Lancashire County Council Flood Investigation Report

Lancashire Summer 2012

Lancashire County Council

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Contents

Executive Summary

Between June and September 2012 Lancashire, along with other parts of the country, experienced a number of significant flooding events. This period was one of the wettest on record and several river levels and rainfall gauging stations in Lancashire hit record highs. Parts of the region witnessed monthly average rainfall for September falling in just 2 days.

Institutional partners including the County and District Councils, the Environment Agency and United Utilities complemented the work of the Emergency Services in taking action to help prevent and alleviate flooding. The immediate flood response involved both the Emergency Services and the other partners mentioned above in meeting duties under the Civil Contingencies Act.

Following on from the flooding, the Councils, Environment Agency and United Utilities have been working together and with affected communities to investigate and understand the causes of flooding, and identify measures to mitigate future risk. In undertaking these tasks these organisations are acting as flood Risk Management Authorities in accordance with the Flood and Water Management Act 2010, and this report focuses on the investigation of how these functions have been exercised.

This report is produced by Lancashire County Council in meeting a statutory duty as set out below. It presents the flood risk management functions of the key agencies in respect of flood risk, and given the scale and frequency of property flooding over the summer, the report aims to provide a strategic review of the exercising of flood risk management functions. Some case studies of the more significant localised flood events are used to illustrate typical actions taken at a more operational level. It should be noted that there may be inconsistencies between the total numbers of flooded properties in each community listed in various parts of this report, and the documents in the Appendices. This is because information is based on that known at the time of writing, and at the time documents were produced during and shortly after the event, which are being reproduced here for illustrative purposes only.

Many of the respective organisation roles under the Flood and Water Management Act 2010 are relatively new, and this is the first time that a serious flood event has tested their delivery. Some of the lessons that flooded communities have identified as needing to be learnt are around high level arrangements for effective collaboration between agencies, and consistent and clear information provision for the public, rather than specific operational responses. Undertaking this investigation with a strategic focus, rather than presenting a detailed assessment of every instance of internal property flooding that occurred, acknowledges the importance of further developing our strategic capability as risk management authorities, in order that operational responses can flow more smoothly in similar events in the future.

Introduction

Lancashire County Council (LCC) as a Lead Local Flood Authority (LLFA) has a duty to investigate flooding in accordance with Section 19 of the Flood and Water Management Act 2010 as follows:

(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.

Significant property flooding occurred in various parts of Lancashire on a number of occasions during the summer of 2012, and the County Council has deemed it necessary and appropriate to carry out this investigation with a strategic focus, in meeting the above duty.

Risk Management Authorities and their Functions

The following organisations are defined as Risk Management Authorities under the Flood and Water Management Act, and have the following flood risk management functions.

Lancashire County Council

Lancashire County Council has a dual risk management role, in its capacity as both highway authority and lead local flood authority.

The County Council as a highway authority has a duty under the Highways Act 1980 to maintain highways that are maintainable at public expense. This requires attention to the drainage requirements of the public highway.

The County Council as a lead local flood authority has a number of duties and powers, in addition to the duty to investigate flooding set out above. These include:

- A duty to develop, maintain, apply, monitor and consult on a Local Flood Risk Management Strategy for its area. Local flood risk includes surface runoff, groundwater, and ordinary watercourses

- a duty to develop and maintain a register of structures or features which might impact on flood risk, including ownership and condition

- The management of the consenting process for works that are likely to affect the flow characteristics of ordinary watercourses

- a power to undertake works for managing flood risk from surface runoff or groundwater

- A power to request information from third parties in connection with flood risk management duties. Risk management authorities have a duty to co-operate with the lead local flood authority in the provision of such information

Environment Agency

The flood risk management responsibilities of the Environment Agency include the following:

- strategic overview for all forms of flooding

- provision of a National Strategy for Flood and Coastal Erosion Risk Management (FCERM) to cover all forms of flooding

- A power to request information from third parties in connection with flood risk management duties. Risk management authorities have a duty to co-operate with the Environment Agency in the provision of such information

- a duty to have regard to Local Flood Risk Management Strategies

- a duty to be subject to scrutiny from lead local flood authorities' democratic processes

- responsibility for coastal flooding

- responsibility for fluvial flooding from main rivers

- updated provisions for the regulation of reservoirs

- permissive powers to carry out maintenance work on main rivers under Section 165 of the Water Resources Act 1991

- the provision of flood forecasting and warning services

- the provision of flood maps

- the provision of flood related information and advice

- investment in flood defences, supplemented through partnership funding where appropriate

Water Companies

The flood risk management responsibilities of water companies such as United Utilities include the following:

- a duty as sewage undertakers under Section 94 of the Water Industry Act 1991, to provide & maintain sewers for the drainage of buildings and associated paved areas within property boundaries

- Responsibility as sewerage undertakers for lateral drains and public sewers, the latter being defined as a conduit, normally a pipe that is vested in a Water and Sewerage Company, or predecessor, that drains two or more properties and conveys foul, surface water or combined sewage from one point to another point and discharges via a positive outfall

- responsibility for any flooding which is directly caused by its assets – i.e. its water or sewerage pipes

- a duty to be subject to scrutiny from lead local flood authorities' democratic processes

- a requirement to exercise flood risk management functions in a manner consistent with the national strategy and guidance and have regard to the local strategies and guidance

- A duty to co-operate with other relevant authorities in the exercise of flood risk management functions, which may include the sharing of information with other relevant authorities

District and Borough Councils

The flood risk management responsibilities of district and borough councils include the following:

- a power to designate structures and features that affect flooding or coastal erosion

- a duty to exercise their flood risk management functions in a manner consistent with local and national strategies, and to have regard to those strategies in their other functions

- a duty to be subject to scrutiny from lead local flood authorities' democratic processes

- a power to do works on ordinary watercourses

District Councils have a number of wider functions and roles that can be relevant to flood risk management and response. These include local planning, housing, environmental health and community engagement activity.

The risk management authorities listed above all have additional responsibilities under the Civil Contingencies Act 2004, which provides the statutory basis for dealing with flooding as an emergency. These include flood preparedness planning and flood response.

The Responsibilities of Riparian Landowners and Residents

Riparian Landowners

Riparian landowners are those who own land adjoining or containing a watercourse. They have certain rights and responsibilities, including the following:

- to maintain the bed and banks of the watercourse, and also the trees and shrubs growing on the banks
- To clear any debris, even if it did not originate from their land. This debris may be natural or man-made
- To keep any structures within their ownership clear of debris. These structures include culverts, trash screens, weirs and mill gates

If riparian landowners do not carry out their responsibilities they may face legal action.

Residents

Residents who are concerned they may be at risk of flooding should take appropriate action to protect themselves and their property. Actions taken can include registering to receive flood warnings, obtaining a personal supply of sandbags, and moving valuable items to higher ground. A range of more resilient and permanent property protection measures are available to protect property from flooding, including water resistant doors, air brick covers, floodgates, raised electrical sockets and the fitting of non-return valves on pipes.

Anyone affected by internal property flooding should try to document as much information about the incident as possible, to assist with subsequent investigation of causes and any insurance claims.

