



Durham County Council

Preliminary Flood Risk Assessment (PFRA) Report

Draft V1 – June 2011

Executive Summary

Durham County Council has a responsibility as the Lead Local Flood Authority (LLFA) under the Flood Risk Regulations (The Regulations) and the Floods and Water Management Act 2010 to manage local flood risk. (Further responsibilities of the Lead Local Flood Authority can be found in section 2)

The European floods directive which is implemented through The Regulations provides a consistent approach for managing floods across Europe. The approach is a six year planning cycle which has four main steps within it, these are:

- Undertaking a preliminary flood risk assessment (PRFA)
- Identifying flood risk areas
- Preparing flood hazard and risk maps
- Preparing flood risk management plans

The PRFA process is aimed at providing a high level overview of flood risk from local flood sources including surface water, groundwater and ordinary watercourses. As the LLFA, Durham has to submit their PFRA report to the Environment Agency by 22 June 2011. The following report is the first of these steps and details information on past (historic) and future (potential) floods within Durham County.

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1 Introduction

1.1 Scope

Durham County Council is the Lead Local Flood Authority (LLFA) is responsible for assessing risk from local sources of flooding i.e. surface ground water and ordinary watercourses.

The Environment Agency is responsible for assessing flood risk from main rivers, the sea and reservoirs and therefore flooding exclusively from these sources will not be included in this report. The report, however, will need to consider the impacts of flooding from main rivers on the risk from local sources.

1.2 Aims and objectives

The PRFA is a high level screening exercise to locate areas in which the risk of ordinary watercourse, surface water and groundwater flooding is significant. It is not a stand alone process and is closely linked to the preparation of the early stages of Surface Water Management Plans (SWMP) and other planning, environmental, operational and sustainability outcomes.

The aim of this PFRA is to provide an assessment of local flood risk across the study area, including information on past floods and the potential consequences of future floods.

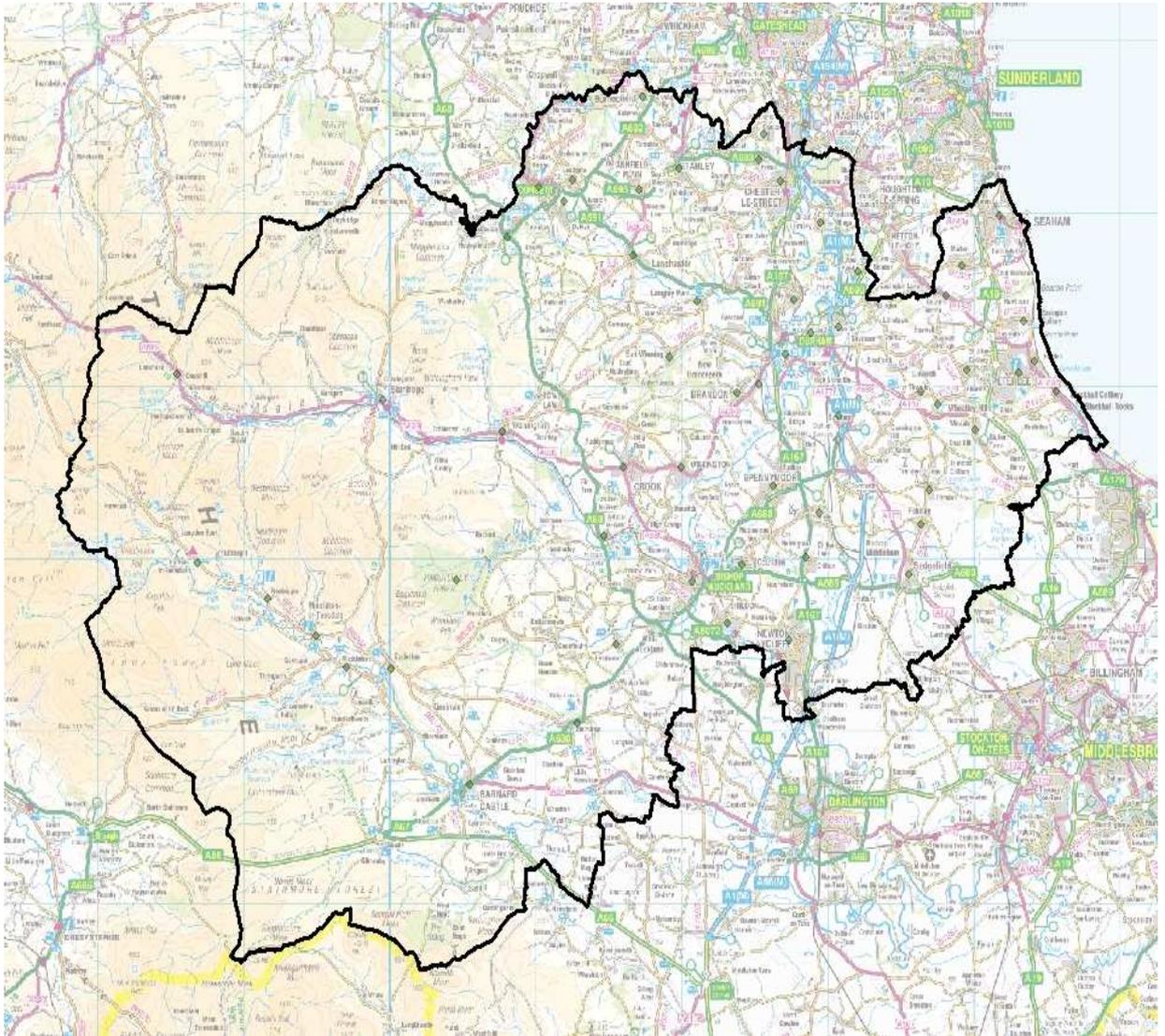
The key objectives can be summarised as follows:

