the Flood Action plans which will be completed in July.

The diagrams below helps demonstrate how the two partnerships have now come together:





Cumbria Strategic Flood Partnership



RFCC

Cumbria Strategic Partnership Board

Catchment Management Group
Eden

Catchment Management Group
Derwent

Catchment Management Group
Kent and Leven

Steering Groups
(Various per Catchment)
MSFWG

Community

'Farmers, environmental charities, landowners, private companies, councils and government agencies have joined together with a common goal.

To look at the evidence and potential funding sources to find flood solutions for defences, resilience, maintenance, upstream management and water level management boards, so they can work together to help communities at risk of flooding.'

In a dynamic move the Cumbria Strategic Flood Partnership have created three groups whose aim is to look at all options for how flood risk can be reduced in Cumbria.

This group the first of its kind in the country brings together the expertise of all those whose water and land management experience to look at what can be done to protect communities both residential and farming.

They will then discuss their findings to the communities at risk and plan a way forward.

This landmark move will ensure that fully integrated solutions for land and water management are utilised to protect people and the environment in which they live and rely on.

Appendices

Appendix 1: Acronyms and Glossary

Acronym	Definition
EA	Environment Agency
CCC	Cumbria County Council
ABC	Allerdale Borough Council
LLFA	Lead Local Flood Authority
FAG	Flood Action Group
LFRMT	Local Flood Risk Management Team
FWMA	Flood and Water Management Act 2010
LDA	Land Drainage Act 1991
WRA	Water Resources Act 1991

Term	Definition
Aquifer	A source of groundwater comprising water-bearing rock, sand or gravel capable of yielding significant quantities of water.
Attenuation	In the context of this report - the storing of water to reduce peak discharge of water.
Catchment Flood Management Plan	A high-level planning strategy through which the EA works with their key decision makers within a river catchment to identify and agree policies to secure the long-term sustainable management of flood risk.
Culvert	A channel or pipe that carries water below the level of the ground.
De Facto Flood Defence	A feature or structure that may provide an informal flood defence benefit but is not otherwise designed or maintained by the Environment Agency
Flood Defence	Infrastructure used to protect an area against floods as floodwalls and embankments; they are designed to a specific standard of protection (design standard).
Floodplain	Area adjacent to river, coast or estuary that is naturally susceptible to flooding.
Flood Resilience	Measures that minimise water ingress and promotes fast drying and easy cleaning, to prevent any permanent damage.
Flood Risk	The level of flood risk is the product of the frequency or likelihood of the flood events and their consequences (such as loss, damage, harm, distress and disruption)
Flood Risk Regulations	Transposition of the EU Floods Directive into UK law. The EU Floods Directive is a piece of European Community (EC) legislation to specifically address flood risk by prescribing a common framework for its measurement and management.

Term	Definition
Flood and Water Management Act	Part of the UK Government's response to Sir Michael Pitt's Report on the Summer 2007 floods, the aim of which is to clarify the legislative framework for managing surface water flood risk in England.
Flood Storage	A temporary area that stores excess runoff or river flow often ponds or reservoirs.
Flood Zone	Flood Zones are defined in the NPPF Technical Guidance based on the probability of river and sea flooding, ignoring the presence of existing defences.
Flood Zone 1	Low probability of fluvial flooding. Probability of fluvial flooding is < 0.1%
Flood Zone 2	Medium probability of fluvial flooding. Probability of fluvial flooding is 0.1 – 1%. Probability of tidal flooding is 0.1 – 0.5 %
Flood Zone 3a	High probability of fluvial flooding. Probability of fluvial flooding is 1% (1 in 100 years) or greater. Probability of tidal flooding is 0.5%(1 in 200 years)
Flood Zone 3b	Functional floodplain. High probability of fluvial flooding. Probability of fluvial flooding is >5%
Fluvial	Relating to the actions, processes and behaviour of a water course (river or stream)
Fluvial flooding	Flooding by a river or a watercourse.
Freeboard	Height of flood defence crest level (or building level) above designed water level
Functional Floodplain	Land where water has to flow or be stored in times of flood.
Groundwater	Water that is in the ground, this is usually referring to water in the saturated zone below the water table.
Inundation	Flooding.
Lead Local Flood Authority	As defined by the FWMA, in relation to an area in England, this means the unitary authority or where there is no unitary authority, the county council for the area, in this case Cumbria County Council.
Main River	Watercourse defined on a 'Main River Map' designated by DEFRA. The EA has permissive powers to carry out flood defence works, maintenance and operational activities for Main Rivers only.
Mitigation measure	An element of development design which may be used to manage flood risk or avoid an increase in flood risk elsewhere.
Overland Flow	Flooding caused when intense rainfall exceeds the capacity of the drainage systems or when, during prolonged periods of wet weather, the soil is so saturated such that it cannot accept any more water.
Residual Flood Risk	The remaining flood risk after risk reduction measures have been taken into account.
Return Period	The average time period between rainfall or flood events with the same intensity and effect.
River Catchment	The areas drained by a river.