Principal Flood Events in 2012

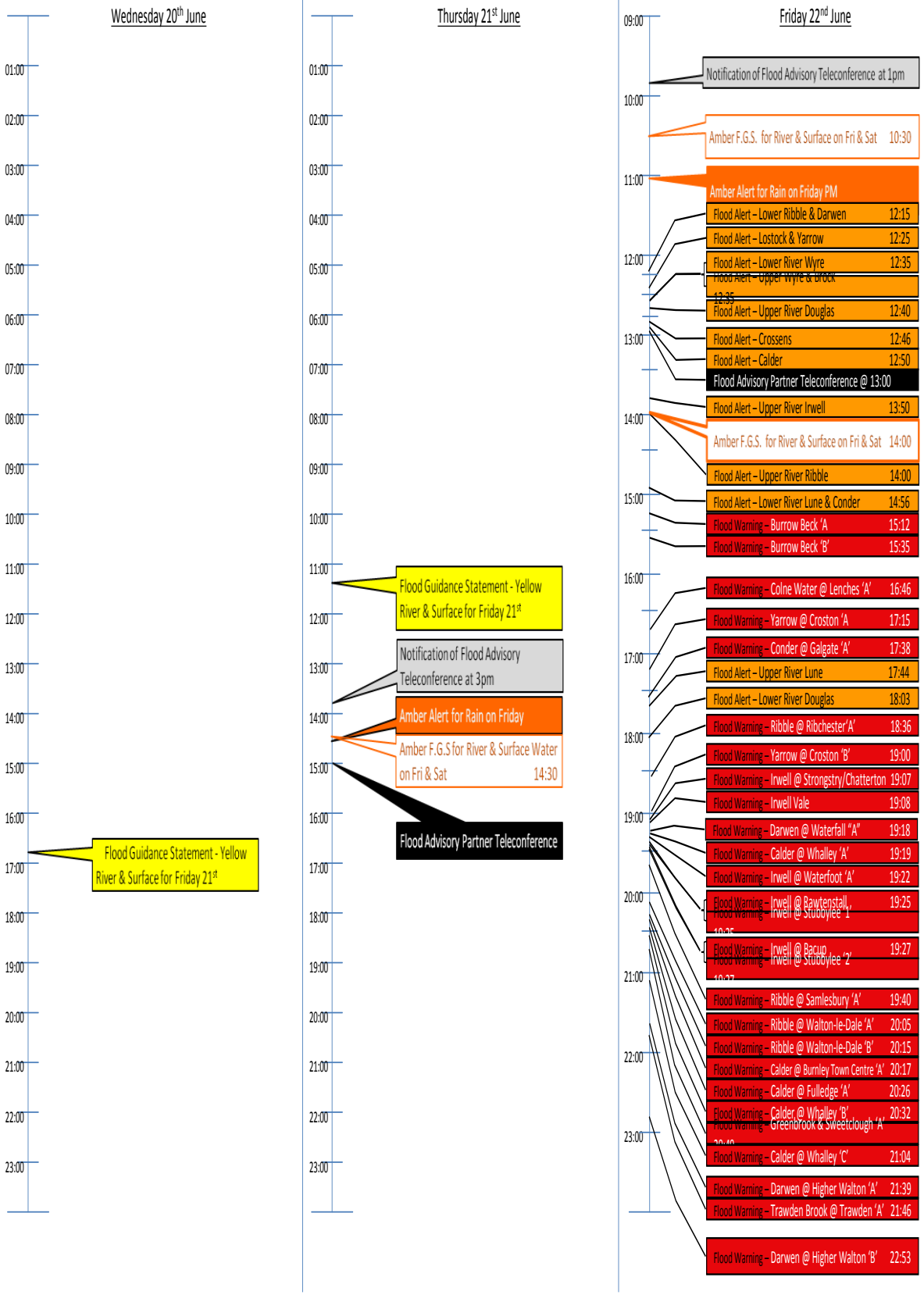
Internal property flooding occurred in various places across Lancashire at various times over the summer of 2012. An overview map summarising the impact of the various flood events on the North West can be seen in the Appendix. The map highlights the impact of the two main flood events that occurred, one in June and one in September.

1. Flood Event 1: 22/23 June 2012

The first major flood event of summer 2012 to affect Lancashire occurred on the night of 22 June. The predicted band of heavy rainfall began in the south of the region in the early hours of Friday 22 June, moving steadily north through the day. Over Friday and Saturday rainfall totals of 100mm were recorded across much of Lancashire. A period of particularly intense rain across East Lancashire caused problems between 1800hrs and 2100hrs, with intensities of 10-15mm per hour recorded in several rain gauges.

River levels responded rapidly to the heavy rainfall, particularly following the most intense period of rainfall on Friday evening. Record river levels were reached on the upper River Irwell in the Bacup and Rawtenstall areas.

The diagram below sets out a timeline of the key events and illustrates the critical and comprehensive provision of warnings by the Environment Agency leading up to the event, and the speed with which problems developed across the county.


Wednesday 20th June
Thursday 21st June
Friday 22nd June
01:00
02:00
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04:00
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06:00
07:00
08:00
09:00
10:00
11:00
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22:00
23:00
Flood Guidance Statement - Yellow River & Surface for Friday 21st
Flood Guidance Statement - Yellow River & Surface for Friday 21st
Notification of Flood Advisory Teleconference at 3pm
Amber Alert for Rain on Friday
Amber F.G.S for River & Surface Water on Fri & Sat 14:30
Flood Advisory Partner Teleconference
Notification of Flood Advisory Teleconference at 1pm
Amber F.G.S. for River & Surface on Fri & Sat 10:30
Amber Alert for Rain on Friday PM
Flood Alert – Lower Ribble & Darwen 12:15
Flood Alert – Lostock & Yarrow 12:25
Flood Alert – Lower River Wyre 12:35
Flood Alert – Upper Wyre & Brock 12:35
Flood Alert – Upper River Douglas 12:40
Flood Alert – Crossens 12:46
Flood Alert – Calder 12:50
Flood Advisory Partner Teleconference @ 13:00
Flood Alert – Upper River Irwell 13:50
Amber F.G.S. for River & Surface on Fri & Sat 14:00
Flood Alert – Upper River Ribble 14:00
Flood Alert – Lower River Lune & Conder 14:56
Flood Warning – Burrow Beck 'A' 15:12
Flood Warning – Burrow Beck 'B' 15:35
Flood Warning – Colne Water @ Lenches 'A' 16:46
Flood Warning – Yarrow @ Croston 'A' 17:15
Flood Warning – Conder @ Galgate 'A' 17:38
Flood Alert – Upper River Lune 17:44
Flood Alert – Lower River Douglas 18:03
Flood Warning – Ribble @ Ribchester 'A' 18:36
Flood Warning – Yarrow @ Croston 'B' 19:00
Flood Warning – Irwell @ Strongstry/Chatterton 19:07
Flood Warning – Irwell Vale 19:08
Flood Warning – Darwen @ Waterfall "A" 19:18
Flood Warning – Calder @ Whalley 'A' 19:19
Flood Warning – Irwell @ Waterfoot 'A' 19:22
Flood Warning – Irwell @ Bawtenstall 19:25
Flood Warning – Irwell @ Stubbylee '1'
Flood Warning – Irwell @ Bacup 19:27
Flood Warning – Irwell @ Stubbylee '2'
Flood Warning – Ribble @ Samlesbury 'A' 19:40
Flood Warning – Ribble @ Walton-le-Dale 'A' 20:05
Flood Warning – Ribble @ Walton-le-Dale 'B' 20:15
Flood Warning – Calder @ Burnley Town Centre 'A' 20:17
Flood Warning – Calder @ Fulledge 'A' 20:26
Flood Warning – Calder @ Whalley 'B' 20:32
Flood Warning – Greenbrook & Sweetclough 'A'
Flood Warning – Calder @ Whalley 'C' 21:04
Flood Warning – Darwen @ Higher Walton 'A' 21:39
Flood Warning – Trawden Brook @ Trawden 'A' 21:46
Flood Warning – Darwen @ Higher Walton 'B' 22:53