- Identify relevant partner organisations involved in future assessment of flood risk; and summarise means of future and ongoing stakeholder engagement;
- Describe arrangements for partnership and collaboration for ongoing collection, assessment and storage of flood risk data and information;
- Summarise the methodology adopted for the PFRA with respect to data sources, availability and review procedures;
- Assess historic flood events within the study area from local sources of flooding (including flooding from surface water, groundwater and ordinary watercourses), and the consequences and impacts of these events;
- Establish an evidence base of historic flood risk information, which will be built up on in the future and used to support and inform the preparation of Durham's Local Flood Risk Strategy;
- Assess the potential harmful consequences of future flood events within the study area;

1.3 Study Area

The study area for the PFRA is defined as the administrative boundary of Durham County Council. The County of Durham covers an area of

approximately 2676 square kilometres and has a population of 508,500¹, the study area falls within the Northumbrian River Basin District and is served by a single water company: Northumbrian water Ltd. The study area is also served by a single Environment Agency region. Durham is bordered to the east by the North Sea and to the south by Hartlepool Borough, Darlington Borough, Stockton Borough and North Yorkshire, to the west is Cumbria and to the north is Northumberland and Tyne and Wear.



¹ National Statistics online August 2008

2 Lead Local Flood Authority Responsibilities

The Flood and Water Management Act 2010 received royal assent on 8 April 2010. The act revises, modernises and consolidates significant legislation covering flooding, land drainage, coastal erosion and reservoir safety. It strengthens and extends existing flood and water legislation including implementing appropriate recommendations from the Pitt Review into the floods of 2007. The act creates lead local flood authority status (LLFA) which will be a new duty for the council. This responsibility sets out a strong leadership role for the council in managing local flood risk and their key duties include:

- **Local strategy for flood risk** – LLFA's are responsible for developing, maintaining and applying a strategy for local flood risk management which should include risks from surface water run off, groundwater and ordinary watercourses
- **Partnership working** – LLFA's are required to convene and coordinate any bodies necessary to deliver an effective joined up management of flood risk (see section 3)
- **European Flood Directive requirements** – LLFA's should fulfil the requirements of the EU floods directive in relation to sources of flood risk including a requirement to complete Preliminary Flood Risk assessments and prepare surface water management plans for areas of greatest risk
- **Flood Expertise** – LLFA's need to develop centres of engineering and flood risk expertise in partnership with other key partners
- **SUD's approving body** – LLFA's are required to approve, adopt and maintain sustainable drainage systems (SUDS) that meet national standards for development
- **Investigate flood incidents** – LLFA's will have a duty to investigate and record details of significant flood events in their area
- **Asset register** – LLFA's will be required to maintain a register of structures or assets that may have an effect on flood risk, the register must be available for inspection and should have details of ownership and condition
- **Works powers** – LLFA's will also have powers to undertake works to manage flood risk and also to designate structure or assets that are relied on for flood risk management