Term	Definition
Sewer flooding	Flooding caused by a blockage or overflowing in a sewer or urban drainage system.
Sustainability	To preserve /maintain a state or process for future generations
Sustainable drainage system	Methods of management practices and control structures that are designed to drain surface water in a more sustainable manner than some conventional techniques.
Sustainable development	Development that meets the needs of the present without compromising the ability of future generations meeting their own needs.
Sustainable Flood Risk Management	Sustainable Flood Risk Management promotes a catchment wide approach to flooding that uses natural processes and systems (such as floodplains and wetlands) to slow down and store water.
Topographic survey	A survey of ground levels.
Tributary	A body of water, flowing into a larger body of water, such as a smaller stream joining a larger stream.
Watercourse	All rivers, streams, drainage ditches (i.e. ditches with outfalls and capacity to convey flow), drains, cuts, culverts and dykes that carry water.
Wrack Marks	An accumulation of debris usually marking the high water line.
1 in 100 year event	Event that on average will occur once every 100 years. Also expressed as an event, which has a 1% probability of occurring in any one year.
1 in 100 year design standard	Flood defence that is designed for an event, which has an annual probability of 1%. In events more severe than this the defence would be expected to fail or to allow flooding.

Appendix 2: Additional information from the community

Above Derwent Flood Action Group Timeline 5th December 2015

Time Line 5th December 2015 – Braithwaite

Friday 4th December 2015

1. Call from the EA just to make contact, no warnings had yet been issued.

Saturday 5th December 2015

To note: –

NL in contact with EA throughout the day which continued for the next two weeks, the baton was then taken up by BR.

Every effort has been taken to obtain the correct time of incidents i.e from notes made on the day and photographs, however these may not match the actual 100% of the time.

9:00

2. NL called meeting of the ADFAG for 9 am. EA informed ADFAG up and running.
3. Marker at " 6 - 7"
4. Actions agreed at the meeting:-
 - a. Croft Terrace, Longcroft, Ashcroft and Campsite to be informed BG
 - b. Whinlatter Drains & Culverts to be checked GD, KH & JG
 - c. Check beck level both Chaplains Beck and Coledale Beck
 - d. Check report of tree likely to fall into beck.
 - e. Check village & notify as many residents in vulnerable locations as possible NL & BR
 - f. Report back at 10am

10.00 – 11:00

5. NL – In contact with EA
6. Flood Sac store to be opened
7. 6 people in Croft Terrace, Longcroft and Ashcroft informed including Bev Brown and Frank Harvey. They were asked to:-
 - a. inform their neighbours
 - b. Consider erecting a barrier
8. The Campsite was informed.
9. Whinlatter (GD & KH from 9:30 – 13:30)
 - a. Whinlatter checked up to and including the layby (ice cream van station)

Page 1 of 14
14/01/2016

Above Derwent Flood Action Group Timeline 5th December 2015

- b. Water high in the beck but running within its banks.
 - c. Flow of water on Whinlatter Road running into village
 - d. Drains and culverts cleared of debris but slow going
 - e. Cut trenches into road verge to allow water to flow off the road into Back Howes (Low Wood)
 - f. One wooden pallet removed from a deep culvert opposite the property Woodlands, Whinlatter Pass. Culvert still blocked, reported to Highways.
 - g. Huge amount of water coming from Hope Camp which was diverted, drain not coping.
10. Flood Bags to be use to divert the water running down track from Braithwaite Lodge onto Newlands Road into Chaplains Beck - JB.
11. Flood Sacs across Cul de Sac to divert water coming from Newlands Road, farm track into drains – JB
12. 10.42 Beck Level at 7 – 8
13. 10.44 Beck starts to break its banks on path in campsite



14. 10:46 – Drains on Whinlatter Road already unable to cope with the surface water

Above Derwent Flood Action Group Timeline 5th December 2015



15. 11.10

- a. Church Hall Opened
- b. Sandbags issued to residents
- c. Beck running over into campsite & Croft Terrace

11:15 – 13:00

16. Jennifer to man telephone:-

- a. Contacted EA:-
 - i. Flood Sacs, none available advised to speak to Allerdale and given Emergency Number
 - ii. Weather Update – More rain expected, not very precise.
- b. Contacted Allerdale for more Flood Sacs, left message no response from Emergency Number.