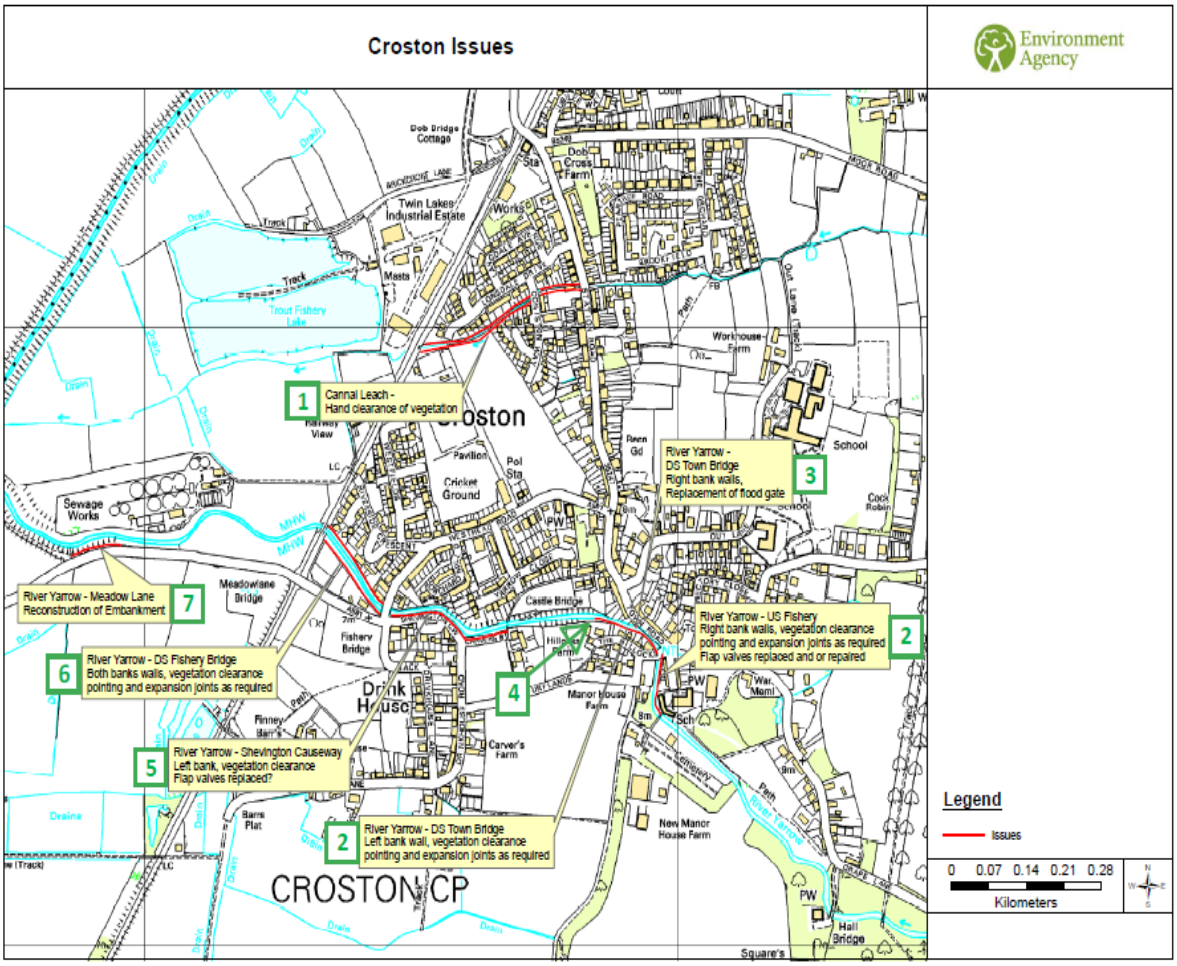
To provide a flavour of the regional impact of this event on one of the risk management authorities, it has been identified that United Utilities (UU) responded to some 1,676 properties reported to have flooded across the North West due to overloaded sewers, between June and August 2012. The vast majority of these reports related to the June incident. This was almost nine times greater than the number of reports received in the equivalent period in 2011. Looking at this in a sample of Lancashire districts, between 22nd and 25th June UU responded to 86 customer contacts reporting wastewater issues in South Ribble compared with 4 the previous year over the same period. Similar statistics for Chorley were 58 compared to 5, and for Rossendale 21 compared with 2. As well as dealing with these direct contacts, UU have been actively working with the other risk management authorities in attending community drop in sessions, and in the wider investigation of flooding from multiple sources across the county.

In June the most severe flooding occurred in Croston, Whalley, Leyland, various parts of Rossendale, and in Darwen (this latter coming under Blackburn with Darwen LLFA area and not covered further in this report). A brief summary of the situation at each of the above Lancashire LLFA locations is listed below. It should be noted that property flooding also occurred in other locations, on a lesser scale.

Croston

- Flood Alert issued for the Lostock and Yarrow Catchment at 12:25 BST on 22nd June
- Croston Flood Alert Alarmed at 12:55 BST on 22/06/12
- Flood Warning issued for River Yarrow at Croston, Area A at 17:15 BST 22/06/12 – properties warned 120
- Flood Warning issued for River Yarrow at Croston, Area B at 19:00 BST 22/06/12 – properties warned 262

Flooding resulted from a combination of factors. The high river levels in the Yarrow prevented surface water draining from the village, and the river overtopped due to it exceeding capacity in the channel. The surface water built up and flooded properties. In addition a small tributary exceeded its capacity and flooded through a garden and down a road into properties. Up to 72 properties were identified as having suffered some degree of flooding. The following plan provides an example of early risk management authority actions taken in response to mitigate future risk for this particular community. Repairs to the River Yarrow floodwall along with surface water outfall improvements are being carried out. EA are working with the flood action group and investigating options for an improved flood scheme for the village. The EA have worked closely with the other risk management authorities to review the flood risk to Croston, and develop a strong business case for a significant flood alleviation scheme for the village. This effort has been rewarded by the proposal for an accelerated flood defence scheme for Croston recently being successful in attracting indicative funding under a national initiative, and in stiff competition with other worthy locations across the country.



Whalley

- Flood Alert issued for the River Calder at 12:50 BST on Friday 22nd June
- Flood Warnings were issued for the River Calder Area's A, B & C on Friday 22/0612 at the following times, which were well in advance of warning thresholds being reached:-
- A= 19:19 BST – properties warned 14
- B= 20:32 BST – properties warned 213
- C= 21:04 BST – properties warned 56

Flooding occurred to around 18 properties in the area around Calder Vale and King Street during 22nd and 23rd June, primarily from the Mill Race leading to Calder Brook. Some flood resilience measures (flood boards) were in place and effective at the front of the Calder Vale houses. A garden wall collapsed adjacent to Whalley Weir. Cross House on Riddings Lane and Abbey Croft on The Sands both flooded from the River Calder coming out of bank.

A Whalley Flood Action Group has been set up and the first meeting took place on 26th July.

Leyland

- A Flood Alert for River Lostock was issued at 12:25 BST on Friday 22nd June. No flood warnings cover this area

Flooding affected property on the following roads in the Leyland area: Curlew Close, Western Drive, Longmeanygate, Midge Hall, Bannister Drive, Fowler Lane and Fowler Avenue. The flooding was attributable to surface water and with some surcharge of dilute sewage from the combined sewerage system. The flooding was exacerbated in some cases by high water levels in nearby watercourses preventing surface water from draining away. At least 15 properties were flooded. A community drop in session was arranged to gather information from, and provide advice to affected residents.

Higher Walton

Flooding from the River Darwen occurred to 5 properties downstream of Cann Bridge. Higher Walton Mill also suffered some flooding affecting approximately 6 businesses.

The flood scheme built in 2009 successfully prevented flooding to the homes on the Bannister Hall estate (upstream of Cann Bridge), which had suffered flooding previously from smaller events. There was also some surface water flooding to the highway.

A community drop in session was arranged to gather information from, and provide advice to affected residents.