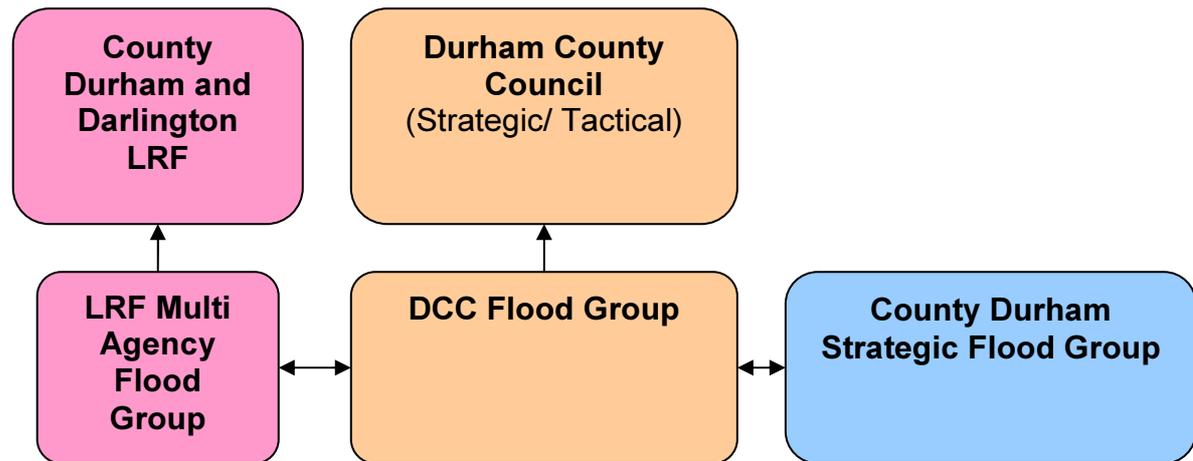
2.1 Coordination of Flood Risk Management

One of the key recommendations from the Pitt Review in the review of the 2007 Floods was *Recommendation 14: Local authorities should lead on the management of local flood risk, with the support of the relevant organisations.* Coupled with the emphasis on partnership working within the Flood and Water Management Act, Durham County Council has an important role to play in the coordination of flood management.

Although Durham County Council is the LLFA, much of the technical expertise and the knowledge of flood risk lies with other organisations and this therefore requires close working with these partner organisations to ensure a coordinated and consistent management of local flood risk.

Within Durham County there are a number of groups that facilitate this multi agency working, this is documented in FIG 1 below.

FIG: 1



2.2 Multi Agency Partners

Memberships of the above groups consist of a variety of different organisations. These include:

- Durham Constabulary
- Cleveland Police
- Durham and Darlington FRS
- Cleveland Fire Brigade
- Environment Agency
- Hartlepool Borough Council
- Stockton Borough Council
- Durham County Council
- Highways Agency
- Northumbrian Water

3 Methodology and Data Review

3.1 *Introduction*

3.1.1 EA Guidance and Template

The PFRA final guidance was produced by the Environment Agency and released in December 2010. It was this guidance and outline template which was used to lead the production of the PRFA report.

3.1.2 Strategic Flood Risk Assessment (SFRA)

In 2009 Golder Associates were commissioned by Durham County Council to produce a level 1 SFRA document which was prepared in accordance with PPS25 guidance. The PPS25 relates to development and the constraints of flood risk with its overarching aim to avoiding development in flood risk areas. This highlights the need to understand the flood risk (historic and future) with the Durham County.

The level 2 SFRA was commissioned in 2009 and completed by March 2010 with the purpose of providing an assessment of flood risk of sites under consideration as part of the Local Development Framework.

3.2 *Data Collection*

3.2.1 Historical Flood Risk Data

The SFRA process involved Golder Associates consultants collecting and collating a large amount of historical flood data from a number of different sources. These sources included Durham County Council, County Durham and Darlington Fire and Rescue Service, Cleveland Emergency Planning Unit, the Highway Agency and Northumbrian Water. This information was processed and where possible, geo-referenced, to produce a historical data flood map.