17. 11:25 – Beck Level at 9

18. 11:30 – Beck still within its normal watercourse. Chicken Bridge Intact, High Bridge and Low Bridge Intact

19. 11:46 – Pallets blocking Culverts on Whinlatter Road

Above Derwent Flood Action Group Timeline 5th December 2015



20. 12:00 – Flood Sacs placed on Riverbank
21. 12:15 – Beck approx 12 inches below Chicken Bridge, water about 3 foot up on all trees directly bordering the beck near Chicken Bridge.
22. 12:30 – Beck still within its banks at High Bridge, approx 6 inches from topping out at the corner, PB
23. 12:35 – Beck still within its banks at Low Bridge, beck level at **RED 1**.
24. 12:45 – Water on one side of campsite (road side), maybe an inch or two in parts. See breach at 10:44.



25. 12:54 – Water starting to collect at village junction and A66, again an inch or two.

Above Derwent Flood Action Group Timeline 5th December 2015



26. 13:00 – Small amount of wooden debris at Low Bridge

27. 13:01 – Water level at top of Little Braithwaite Bridge



28. GD & KH still at Whinlatter

29. JB & Grant clear top gully of farm track in an attempt to divert the water.

30. BR & NL notifying residents

Approx 13:30 – 13:45

31. High Bridge still intact

32. NL & BR either at bridge or notifying residents

33. Norman Thompson at 3 Skiddaw View was visited he elected to stay at home as upstairs available.

Above Derwent Flood Action Group Timeline 5th December 2015

- 34. Water breaching Coledale Beck right bank at the puddle and Chaplains Beck overflowing onto Newlands Road
- 35. Properties in Main Street, Newlands Road and the Cul de Sac begin to flood

Approx 14:30

- 36. 14:41 – Water up to Chicken Bridge but still intact
- 37. 14:48 – Chicken Bridge Down but still held upstream by trees



- 38. 14:53 – High Bridge parapet still intact.
- 39. 14:55 – Beck still in original watercourse upstream of High Bridge, couple of inches of surface water coming down the Whinlatter Road (not the beck)



Above Derwent Flood Action Group Timeline 5th December 2015

40. 14:56 Plank Debris see at High Bridge



41. 14:57 Water at top of High Bridge, parapet under stress



42. 15:00 – Beck had already broken its banks on both sides downstream of High Bridge

Above Derwent Flood Action Group Timeline 5th December 2015



43. 15:01 – Beck had already broken its banks upstream of Low Bridge, wooden bridges still intact.



44. 15:14 – Upstream parapet shown as collapsed

Above Derwent Flood Action Group Timeline 5th December 2015



45. 15:16 – Surge from Land slip at Force Crag Mine and/or jammed tree debris downstream from gravel pit pushes water out of its channel

a. Whinlatter Side straight down the road into the village



b. Common Side, onto Common near Chapel and then back into the proper beck channel

Above Derwent Flood Action Group Timeline 5th December 2015



46. 15:38 All wooden upstream of Low Bridge are shown as down and totally blocking Low Bridge and forcing more water out of the beck



47. Village split in two.
48. Some landlines were out in the Village
49. A number of landslip occurred from Force Crag Mine to the Village

Approx 15:30 – 16:00

Above Derwent Flood Action Group Timeline 5th December 2015

- 50. KH into Cul de Sac with tractor and carer for N with medicine. Unable to get N to evacuate.
- 51. KH returned for G, unable to evacuate once surge hit
- 52. ? 15:55 Surge of Water in the Village



- 53. Within minutes the water in parts of the village rose from 1 foot to 3 foot and was extremely fast flowing.
- 54. NL – Called 999 and logged incident from West side of the village
- 55. Resident on East side of the village relative phoned 999, called logged
- 56. No response from 999.