Rossendale

On Friday 22 June, many areas of Rossendale were affected by localised flooding, including:

- Surface water flooding affected up to 24 properties in Bacup
- Up to 69 properties suffered some degree of flooding from Folly Clough Brook in Crawshawbooth
- Up to 8 properties flooded at Irwell Vale and 17 at Strongstry, from a combination of ordinary watercourse, surface water, sewer surcharge and main river factors
- Up to 26 properties affected by surface water flooding at Whitewell Bottoms, Piercy and Edgeside

Rossendale features as a case study later in this report, to exemplify the more local deployment of flood risk management functions by the various risk management authorities. An example working summary of the flood impact, primary flood source and lead risk management authority is presented in the Appendix.

2. Flood Event 2: 24th September 2012

A Flood Guidance Statement was issued on Saturday 22nd September, warning of heavy, persistent rain from Sunday 23rd to Tuesday 25th September, with significant disruption possible across much of England and Wales. The North West remained on a yellow alert until 06:00 on the 24th when the alert was upgraded to medium risk (amber) as the forecast became more accurate. Parts of the region saw 80% of the monthly rainfall through Monday 24th into Tuesday 25th.

The Environment Agency presented a summary report of their responses to the September flooding to the Regional Flood and Coastal Committee meeting in October 2012.

The most severe property flooding occurred in West Lancashire, and a brief summary of the more significant issues is listed below. It should be noted that property flooding also occurred in other locations during this event, on a lesser scale, notably in other parts of West Lancashire, Croston and parts of Wyre. Extensive field flooding was reported in Fylde, Wyre and West Lancashire.

West Lancashire

Up to 18 residential and 2 commercial properties are known to have suffered some degree of internal property flooding during this event. The causes were largely related to surface water, green field run off, and ordinary watercourse culvert surcharges, all resulting from exceptionally intense and localised rainfall in a number of locations across the Borough. The residential property flooding particularly affected Ormskirk and the surrounding rural areas. West Lancashire features as a case study later in this report, to exemplify the more local deployment of flood risk management functions by the various risk management authorities.

Hambleton

Flooding was reported to 12 properties in Sherbourne Road, Hambleton on 24th September due to flow from the highway drainage and sewer networks.

A community meeting was held with United Utilities and Lancashire County Council, to look at opportunities to resolve the issues. Local residents in Hambleton are being encouraged to form a community-based flood action group, in order to prepare better for any future flood events.

Preesall

Flooding was reported to 7 properties in Sunnyside Terrace. Lancashire County Council has carried out works to a culvert on Green Lane Watercourse under Cart Gate. A community meeting was scheduled for January 2013 to discuss the issues further and to assist in establishing a community-based flood action group.

The Exercising of Flood Risk Management Functions

The risk management authorities in Lancashire, led by Lancashire County Council as the lead local flood authority, have organised themselves into a partnership structure to help develop and deliver their flood risk management functions as required under the Flood and Water Management Act 2010. The above events demanded the exercising of emergency response obligations where appropriate under the Civil Contingencies Act, and the complementary exercising of flood risk management functions as identified earlier in this report, in advance of the events, during them, and as part of subsequent recovery processes. Experience of the above events identified some issues and opportunities for improvement across all of these activities. The remainder of this report will concentrate on how the flood risk management authorities deployed their flood risk management functions, and how learning is being captured to ensure mitigation of flood risk in similar situations in the future. The next section sets out the strategic multi-agency review processes that have been deployed following the flooding, and is followed by case studies of some of the most serious events listed above to demonstrate how flood risk management functions are also continuing to be exercised at a more operational level in the recovery process.

Strategic Countywide Flood Review Processes

LLFA led Risk Management Authority debrief

On 29th June the County Council convened a meeting of the key partners affected by the June floods, to explain the Section 19 Investigation Duty, and instigate some early sharing of experiences, issues and key learning amongst the relevant risk management authorities. The meeting was attended by representatives from the County Council and Blackburn with Darwen LLFA's, the Environment Agency, United Utilities, and seven district councils in whose areas significant and/or property flooding had occurred. A representative of the National Flood Forum also attended. The key issues and learning points are listed below.

Issues identified

- The challenge faced by councils in resourcing standby requirements and multi-agency flood plan activation in such widespread situations
- Low take up of EA flood warning schemes by the public in flood risk areas, and the non-availability of such warning in areas not at fluvial risk
- Some lack of understanding of flood risk management responsibilities in a two tier local authority structure
- Some local resilience issues (e.g. lack of coordination in the mobilisation of rest centres as part of Civil Contingency Act response roles)
- Lack of agreement and certainty in terms of causes of flooding and the interactions of potential flood sources
- Some public confusion suggested around flood alert/warning terminology

- Lack of public support hitherto for flood action groups even in areas of historical fluvial flood threat
- Some conflict experienced between pre flood intelligence and actual event
- Some suggestion of the public being passed between agencies' call centres inappropriately, and a lack of clear information about responsibilities from partner agencies
- Individual authority sand bag policies not always clear, and not always deliverable in widespread or rapid onset situations
- Some failures of property resilience measures

Areas of good practice and themes for further development

- Need for targeted promotion of the flood warning scheme, complemented by efforts to mobilise community flood action groups. The risk management authorities have worked with affected communities since the flood and as a result a number of such groups are now forming in communities flooded during 2012
- Need for clarification of flood risk management duties, and policies around situations where permissive powers exist, particularly where both county and district councils have the ability to take permissive action if deemed appropriate. LCC is writing to riparian landowners where appropriate to clarify legal responsibilities
- The use of structured debriefing and intelligence gathering approaches by partners to establish causes and solutions, for example Making Space for Water partner agency meetings, and community drop in sessions. These approaches have been widely used in 2012, with strong participation from the relevant risk management authorities
- Need to improve communication in its widest sense – between agencies, and with the public. The County Council as lead local flood authority is leading on this major piece of work countywide, whilst the risk management authorities are developing local solutions (see case studies)
- Inclusion of other voluntary agencies such as the National Flood Forum who can bring national experience and influence to bear, for instance in working with manufacturers to resolve issues around apparent failures of property resilience measures, and supporting communities
- Effective event preparation- weather forecast monitoring, mobilisation of incident management structures, pre-emptive asset inspections and obstruction removal regimes
- Increasing awareness – novel deployment of social media, and embedding of flood warning information into partner websites
- Managed recovery targeted across a range of themes – for example the EA model (assets, data/evidence, communities, media, hot issues)
- Initiatives by local councils to provide free council removal and disposal of flood damaged items
- Proactive use of pumping stations by the EA and local councils to provide extra watercourse storage capacity in advance of the event

- Prompt arrangement and promotion of community drop in facilities to clarify details and causes, and support and reassure the public. Sessions arranged by the EA but with other risk management authority participation

Lancashire Resilience Forum Debrief

On 25th July the Lancashire Resilience Forum (LRF) convened a further debrief of the June flood event. This debrief focused primarily on the delivery of category one and two responder requirements under the Civil Contingencies Act, in the context of flood response. The debrief was participated in by representatives from the British Army, Lancashire Constabulary, Lancashire Fire and Rescue Service, North West Ambulance Service, East Lancashire Primary Care Trust, the Environment Agency, the Met Office, Department of Communities & Local Government, and officers from Lancashire's unitary, district and county councils. The debrief examined the following aspects of the response: notification processes, response co-ordination, communications, resources, and recovery.

The key actions to be taken forward were identified as follows:

- Agencies to ensure a structured sign up within their organisations to flood advisory and flood warning services
- Agencies to review the robustness of contact information and associated review processes
- EA to work with other agencies in reviewing the appropriateness of trigger levels in the LRF Flooding and Severe Weather Plan
- The LRF Sub Group to review methods for convening teleconferences, and keeping agencies abreast of developments during incidents
- The LRF Sub Group to promote take up of the EA Targeted Flood Warning Service by LRF members, in the context of their key assets
- Improved notification of the opening of rest centres to both the Police and LCC Emergency Planning, to improve co-ordination of evacuation activities
- Teleconferences in advance of potential incidents to always consider the need to implement formal strategic co-ordination processes for multi-agency incident response
- EA to recirculate key flood information contact numbers to LRF members
- The LRF Sub Group to review communication of community messages, including discretionary services such as sand bag provision

The above actions are being pursued and regularly checked for progress through the LRF Flooding and Severe Weather Sub Group. They have been allocated to appropriate lead agencies and in some cases assimilated into other current review processes being driven by the risk management authorities, such as the Multi Agency Flood Plan review.