This information made up the primary historical data with additional information provided by other sources detailed below.

3.3 *Other Data Sources*

3.3.1 National Flood Risk Mapping

National flood risk mapping for different flood sources (including surface water and groundwater) are available from the Environment Agency and these data sources have been used as supporting data for this section. A description on each is included below.

3.3.2 Historic Surface Water and Groundwater (HSWGW) Database

This database contains point source data that was submitted to the Environment Agency from a number of sources including local authorities, water companies and the fire service. It also includes the national groundwater flooding database, the Integrated Surface Water Management Group (SWMG) and surface water and groundwater Flood Event Outlines.

The database is not, however, a comprehensive record as information is limited. In addition some of the data that was submitted was not included as it did not meet the required standards.

3.3.3 Historic Flood Map

The Historic Flood Map dataset contains combined extents from known flooding events from surface water, groundwater, rivers and the sea. It is derived from the Flood Event Outline dataset and does not include point flooding records. It has some limitations as it does not provide information on all past flooding events or contain specific detail on the date or probability of flooding, it simply highlights that flooding did occur.

3.3.4 Future Flood Risk Data

The PFRA is also required to take into account floods which may occur in the future. This includes the possibility of floods occurring from current conditions and of those occurring taking into consideration climate change. For this purpose the Environment Agency's Flood Map for Surface Water was used to highlight potential flood areas. The Flood Map for Surface Water uses a numerical hydraulic model to predict the extent of flood risk from two rainfall events (1 in 30 annual chance and 1 in 200 annual chance).

3.3.5 Identifying Flood Risk Areas

To ensure a consistent and proportion approach Defra have identified a significance criteria and thresholds for defining Flood Risk areas. These are based on three key factors:

- Human Health
- Economic Activity
- Environment

These indicators have been used to determine areas where flood risk and potential consequence exceed a pre-determined threshold. The areas that have been identified using this methodology and exceed 30,000 people at risk have been identified as national flood risk areas.²

² DEFRA guidance for selecting and reviewing Flood Risk Areas for local Sources of Flooding (Dec 2010)

3.4 Data Limitations

3.4.1 Requirement to Collect Data

The requirement to collect and record historic flood data is one that is currently being placed on the LLFA and all future events will have to be recorded. While this will greatly assist in future flood assessments, it does mean that completing this PFRA is reliant on inconsistent and incomplete historic flood datasets.

3.4.2 Current Data Shortfalls

The data included in this report is that based on information which is currently available; it does not necessarily represent a complete record of every historic flood event that has occurred in Durham. The collection of flood data in the past was done on an ad-hoc basis depending on the situation and officers responsible at the time.

3.4.3 Data Collection Systems

Not only is the historic data incomplete but there has been no system for recording and collecting data. This has meant that the flood data is inconsistent, of varied quality and often missing. This makes comparing data and producing a consistent map of flood risk areas a difficult task. The production of a comprehensive data collection system with specific criteria's for the collection of flood data is one area that needs to be addressed by the LLFA for future flood events. Once in place this will provide comprehensive basis for future PRFA production. (See section 6)

4 Historic Flood Risk

4.1 *Brief Description of Durham County*

The County of Durham is characterised by high ground to the west, and lower undulating ground to the east. The River Wear corridor runs through the heart of the County, along which a wide tranche of relatively low lying land extends in a northerly direction, encompassing the towns of Chester-le-Street and Durham.

A similarly characteristic 'split' is evident across the County when considering land use. The west of the County i.e. 'the North Pennines Area', is characterised by small rural settlements and small market towns. In contrast, the east of the County is still rural, however this area is characterised by towns that were built to support the mining of steel and coal. These old industrial areas are now experiencing a pressing demand for urban regeneration.

The high ground to the west of the River Wear is underlain by Yordale (limestone geology) with a peat soil layer. The central belt of the County is situated on coal measures, and these are overlain by till. To the east, Zechstein (limestone) geology dominates, once again with till as the surface soils. Alluvium, sands and gravels are evident along the corridors of the River Wear and River Tees, with isolated lenses of clay to the north and south of the County respectively.