Approx 17:00 – 20:00

- 57. Resident on East side of the village relative phoned Keswick Mountain Rescue
- 58. Resident on East side of the village relative phoned Cockermouth Mountain Rescue
- 59. Keswick Mountain Rescue get into the Cul De Sac
 - a. Resident – evacuated and taken to neighbour
 - b. Residents (4 adults & 2 children) evacuated, assisted by KH
 - c. 3 x Residents in bungalows elected to remain in their own home
- 60. Newlands Road
 - a. 2 x Residents in houses elected to remain in their own homes on the upper floor.
- 61. KH cleared landslip on Newlands Road to allow exit of Mountain Rescue and Evacuees

Approx 20:00 – 22:30

- 62. EA confirmed no resource available to come out.
- 63. Co-ordinated effort by local farmers cleared one of the wooden bridges to get some capacity underneath the bridge and allow water to run through. Water level in village started to drop.

Above Derwent Flood Action Group Timeline 5th December 2015

Sunday 6th December

64. BR at bridge for 7:45, ADFAG members on west side meet at 9am.

65. 09:39 – Tree Debris forcing water from Beck down Whinlatter Road



66. BR contacts Allerdale and 2 JCB arrives, 1 stayed for a couple of hours and returned late afternoon (needed at Thirlmere) , the other was available all day. The JCB's were used to push banking back into position, one on each side of the beck and basically did as directed ADFAG. Volunteers pruned trees to allow access for the vehicles at the riverbank.

67. Local farmers and Allerdale JCB work all morning on removing Trees and Bridges from Low Bridge to increase capacity under bridge.

68. EA's first look at the situation, ready for work to start on Monday.

69. 10:03 – Village continues to be flooded by water coming down the Whinlatter Road



Above Derwent Flood Action Group Timeline 5th December 2015

70. 11:00 1 x PC and 2 x Support Officers arrived. After giving advice on Health and Safety left.

71. 11:17 – Work continues to clear Low Bridge of tree and wooden bridge debris



72. The entire village was out helping.

73. In the afternoon the Clearance Team move to Little Braithwaite Bridge to remove tree debris and the remains of “Emerald Bank” bridge (It’s the bridge that was located between Ghyllbank on the east bank and Emerald bank on the west bank) which also managed to make its way to Little Braithwaite Bridge in 2009!. Newlands Beck broke its banks and was the cause of 4 properties being flooded in Lower Portinscale.



Monday 7th December

Above Derwent Flood Action Group Timeline 5th December 2015

- 74. EA Present
- 75. Highways Present
- 76. Allerdale BC Present

Photographs
Stuart Miller
Pam Andrews
Geoff Davidson

Appendix 3: Summary of Relevant Legislation and Flood Risk Management Authorities

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 Source	Environment Agency	Lead Local Flood Authority	District Council	Water Company	Highway 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.

Government – DEFRA develop national policies to form the basis of the Environment Agency's and the LLFA's work relating to flood risk.

Environment Agency 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 (RMA's). The EA also collates and reviews assessments, maps, and plans for local flood risk management (normally undertaken by LLFA).

Lead Local Flood Authorities (LLFAs) – Cumbria County Council are 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 RMA 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 RMA's to maximise knowledge of flood risk to all involved. This function is carried out at CCC by the Local Flood Risk Management Team.

District and Borough Councils – These organisations perform a significant amount of work relating to flood risk management including providing advice to communities and gathering information on flooding. These organisations are classed as RMA's.

Water and Sewerage Companies 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. These organisations are classed as RMA's

Highway Authorities 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. These organisations are classed as RMA's

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 process 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 4: Useful contacts and links

Sign up for Flood Warnings

<https://www.gov.uk/sign-up-for-flood-warnings>

Environment Agency – Prepare your property for flooding; a guide for householders and small businesses to prepare for floods

<https://www.gov.uk/government/publications/prepare-your-property-for-flooding>

Environment Agency – What to do before, during and after a flood: Practical advice on what to do to protect you and your property

<https://www.gov.uk/government/publications/flooding-what-to-do-before-during-and-after-a-flood>

Environment Agency – Living on the Edge: A guide to the rights and responsibilities of riverside occupiers

<https://www.gov.uk/government/publications/riverside-ownership-rights-and-responsibilities>

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>

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