Lancashire County Council Internal Service debrief

The County Council conducted an internal debrief of the authority's response to the June floods, on 16th July 2012. The aims of the debrief were as follows:

1. To identify:
   - how LCC responded to the incidents
   - how LCC liaised with partner organisations
   - what went well
2. To learn lessons for future response by LCC staff
3. To identify issues for discussion at multi-agency LRF Debrief on 25th July 2012.

The debrief was attended by senior council officers representing Emergency Planning, Business Continuity, Property, Corporate Communications, Adult & Community Services, Flood Risk Management, Highways and Environmental Service interests. The key strategic actions for LCC were identified as follows:

- LCC services to be briefed on the availability and nature of meteorological and flood risk warning information from the Met Office and Environment Agency, with a view to ensuring appropriate sign up to receiving them
- LCC to ensure such information is provided consistently for the whole geographic area of the county, despite different operational practices resulting from the EA having different operational boundaries
- LCC to continue with trials of the EA Targeted Flood Warning Service for property assets, and ensure further take up of the service for other appropriate assets
- LCC services to determine what are the appropriate flood warning triggers for taking pre-emptive action, and to identify what such action should consist of for each service
- LCC to ensure responsive services such as Highways are included in the multi-agency exchange of contact information, to improve co-ordination of effort and resources during flood response
- LCC Corporate Communications to work with LCC service leads and other risk management authority communications leads, in developing a Lancashire wide strategy for flood risk management communication and raising public awareness

The County Council is progressing the above actions which will enhance its role both as a lead local flood authority, a risk management authority, and as a category 1 responder under the Civil Contingencies Act.

Other Approaches to Intelligence Gathering and Engagement Following the Floods

The Lancashire wide structure of Making Space for Water meetings, supported by the appropriate risk management authorities, has provided a well rehearsed basis for debriefing operational aspects and impacts from flood locations. Even before the floods these meetings were being held in district council areas of the county, usually on a quarterly basis, providing a regular forum for the relevant risk management authorities of the County and District Councils, the Environment Agency and United Utilities to exercise their risk management functions in discussing and seeking solutions to potential flood risk concerns. Following the flooding these meetings have in many cases been convened on an additional, extraordinary basis, to allow prompt review and diagnosis of each local flood event.

In some locations the recent flooding has generated a community appetite to understand and get involved in the management of flood risk. The EA has taken a strong role in convening community flood action groups in a number of locations, and these groups are being supported through participation and dialogue with the risk management authorities. A number of the communities affected by the floods were provided with drop in sessions, in the aftermath of the floods, where affected property owners could discuss resilience, insurance, and other related issues with the risk management authorities and knowledgeable organisations such as the National Flood Forum. The following case studies make reference to efforts to develop community flood action groups, with a view to communities being helped to develop their own resilience and control in mitigating the potential effects of future flooding on their properties.

Case Study 1 – Rossendale, June 2012

Approximately 174 properties suffered some degree of internal property flooding across Rossendale in summer 2012, with the vast majority occurring around 22nd and 23rd June. The flooding resulted from a variety of sources, and the relevant risk management authorities were promptly mobilised in line with the Rossendale multi-agency flood plan.

Community drop-in sessions were organised in Crawshawbooth and Irwell Vale, affording the opportunity for a sharing of information between the risk management authorities and affected communities. Invitation leaflets were distributed to affected properties.

The ongoing deployment of risk management functions has taken place through a series of extraordinary Making Space for Water Operational Group meetings. The following summary of operational responses at the main flood incident locations in Rossendale demonstrates the approach being taken to finding appropriate operational solutions, and the commitment of the risk management authorities in deploying their flood risk management functions.

Irwell Vale

Flooding at Irwell Vale was thought to be as a result of surface water flowing off the hillside behind the railway embankment and groundwater emerging near the foot of the hill. Drainage can be hindered by high levels in the River Irwell. Flood resistance measures appear to have failed in some cases. The following actions have been undertaken by risk management authorities;

- EA commissioned an independent report appraising the flood risk and property protection measures in Irwell Vale. The report identified a range of possible interventions including modifications to drainage and water storage capacity, enhanced property level protection measures, pumping, and improvements to flap valve arrangements into the river
- EA have loaned the community the use of a pump, and made temporary provision for the deployment of a site controller to manage surface water drainage at times of high river levels. EA are arranging training for community volunteers in the use of the pump
- UU have undertaken CCTV surveys and identified a leaking sewer
- All risk management authorities are supporting the evolution of the community action group, and bringing forward items for the action group's consideration, such as possible interventions, community role in operating pumps, riparian responsibilities, and a demonstration of various property protection measures
- Residents have received training in the use of the property level protection measures already in situ. This process identified some faulty items, and such cases have been referred to the manufacturers where appropriate

- LCC to undertake ground investigations prior to developing options for further reducing surface and groundwater flood risk

Strongstry, Chatterton and Stubbins

Flooding at Strongstry affected properties on North Street, and resulted from high levels in the River Irwell exacerbated by surface water running off the railway embankment, and a local ordinary watercourse. The River Irwell also contributed to the flooding at Chatterton, where surface water from a car park added to the problem. The following actions have been undertaken by risk management authorities;

- LCC liaising with EA and Rossendale Borough Council (RBC) re the wider flood risk management impacts of the ordinary watercourse culvert scheme proposal.
- EA have assisted RBC in providing contractors for urgent non-main river clearance and reinstatement
- EA have identified properties with potential to benefit from property level protection measures
- EA have undertaken gravel removal, bank regrading, flap valve and field drain installation. Need for a gravel trap being investigated
- EA are reviewing the proposals for a funded flood risk management scheme downstream at Ramsbottom with a view to maximising benefits to Stubbins
- All risk management authorities providing each other with mutual support in terms of design, information, procurement options and works resources
- All risk management authorities are supporting the continued evolution of the community flood action group. This is an offshoot of the existing residents association, with nominated residents working with the EA and reporting back to the main association

Crawshawbooth

The flooding at Crawshawbooth resulted from overtopping of Folly Clough Brook, due to obstruction of a debris screen. The following actions have been undertaken by risk management authorities;

- LCC investigating possible changes to highway infrastructure to help channel any surface water away from adjacent properties
- EA commissioning an overland flow model to identify an acceptable contingency flow route in the event of future overtopping of the culvert
- UU are investigating apparent surcharging issues on the sewer system
- LCC have commissioned the creation of a surface water management plan for the Upper Irwell catchment
- EA have identified suitable candidate properties for property protection measures
- EA have cleared gravel and are installing redesigned debris screens on Folly Clough Brook, to make them less prone to rapid blocking, and have raised walls at Water St to increase capacity
- UU/EA reviewing the scope for additional flood water storage upstream

- EA/RBC reviewing scope for the provision of a gravel trap
- RBC to flag the need to consider early closure of Burnley Road in any similar future event as a priority for the muliti-agency flood plan, to prevent aggravation of property flooding by vehicle bow waves
- EA/RBC to investigate potential flood warning mechanisms for the community
- A drop-in session was arranged in conjunction with the National Flood Forum soon after the flooding. A flood action group has now been established by the local community and the risk management authorities have been providing updates

Whitewell Bottom/Piercy/Edgeside

The flooding in these areas resulted from surface water draining off the hillsides, bringing down gravel, boulders and other debris. This material contributed to blockages in ordinary watercourse tributaries, culverts, and impeded water dispersal into Whitewell Brook.