4.2 *History of Flooding in Durham County*

There is a long history of flooding in the County of Durham, with records dating back to the 14th century. The Environment Agency has prepared a comprehensive summary of known flooding events within the River Wear and River Tees catchments since this time (to 2008). It is emphasised that these incidents relate exclusively to river flooding, and do not include the July 2009 flood.

River flooding within the County is primarily due to the overtopping of the River Wear and its tributaries in towns and villages along its length. Riverfront areas in Durham city centre have experienced flooding from the River Wear on 5 occasions in the last 10 years, most recently in July 2009. There are relatively few incidents of flooding from the River Tees within the County, although flooding has been experienced historically in Barnard Castle, exacerbated by a coincident snow melt that increased water levels in the river.

There are a substantial number of reported incidents of surface water flooding throughout the County, and the July 2009 event was a timely reminder of the susceptibility to flooding following particularly heavy (and prolonged) rainfall. It is understood that on the 2nd of July approximately 50mm of rainfall fell in around 40 minutes over some areas of the County. On the 17th of July a second rainfall event occurred, with over 100mm falling in a 24 hour period. The feedback received from Town and Parish Councils had provided some

very useful eyewitness accounts of the flooding that resulted, with some areas subjected to relatively deep floodwaters, affecting homes and thoroughfares.

4.3 Risk of Flooding from the Sea

The coastal frontage of Durham County extends from Seaham in the north to Crimdon Park in the south. The town of Seaham is situated immediately next to the coast, however the coastal communities of Dawdon, Easington Colliery, Horden and Blackhall Colliery are some distance inland (typically around 0.5km). The coastline is characterised by beach cliffs, and historically sea defences have been constructed to prevent the erosion of the seafront in Seaham. Consequently, the risk of tidal flooding to property within the County of Durham is negligible. This is reinforced by the SFRA Flood Maps.

The impact of sea level rise as a result of climate change has been considered. In summary, it is reasonable to assume that there will be no increase in the risk of coastal flooding due to climate change.

4.4 Risk of Flooding from Surface Water

A considerable number of localised (surface water) flooding incidents have been captured throughout the County. Many of these are situated within developed areas, affecting homes and businesses. Within more rural areas however, a number of surface water flooding incidents are evident, resulting in road closures.

It is understood that ongoing investment is being placed into progressively improving the drainage system by Northumbrian water and Durham County Council, prioritising areas of greatest need. This will increase the capacity of the drainage system to typically 2.5% (1 in 40) where improvements have been carried out, including (most recently) communities within Durham and Chester-le-Street.

The risk of surface water flooding has been integrated for the County as a whole, highlighting (and prioritising) areas that may be susceptible to ponding and/or overland flow following periods of heavy rainfall

4.5 Risk of Flooding from Groundwater

No records of groundwater flooding have been found within the County of Durham. In 2004, Defra commissioned Jacobs to carry out a detailed investigation into areas of potential 'groundwater emergence' throughout England. This study concluded that there were no areas of predicted groundwater flooding within this area.

It is worth noting that there is a long history of coal mining within the north east region, and it is understood that mine dewatering has recently ceased in some areas. This may lead to an increase in groundwater levels within historical mining areas of the County, and discussions have been held with Council engineers accordingly. It has been concluded (from strategic

perspective) that there is a high level of uncertainty as to the long term impacts of the cessation of dewatering upon groundwater levels, and there is no evidence that groundwater flooding will ensue.

Finally, the Environment Agency has delineated a series of 'groundwater source protection zones' for England and Wales. These are mapped to assist the Environment Agency monitor the risk of contamination from activities that may pollute important groundwater resources in the area. A relatively large proportion of the area to the east of the A1(M) within Durham County has been delineated as a source protection zone, confirming the presence of groundwater within this area. In summary however, it would appear that the potential risk of groundwater flooding in the County of Durham is very small.

4.6 *Historic Flood Data*

Much of the data collected is of varying standards and detail but to avoid losing information that may still be useful to support and inform future PFRA cycles as well as Durham's Local Flood Risk Management Strategy, the key flood events have been documented below.

Area	Frequency	Detail
GAINFORD CHESTER-LE-STREET: E426415, N550953	YEARLY	The location of Gainford is open space gardens in the ownership of Durham county council. This area during heavy rain floods the gardens and property flooding has occurred. The water is a result of a run off from a DCC school field.
MENCEFORTH COTTAGES, CHESTER-LE-STREET: E426907, N551714	2009	This location receives highway and property flooding due to run off from higher land, gradients etc. Recent schemes to improve the highway drainage, flood walls and highway drain improvements upstream it is noted that an improvement is evident.
POTTERS BANK JTN OF ELVET HILL ROAD, DURHAM CITY: E427020, N541425	2010	The highway floods from the field during heavy rain. A recent meeting has took place with the land agent suggesting chicanes or a soakaway to reduce the impact onto the highway.
BROADWOOD VIEW, CHESTER-LE-STREET: E427687, N550778	2005, 2006, 2009	The properties have received major flooding due to capacity issues to with the local sewers. Northumbria Water are currently compiling a scheme that will remove this from the at risk list.
PLANTATION VIEW, WEST PELTON: E422914, N552860	2005, 2006, 2007, 2008, 2009, 2010	The properties of 14-22 plantation view receive major property flooding due to surface water run off.
TOWN CENTRE, CONE TERRACE, CHESTER-LE-STREET: E427641, N551528 Wallnook Lane, Langley Park: E421742, N545234	2005	Highway flooding is evident at the bottom of Front Street and Cone Terrace along to the leisure centre. This is usually evident during high river levels and heavy rain. Historic - 4 Houses Affected

4.6 *Consequences of Historic Flooding*

Insufficient data is available to draw definitive conclusions on the impacts and consequences of historic flood events on people, the economy and the environment, as this information has not been recorded in the past.

Due to a lack of comprehensive information on the past floods, those that are recorded are not considered within the national perspective to have had 'significant' harmful consequences.

5 Future Flood Risk

5.1 Areas at Risk from Future Flooding

Using the Flood Map for Surface Water model, FIG 2 shows that there are a number of 'key' areas at risk within Durham County. These are included in the table below and a more detailed map of each area can be found in FIGS 3-13.

FIG: 2

Map	Area	Properties affected	Comments
1	East Stanley	160	Flooding due to sewer inundation and increased over ground flow.
2	Chester le Street 1	462	Flooding due to sewer inundation and increased over ground flow.
3	Chester le Street 2	128	Flooding due to sewer inundation and increased over ground flow.
4	Durham City 1	148	Flooding due to sewer inundation and increased over ground flow.
5	Durham City 2	198	Flooding due to sewer inundation and increased over ground flow.
6	Bishop Auckland	524	Flooding due to sewer inundation and increased over ground flow.
7	Newton Aycliffe	130	Flooding due to sewer inundation and increased over ground flow.
8	Crook	165	Flooding due to sewer inundation and increased over ground flow.
9	Westgate & St John's Chapel	35	Flooding due to sewer inundation and increased over ground flow.
10	Frosterley	60	Flooding due to sewer inundation and increased over ground flow.
11	Wolsingham	90	Flooding due to sewer inundation and increased over ground flow.

5.2 The Impacts of Climate Change

5.2.1 The Evidence

There is clear significant evidence that global climate change is happening now. It cannot be ignored. Over the past century around the UK we have seen sea level rise and more of our winter rain falling in intense wet spells. Seasonal rainfall is highly variable. It seems to have decreased in summer and increased in winter, although winter amounts changed little in the last 50 years. Some of the changes might reflect natural variation, however the broad trends are in line with projections from climate models. Greenhouse gas (GHG) levels in the atmosphere are likely to cause higher winter rainfall in future. Past GHG emissions mean some climate change is inevitable in the

next 20-30 years. Lower emissions could reduce the amount of climate change further into the future, but changes are still projected at least as far ahead as the 2080s. We have enough confidence in large scale climate models to say that we must plan for change. There is more uncertainty at a local scale but model results can still help us plan to adapt. For example we understand rain storms may become more intense, even if we can't be sure about exactly where or when. By the 2080s, the latest UK climate projections (UKCP09) are that there could be around three times as many days in winter with heavy rainfall (defined as more than 25mm in a day). It is plausible that the amount of rain in extreme storms (with a 1 in 5 annual chance or rarer) could increase locally by 40%.