- EA/UU/LCC/RBC are working with a local riparian owner to try and establish the capacity of the culverted watercourse and combined sewers in the area, with a view to identifying options for routing excess surface water into these systems
- EA have removed excess gravel from Whitewell Brook and are assisting RBC with identifying contractors for similar work on the Brook's tributaries
- EA/LCC working with the National Flood Forum to generate interest in a community flood action plan
- EA assessing scope for lowering Whitewell Brook
- EA assessing suitability of properties for property level protection measures
- LCC/EA/UU are working together to investigate drainage issues at Globe Mill and other locations
- RBC are investigating a number of ordinary watercourse performance issues

Shawforth

Market Street and eight nearby properties suffered flooding where the River Spodden flows through a restricted culvert put in place by residents in order to create access to garages on the far bank. Surface water flooding from the highway aggravated the situation. The following actions have been undertaken by risk management authorities;

- EA have cleared the channel of the River Spodden
- EA working with the National Flood Forum to explore with the residents the scope for property level protection measures
- LCC have increased highway gulley emptying frequency
- EA/RBC/LCC investigating the scope for changing overland flow pattern, through possible measures on LCC or RBC land

Whitworth

Flooding resulted from the River Spodden overtopping in two locations in Whitworth. The local leisure centre, industrial units and shop cellars flooded in June. The leisure centre was able to recover quickly from flooding because following previous advice, flood resilience had been built into recent refurbishment work. The following actions have been undertaken by risk management authorities;

- EA have raised the wall on the bank of the river near the leisure centre to increase capacity and reduce the risk of overtopping
- A riparian owner has carried out repairs to the wall adjacent to Bridge End industrial units near to Tong Lane

Bacup

A number of streets in Bacup suffered flooding from surface water, blocked drains and obstructed watercourses. The following actions have been undertaken by risk management authorities;

- RBC investigating various instances of ordinary watercourses overtopping and performance of drainage on unadopted streets
- EA liaising with RBC over suitability for a gravel trap
- LCC have replaced a damaged highway drain and cleared an obstructed drainage outlet
- RBC have initially been leading on efforts to establish a community flood action group, supported by the National Flood Forum. This activity is being taken forward by Sustainable Water in East Lancashire (SWEL), via the Groundwork Trust.
- Residents have removed gravel from an ordinary watercourse
- All risk management authorities are involved in various site specific investigations

Rawtenstall

Following flooding from Ballenden Brook to two units at the Riverside Business Park, gravel has been removed and the factory owners are raising the channel walls upstream of the culvert under one of the factories. The following actions have been taken by risk management authorities at this and other vulnerable locations in Rawtenstall;

- Following flooding from Balladen Clough the EA have carried out repairs to ensure there is uninterrupted access to the debris screens. The screen adjacent to Market St has been replaced, and some new screens are being procured
- EA and LCC have visited the units at Riverside Business Park and provided advice on property protection measures
- RBC are investigating drainage issues close to Hardman Avenue
- EA are checking abstraction arrangements for the upstream reservoir near Hardman Avenue

- LCC to liaise with the reservoir owner re outlet arrangements
- RBC leading on the provision of community information for the Hardman Avenue area
- UU are modelling sewer capacity at Holmeswood, to assess the scope for accommodating flow from a severed culvert
- LCC will lead on the provision of community information in Holmeswood
- RBC to carry out works at Leigh Brook Road to better accommodate the ordinary watercourse flow towards the river, rather than surcharging onto the highway

Ewood Bridge

One property was affected by flooding from the River Irwell, and six properties suffered flooding following run-off from a golf course. The following actions have been undertaken by risk management authorities;

- A wall next to the River Irwell has been raised by a property owner
- EA have cleared silt from the river
- LCC investigating the feasibility of enlarging a section of culvert under the highway
- LCC/RBC investigating surface water flows on Edge Lane

Other locations

Numerous other locations across Rossendale have been identified where isolated properties suffered flooding in June, or where deficiencies in infrastructure have become apparent which thankfully did not result in internal property flooding. The risk management authorities are investigating these and identifying appropriate local interventions where possible. The Making Space for Water Operational Group is coordinating all the above activity.

District Level Partnership Approach in Rossendale

The work of the Making Space for Water Operational Group in Rossendale is accountable for progress both to the local community flood action groups that are taking shape, and to a strategic steering group of senior officers from the key partners, chaired by the Borough Council Chief Executive. This steering group is seeking to ensure that the strategic lessons learnt as identified from the debriefs reported earlier are able to complement the operational activities being undertaken through the Making Space for Water Group meetings. It picks up wider issues such agency roles and responsibilities, communications issues, and consistency in community engagement. The actions below are examples of some of the agreed outputs of this strategic group;

1. Strategic Group core membership to include Rossendale Borough Council (RBC), Lancashire County Council (LCC), the EA, and Greenvale Homes Registered Social Landlord. The Group will receive updates from the Making Space for Water Operational Group.
2. LCC to circulate Scrutiny Committee report on risk management authority flood risk management roles and responsibilities to Strategic Group for information.

3. Operational Group to meet initially fortnightly and to focus on securing funding and delivering flood risk management actions, led by the EA.
4. EA are about to update their maps for surface water flooding, and will provide an update on the implications for Rossendale when available.
5. Greenvale to link up with other housing providers in Rossendale to identify opportunities to support the risk management authorities, increase property resilience, and ensure a co-ordinated approach.
6. EA to forward alternative organisation contact details for organisers of teleconferences, to ensure all organisations are represented as necessary.
7. Communications lead officers from RBC, LCC and the EA to meet and develop consistent and locally appropriate flood risk management messages. All to ensure they are on relevant websites.
8. EA, LCC and RBC to ensure that they link in with Whitworth Town Council to ensure joined up communications in Whitworth.
9. Community volunteers have been identified to represent community action group interests in Crawshawbooth, Stubbins, Strongstry, Irwell Vale and Whitworth. Agencies to liaise with communities initially via these volunteers.
10. The community volunteers will identify potentially vulnerable people within their communities. The EA will use this information to prioritise appropriate support in any future incident.
11. All risk management authorities to contribute to a briefing paper for RBC/LCC Council Members, and other relevant stakeholders, to cover such matters as:
    - The work all the partners are progressing in communities affected by flooding this summer
    - How we are using this approach to pilot partnership working across Lancashire to identify, plan and prioritise future work
    - The role of the Regional Flood & Coastal Committee and the funding allocation process
    - New approaches to working with local communities at risk
    - The actions Members can take to support this work and inform future plans

Property Level Protection

One particular initiative that is being pursued by the risk management authorities in Rossendale is the intention to try and secure substantial funding via the North West Regional Flood & Coastal Committee, for the installation of property flood protection measures in recently flooded communities. The EA have identified some 70 properties from the flooded areas in Rossendale that would seem likely to benefit from the installation of some form of property protection measures. A framework of appropriate consultants and product suppliers has been set up in readiness, assuming some level of funding will be successfully secured, and the offer of appropriate measures to householders will be led by either LCC, RBC or the EA, according to the primary source of flooding identified in each community. The intention is to commence rolling this out in Spring 2013.

Case Study 2 - West Lancashire, September 2012

The EA opened incident rooms across the region on 24th September in response to the rainfall, which resulted in properties being flooded from both river and surface water flooding.

The North West region had 188.6mm of rainfall in September, around 169% of the long-term average. The EA issued 38 Fluvial Flood Alerts, 30 Fluvial Flood Warnings and approximately 119 properties flooded across the North West due to river and surface water flooding. Warnings were issued to 1,990 North West properties, and 8,350 properties in the region were defended.

The EA flood forecasting duty team produced over 300 forecasts for the 24-27th September event in support of the flood warning service to local communities.

The main Lancashire impact of the September event, in terms of property flooding, was in West Lancashire. The area suffers from a combination of surface water, ordinary watercourse and main river issues. 19 properties were flooded in and around Ormskirk. A community drop-in session was held in October and a further community meeting was held during December. There is interest in the establishment of community flood action groups, which the EA are leading. In the period up to Christmas three Making Space for Water partner agency meetings were held to develop proposals for future flood risk mitigation across the borough.

A summary of the issues in West Lancashire is as follows;

Dyers Lane, Railway Path, Ormskirk

A major factor seems to have been the contribution of surface water flows from Railway Path, due to a collapsed culvert, that overshot the brook and continued to flood the north side of Dyers Lane. Initial works carried out by LCC Highways have mitigated this risk, and further works being pursued as follows:

- LCC to undertake a survey of Railway Path watercourse culvert to try to establish the existence of any blockages under the adopted highway or adjacent property
- LCC to lead on hydraulic capacity assessment of catchment contributing to Railway Path culvert
- UU have surveyed the foul sewer in Railway Path and confirmed its functionality
- LCC to liaise with Network Rail (NR) to identify how surface water within NR property is conveyed and where directed to outside their property and formulate an informed view on NR's surface water drainage arrangements
- NR in turn carrying out CCTV investigations on the culvert under and issuing from railway property, and investigating leakage from the ballast

- LCC to investigate surface water issues in the Black Moss Lane, Ryburn Road & Railway Path residential areas
- EA to undertake minor debris removal and vegetation cutback on Sandy Brook
- EA have produced LiDAR (topography) information for the catchment area
- EA have undertaken an internal preliminary review & scoping of existing main river modelling
- EA have programmed a hydrology & modelling project for Sandy Brook main river for 2013/14
- All agencies engaging with the local community to explore development of a community flood action group
- EA/West Lancashire Borough Council (WLBC) assessing scope for property protection measures

Altys Lane, Ormskirk

Flooding at culvert inlet of Sandy Brook and surface water flooding affected property at the northern end of Altys Lane. LCC Property Group arranged for a temporary bund in order to mitigate the risk to property from overland flow. The following further actions have been undertaken by risk management authorities;

- LCC investigating the potential sources of surface water, and the potential to mitigate run-off
- EA have revised the culvert inspection programme for 2013/14 to include Altys Lane

Rear of Asmall Lane / Halsall Lane / Whiterails Drive / Cotton Drive residential area

It is likely that the main source of flooding was surface water, caused by the scale of run-off west of Asmall Lane, rather than from Sandy Brook. The following actions have been undertaken by risk management authorities;

- LCC Highways have checked performance of the highway drainage in vicinity of Halsall Lane
- EA have programmed a hydrology & modelling project for Sandy Brook main river for 2013/14
- All agencies attended a community drop in session and are engaging with the local community to explore development of a community Flood Action Group
- EA/WLBC assessing scope for property protection measures
- LCC/WLBC are investigating the performance of ordinary watercourse culverts in the vicinity of Halsall Lane, some sections of which run under the highway, and some under private land. Potential issues may be culvert blockages, capacity, or ability to outfall into Hurlston Brook at times of high river levels. There may be a responsibility for rectification by riparian owners here, and LCC have provided advice on this in correspondence

Plex Lane, Halsall

Green field runoff was determined as a major contributor to flooding in this area. There were also concerns around surface water in the highway and the performance of ordinary watercourse culverts. Following a community drop in session attended by the appropriate risk management authorities, the following actions were being undertaken;

- LCC Highways held a site meeting with residents to identify areas affected, advise on responsibilities and determine possible actions
- LCC have carried out highway gulley clearance and jetting, and are monitoring with a view to reassessing cleaning frequency
- EA to undertake some ditch clearance work
- LCC to review the wider drainage network with a view to identifying the need for any remedial action, and responsibilities for such action

Westhead village

Flooding arose from a combination of surface water and ordinary watercourse overtopping.

- LCC to investigate highway drainage and culvert capacities, and identify appropriate responsible parties for any rectification work, including riparian owners where appropriate
- EA have contacted property owners to provide advice on flood resilience

Southport Road, Ormskirk

Flooding arose from a combination of surface water, main river (Hurlston Brook) and ordinary watercourse overtopping.

- LCC investigated highway drainage and confirmed functionality
- LCC, WLBC and EA are arranging various culvert investigations
- EA modelling the capacity and watercourse inputs to Hurlston Brook

A number of other locations across West Lancashire have seen investigations by LCC into the performance of highway drainage systems, and identification of responsibilities for the rectification of field flooding.

Conclusion

This report has examined at a strategic level the impact of flooding in 2012 in various parts of Lancashire, and the strategic deployment of flood risk management functions. Through two case studies it has demonstrated some of the operational responses that have been undertaken in some of the worst affected locations.

The 2012 floods provided the first widespread test of flood response and risk management in Lancashire since the introduction of the Flood & Water Management Act 2010. Hence the focus of this report on the strategic issues requiring attention by the risk management authorities in the county.

Through the flood event summaries and case studies, the report has set out examples of how the risk management authorities in Lancashire have readily come together to examine flood risk management issues in each district of the county, an approach well rehearsed through the partnership structures that have been created in Lancashire for flood risk management. In particular, the existence of Making Space for Water meetings in each district of the county prior to the floods has provided an effective vehicle for risk management authorities to agree responsibilities, share information on investigations, and identify necessary courses of action. The report also provides examples of innovative and inclusive approaches to the mitigation of flood risk, with a particular emphasis on helping communities to understand flood risk, and how they can take some control over managing its impact.

The Debrief sections of the report have demonstrated the commitment of the risk management authorities and emergency services to learn lessons, change practices in the light of experience, and therefore enhance future delivery of flood risk management functions.

In looking to the future, it is nevertheless evident from the report that there is work to be done on a number of fronts to increase the effectiveness of flood risk management function delivery. This report has helped to highlight some key strategic themes which will continue to be pursued by the risk management authorities in partnership, as we emerge from the immediate response and local recovery phases of activity. These themes can arguably be represented as strategic objectives, with anticipated outcomes and some of the key actions already under way, as identified below:

Objective: The provision of simpler and more accessible information for the public on flood risk, the roles of risk management authorities, and who to contact for support

Outcome: A good public understanding of the risk management authorities' service offer

Actions: Development of multi-agency communications strategy, proactive use of appropriate media including websites.

Objective: Finding ways for agencies to work together effectively across boundaries (organisational, geographic, political, catchment, etc.)

Outcome: Efficient delivery of flood risk mitigation regardless of boundaries

Actions: Continued partnership development with flexibility to adapt to different needs.

Objective: Empowering communities to be flood risk aware and self resilient

Outcome: Communities feel better informed, less reliant on outside help, and more in control of their own safety and property protection.

Actions: Increase take up of warning services, provide property level protection, support community flood action groups, clarify roles and responsibilities.

Objective: Continuing to pursue funding and innovation opportunities to increase protection for infrastructure, property and communities.

Outcome: Flood risk is identified and prioritised and investment targeted to best effect, so that those most at risk benefit.

Actions: Develop Surface Water Mapping and Surface Water Management Plans, carry out investigations, prioritise activity through Making Space for Water Groups, bid effectively into partner funding streams, identify and secure partnership funding contributions.