5.2.2 Key Projections for Northumbria River Basin District

If emissions follow a medium future scenario, UKCP09 projected changes by the 2050s relative to the recent past are:

- Winter precipitation increases of around 10% (very likely to be between 0 and 23%)
- Precipitation on the wettest day in winter up by around 11% (very unlikely to be more than 24%)
- Relative sea level at Tynemouth very likely to be up between 7 and 38cm from 1990 levels (not including extra potential rises from polar ice sheet loss)
- Peak river flows in a typical catchment likely to increase between 8 and 13% increases in rain are projected to be greater near the coast than inland.

5.2.3 Implications for Flood Risk

Climate changes can affect local flood risk in several ways. Impacts will depend on local conditions and vulnerability. Wetter winters and more of this rain falling in wet spells may increase river flooding in both rural and heavily urbanised catchments. More intense rainfall causes more surface runoff, increasing localised flooding and erosion. In turn, this may increase pressure even drier summers, so we need to be prepared for the unexpected.

Rising sea or river levels may increase local flood risk inland or away from major rivers because of interactions with drains, sewers and smaller watercourses. Where appropriate, we need local studies to understand climate impacts in detail, including effects from other factors like land use. Sustainable development and drainage will help us adapt to climate change and manage the risk of damaging floods in the future.

5.2.4 Adapting to Change

Past emission means some climate change is inevitable. It is essential we respond by planning ahead. We can prepare by understanding our current and future vulnerability to flooding, developing plans for increased resilience and building the capacity to adapt. Regular review and adherence to these plans is key to achieving long-term, sustainable benefits.

Although the broad climate change picture is clear, we have to make local decisions uncertainly. We will therefore consider a range of measures and retain flexibility to adapt. This approach, embodied within flood risk appraisal guidance, will help to ensure that we do not increase our vulnerability to flooding.

5.2.5 Long Term Developments

It is possible that long term developments might affect the occurrence and significance of flooding. However current planning policy aims to prevent new development from increasing flood risk. In England, Planning Policy Statement 25 (PPS25) on development and flood risk aims to 'ensure that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas at highest risk.

Where new development is, exceptionally, necessary in such areas, policy aims to make it safe without increasing flood risk elsewhere and where possible, reducing flood risk overall'. In Wales, Technical Advice Note 15 (TAN15) on development and flood risk sets out a precautionary framework to guide planning decisions. The overarching aim of the precautionary framework is 'to direct new development away from those areas which are at high risk of flooding'. Adherence to Government policy ensures that new development does not increase local flood risk. However, in exceptional circumstances the Local Planning Authority may accept that flood risk can be increased contrary to Government policy, usually because of the wider benefits of a new or proposed major development. Any exceptions would not be expected to increase risk to levels which are 'significant' (in terms of the Governments criteria).

5.3 Maps

FIG 3: East Stanley

FIG 4: Chester le Street 1

FIG 5: Chester le Street 2

FIG 6: Durham City 1

FIG 7: Durham City 2

FIG 8: Bishop Auckland

FIG 9: Newton Aycliffe

FIG 10: Crook

FIG 11: Westgate and St John's Chapel

FIG 12: Frosterley

FIG13: Wolsingham

6 Review of Indicative Flood Risk Areas

6.1 Overview

In order to ensure a consistent national approach, Defra have identified significant criteria thresholds to be used for defining flood risk areas. Guidance on applying these thresholds has been released by Defra. In this guidance document³, Defra have set out agreed key risk indicators and threshold values which must be used to determine Flood Risk Areas.

The methodology is based on using national flood risk information to identify 1km squares where local flood risk exceeds a defined threshold; where a cluster of these grid squares leads to an area where flood risk is most concentrated, and over 30,000 people are predicted to be at risk of flooding, this area has been identified as an Indicative Flood Risk Area.

The Durham area does not have any Indicative Flood Risk Areas as defined above and therefore none will be recorded in Appendix 3 of the Preliminary assessment spreadsheet.

³ 'Selecting and reviewing Flood Risk Areas for local sources of Flooding' (Defra 2010)

7 Next Steps

7.1 Future Data Collection

As described in Section 2, Durham County Council, as LLFA now has a duty to investigate and record details of significant flood events in their area. The collection of this data will ensure that a comprehensive record of flood data can be issued to inform future assessment and reviews and for imputing into mapping and local strategy planning.

In addition, the PRFA process is based on a 6 yearly cycle and the next submission is due in 2016. Within this next submission more information will be mandatory as part of the Appendix 1, historic flooding spreadsheet. This emphasises the need for a comprehensive recording system for future flooding to ensure that future PFRA cycles comply with the European Floods Directive.

The format of the data will be in a centralised spreadsheet and would include fields such as detail of the flood, the properties affected – including whether they are commercial, residential or other critical infrastructure; the source, extent and depth of the flooding. It would also include other details of the event – i.e. rainfall duration, depth and location of relevant photographs etc.

7.2 Scrutiny and Review Procedures

The scrutiny and review procedures that must be adopted when producing a PFRA are set out by the European Commission. Meeting quality standards is important in order to ensure that the appropriate sources of information have been used to understand flood risk and the most significant flood risk areas are identified.

Another important aspect of the review procedure is to ensure that the guidance is applied consistently; a consistent approach will allow all partners to understand the risk and manage it appropriately. The scrutiny and review procedure will comprise two key steps, as discussed below.

7.2.1 Local Authority Review

The first part of the review procedure is through an internal Local Authority review of the PFRA, in accordance with appropriate internal review procedures. Internal approval should be obtained to ensure the PFRA meets the required quality standards, before it is submitted to the Environment Agency. Within Durham, the PFRA will be submitted to the Scrutiny Committee before being delivered to the Environment Agency.

7.2.2 Environment Agency Review

Under the Flood Risk Regulations, the Environment Agency has been given a role in reviewing, collating and publishing all of the PFRA's once submitted. The Environment Agency will undertake a review of the PFRA and ensure that

they meet the required standard for the European Commission. They will also review Flood Risk Areas that have been amended and ensure the format of these areas meets the provided standard. If satisfied, they will recommend submission to the relevant Regional Flood Defence Committee (RFDC) for endorsement.

RFDC's will make effective use of their local expertise and ensure consistency at a regional scale. Once the RFDC has endorsed the PFRA, the relevant Environment Agency Regional Director will sign it off, before all PFRA's are collated, published and submitted to the European Commission.

The Durham PFRA submission must be made to the Environment Agency by the 22nd of June 2011. They will then submit it to the European Commission by the 22nd of December 2011 using the review procedure described above.

8 References

- Defra *WAG* (2010) Selecting and reviewing Flood Risk Areas for local sources of flooding – Guidance to Lead Local Flood Authorities. Available from <http://www.defra.gov.uk/environment/flooding/documents/research/flood-risk-method.pdf>
- Defra (2010) Surface Water Management Plan Technical Guidance
- Environment Agency (2008) River Tees Catchment Flood Management Plan
- Environment Agency (2010) Preliminary Flood Risk Assessment – Final Guidance (Report – GEHO1210BTGH-E-E) Available from <http://publications.environment-agency.gov.uk/pdf/GEHO1210BTGHe-e.pdf>
- Environment Agency (2010) Preliminary Flood Risk Assessment – Annexes to the Final Guidance (Report – GEHO1210BTHF-E-E) Available from <http://publications.environment-agency.gov.uk/pdf/GEHO1210BTHFe-e.pdf>
- Environment Agency Building Trust with Communities
- Golder Associates (2009) Durham County Council – Level 1 Strategic Flood Risk Assessment
- Golder Associates (2010) Durham County Council – Level 2 Strategic Flood Risk Assessment
- The Pitt Review (2008) Learning Lessons from the 2007 Floods
- Aecom Ltd (2011) Durham County Council – Surface Water Management Plan

9 Annexes

- **Annex 1** – Records of past floods and their significant consequences (preliminary assessment report spreadsheet)
- **Annex 2** – Records of future floods and their consequences (preliminary assessment report spreadsheet)
- **Annex 3** – Records of Flood Risk Areas and their rationale (preliminary assessment report spreadsheet)
- **Annex 4** – Review checklist