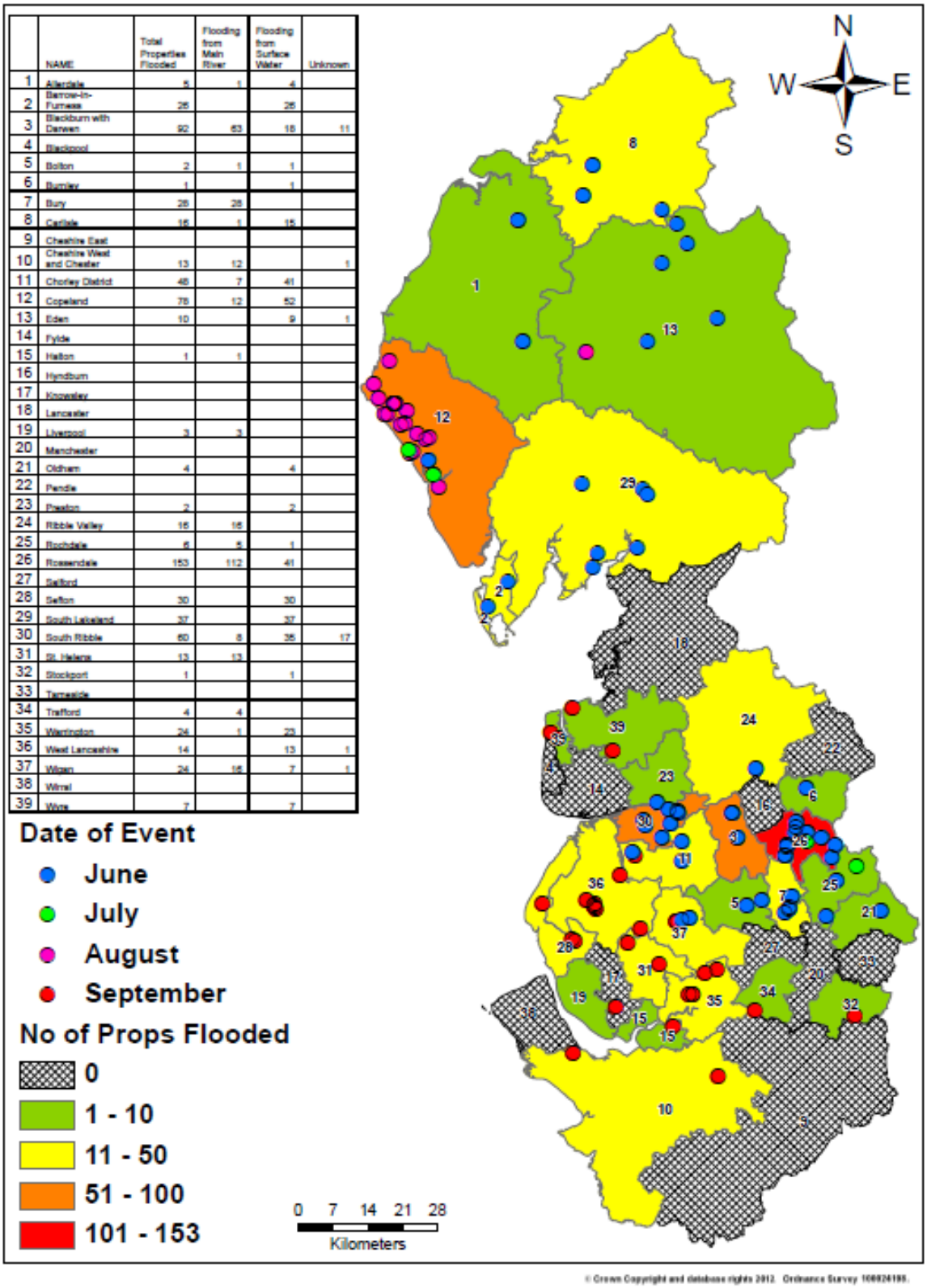
In summary, then, whilst issues and areas for improvement have been identified, the conclusion of this report is that all Lancashire's risk management authorities have exercised their flood risk management functions effectively and proactively in the vast majority of recorded flood incidents. It is also concluded that the risk management authorities have all shown a demonstrable appetite to identify and implement improvements, as evidenced through participation in debrief processes, commitment to community engagement efforts, and the ongoing focus on strategic objectives as set out above. The forthcoming Local Flood Risk Management Strategy for Lancashire will provide further context and support for risk management authorities in exercising their flood risk management functions in the future.

Appendix

Summer Flooding Analysis 2012 North West Region

Environment Agency

	NAME	Total Properties Flooded	Flooding from Main River	Flooding from Surface Water	Unknown
1	Allerdale	5	1	4	
2	Barrow-in-Furness	26		26	
3	Blackburn with Darwen	92	63	18	11
4	Blackpool				
5	Bolton	2	1	1	
6	Burnley	1		1	
7	Bury	28	28		
8	Carlisle	16	1	15	
9	Cheshire East				
10	Cheshire West and Chester	13	12		1
11	Chorley District	48	7	41	
12	Copeland	78	12	52	
13	Eden	10		9	1
14	Fylde				
15	Halton	1	1		
16	Hyndburn				
17	Knowsley				
18	Lancaster				
19	Liverpool	3	3		
20	Manchester				
21	Oldham	4		4	
22	Pendle				
23	Preston	2		2	
24	Ribble Valley	16	16		
25	Rochdale	6	5	1	
26	Rossendale	153	112	41	
27	Salford				
28	Sefton	30		30	
29	South Lakeland	37		37	
30	South Ribble	60	8	35	17
31	St. Helens	13	13		
32	Stockport	1		1	
33	Tameside				
34	Trafford	4	4		
35	Warrington	24	1	23	
36	West Lancashire	14		13	1
37	Wigan	24	16	7	1
38	Wirral				
39	Wyre	7		7	



ROSSENDALE SUMMER 2012 FLOODS

LOCATIONS FLOODED, IMPACT ON PROPERTY, FLOODING SOURCE & LEAD ORGANISATION

Item	No. of Properties	Location	Flooding Source	Lead
1	8	Irwell Vale	surface water, groundwater	EA
2	14 + 3 0	Strongstry/Chatterton/Stubbins ▪ Strongstry & Chatterton ▪ Stubbins	main river, ordinary watercourse & surface water surface water & ordinary watercourse	EA
3	69	Crawshawbooth	main river & surface water	EA
4	2 1 0 0 0 3	Rawtenstall ▪ Balladen Brook, Riverside Business Park, Holme Lane ▪ Balladen Clough, Waingate Road ▪ Hardman Ave/Hall Carr Road ▪ Holmeswood ▪ Lee Brook Road ▪ Linden Lee	ordinary watercourse main river surface water surface water ordinary watercourse surface water	RBC EA LCC LCC RBC LCC
5	1 4 <=10 1 cellar + Ind. Units + 4 cellars 0 1	Whitewell Bottom/Piercy/Edgeside ▪ Charles St ▪ Burnley Rd East/Foxhill Drive, Piercy ▪ Phillipstown ▪ Wales Rd, Edgeside ▪ Globe Mill/Burnley Road East, near Waterfoot Business Park ▪ Rockbridge Fold ▪ Cliff Bank Hamlet	surface water ordinary watercourse & surface water surface water & ord w/c surface water surface water & highway drainage ord w/c & surface water ordinary watercourse	LCC RBC RBC LCC LCC RBC RBC

6	7	Whitworth	Main river	EA
7	8	Shawforth	main river & surface water	EA
8	Ind. Units 1 + 10 garages 1 0 2 0	Bacup ▪ Town centre, various, incl. Henrietta St ▪ Oakenclough Rd & Greave Clough Drive ▪ Clough St ▪ Holmes Lane ▪ Pennine Road (& Tong Lane) ▪ Dale Street	Surface water surface water & ord w/c surface water ordinary watercourse ordinary watercourse surface water	LCC LCC/RBC LCC RBC RBC LCC
9	1 cellar 0 0	Edenfield ▪ Market St ▪ Fish Rake Lane ▪ Gin Croft Lane	Ord w/c & surface water ordinary watercourse surface water	LCC RBC/LCC LCC
10	7	Ewood Bridge (incl 1 from main river)	Surface water	LCC
11	1	Other .... Tor End Road, Helmshore	Surface water	LCC
	168	TOTAL		